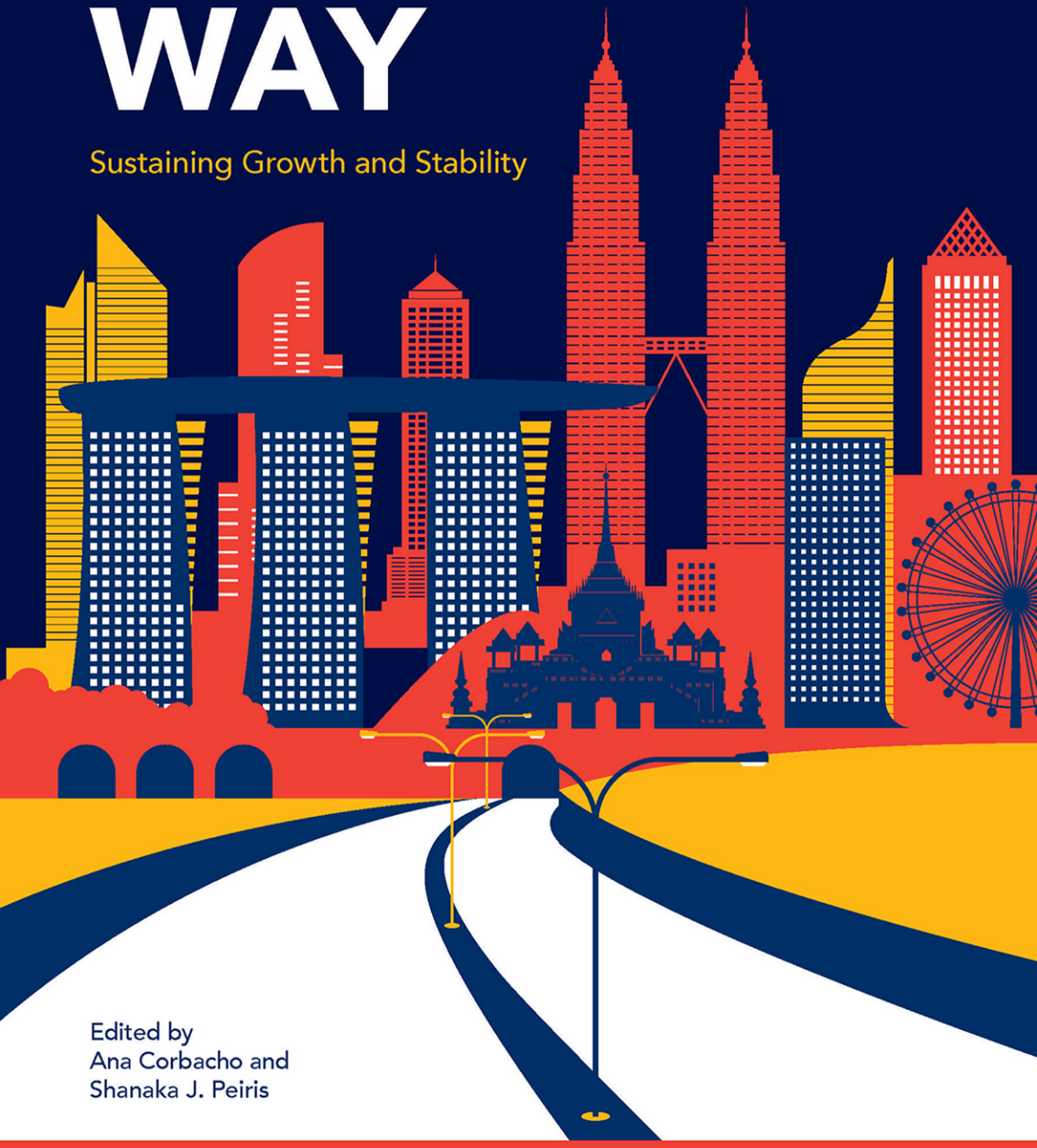
THE ASEAN WAY

Sustaining Growth and Stability



Edited by
Ana Corbacho and
Shanaka J. Peiris

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Foreword

The resilience and sustained growth over the past 20 years of the five founding members of the Association of Southeast Asian Nations (ASEAN)—Indonesia, Malaysia, the Philippines, Singapore, and Thailand—have been among the strongest across emerging markets. This book shares many lessons from the ASEAN-5 countries' policy reforms and economic resurgence after the Asian financial crisis, including the consensus-based "ASEAN Way" of collaborating and integrating trade, finance, and labor markets on the path toward an ASEAN Economic Community. Cooperative frameworks also underpin the region's financial safety net under the Chiang Mai Initiative Multilateralization.

Overall, the ASEAN-5 economies' monetary policy frameworks have performed well, delivering both output and price stability during a period of significant domestic and regional turbulence and transformation. A gradual move toward greater exchange rate flexibility, coupled with the flexible inflation-targeting frameworks put in place in Indonesia, the Philippines, and Thailand, and the somewhat different approaches of Malaysia and Singapore, helped sustain growth with low inflation. The ASEAN-5 also overhauled financial regulation and supervision and undertook financial reforms aimed at restructuring banks and nonfinancial corporations and developing local current bond markets. These policy reforms helped these countries withstand the global financial crisis and preserve financial stability.

Global financial cycles have had a pervasive impact on ASEAN-5 business cycles, transmitted partly through financial conditions and capital flows. Real economy factors, such as external demand from the United States and more recently China, have also been important, but global financial factors have tended to dominate. To lean against the wind of capital flows and preserve financial stability, regional policymakers have relied on several policy levers, including macroprudential and microprudential measures, exchange rate adjustment, and foreign exchange market intervention. These policy tools have supplemented monetary policy. The extensive use of macroprudential policies in the ASEAN-5, a frontier area in macro policymaking globally, provides lessons on their potential effectiveness. Empirical and model-based approaches show that macroprudential policies helped manage the financial cycle in ASEAN-5, allowing macro policies to focus on the business cycle and sustain growth.

Global financial spillovers will continue to test the resilience of ASEAN-5 economies. Sustaining growth and stability will demand further upgrading of policy and institutional frameworks, exploiting macroeconomic policy synergies, and enhancing resilience through regional financial integration. Against the backdrop of elevated global uncertainty, the policy challenges that will face the ASEAN-5 may vary more than those they faced during recent decades, given different starting conditions. Whereas some economies must grapple with persistently weak inflation amid

high household leverage, others must carefully orchestrate an infrastructure push and manage continued global financial volatility.

The IMF remains a committed partner in the region's growth and transformation. I hope this book will inspire a broader conversation on how the ASEAN way of collaboration and integration in the areas of trade, finance, and labor markets can guide the path forward not just for Southeast Asia, but also for other emerging market and developing economies.

Christine Lagarde
Managing Director
International Monetary Fund

Acknowledgments

This publication benefited from valuable guidance from Changyong Rhee and Odd Per Brekk, Director and Deputy Director in the IMF's Asia and Pacific Department. It also benefited from insights from panelists and participants at numerous seminars and events, including at ASEAN-5 central banks, the ASEAN+3 Macroeconomic Research Office (AMRO)–IMF annual conferences, the South East Asian Central Banks (SEACEN) deputy governors' conference, and at the IMF.

We express our strong appreciation for support from Hoe Ee Khor (AMRO), who guided our early work; IMF Executive Director Juda Agung; and coauthors and contributors Mia Frances R. Agcaoili, Julian T. S. Chow, Geraldine Dany-Knedlik, Ding Ding, Ichiro Fukunaga, Juan Angel Garcia, David Grigorian, Jaime Guajardo, Minsuk Kim, Rui C. Mano, Dirk Muir, Pablo Lopez Murphy, Aubrey Poon, Khristine L. Racoma, Sohrab Rafiq, Sherillyn R. Raga, Umang Rawat, Manrique Sáenz, Yiqun Wu, and Xiaohui Wu.

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We are very grateful to Francis Joseph Landicho and To-Nhu Dao, from the Asia and Pacific Department, for their excellent job coordinating the production of the manuscript.

Ana Corbacho and Shanaka J. Peiris
Editors

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CHAPTER 1

Overview

A bumpy normalization of monetary policies in advanced economies, capital flow volatility, global policy missteps: these are just a few of the possible risks shaping the global outlook in the years ahead. They represent important challenges for emerging market and developing economies across the globe.

The Association of Southeast Asian Nations–5 (ASEAN-5: the five founding members, comprising Indonesia, Malaysia, the Philippines, Singapore, and Thailand) stand strong in the face of these challenges. The dramatic transformation of their policy frameworks since the Asian financial crisis delivered macro-financial stability during significant domestic and regional transformation as well as global macroeconomic and financial turmoil. Over the past few decades, the ASEAN-5 have strengthened resilience, built up buffers, and adapted their policies to respond to global spillovers.

However, global risks will continue to test ASEAN-5 economies. Against this backdrop, this book proposes a policy agenda to sustain growth and stability in the coming decades. Part I offers a retrospective of the evolution of monetary policy and financial stability frameworks in the ASEAN-5, with special focus on changes since the Asian financial crisis and the more recent period of unconventional monetary policies in advanced economies. Part II looks into the channels of transmission of global spillovers and the monetary, exchange rate, and ASEAN-5 macroprudential policy responses. Part III concludes with forthcoming challenges and maps out ways to further upgrade policy frameworks, exploit synergies, and enhance resilience.

The successful experience of the ASEAN-5 provides valuable lessons for other emerging market and developing economies. The authors' rigorous and novel analysis leaves no stone unturned as they gather evidence of what has worked and what could work better to meet the challenges ahead.

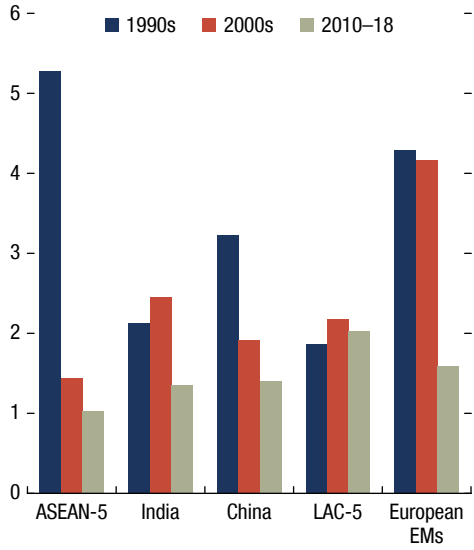
The analysis put forth in the book supports three broad conclusions:

1. The ambitious reforms of monetary policy and financial stability frameworks since the Asian financial crisis paid off.

Since the Asian financial crisis, the ASEAN-5 countries have adjusted their policy frameworks to address financial booms and busts more systematically, embarking on an ambitious and broad-ranging program of economic and financial sector reforms.

This chapter was prepared by Ana Corbacho and Shanaka J. Peiris.

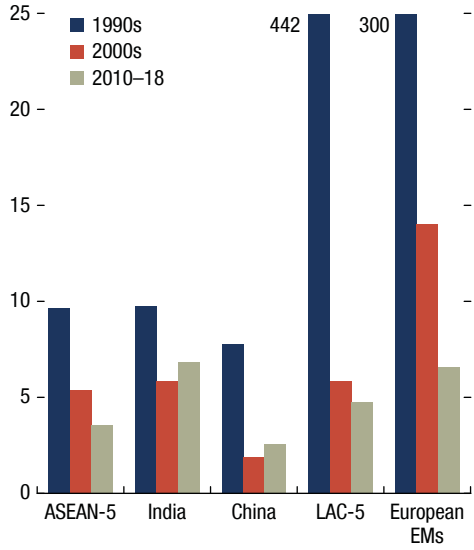
Figure 1.1. GDP Growth: ASEAN-5 and Peers
(Standard deviation of year-over-year growth)



Sources: IMF, World Economic Outlook database; and IMF staff calculations.
Note: ASEAN-5 = Indonesia, Malaysia, Philippines, Singapore, Thailand; LAC-5 = Brazil, Chile, Colombia, Mexico, Peru; European EMs = Bulgaria, Hungary, Poland, Romania, Russia, Turkey, Ukraine.

With respect to monetary policy frameworks, a flexible inflation-targeting framework in Indonesia, the Philippines, and Thailand, alongside slightly different frameworks in Malaysia and Singapore, have served the ASEAN-5 economies well in terms of low inflation and output volatility (Figures 1.1 and 1.2). Chapter 2, by Hoe Ee Khor and others, examines the evolution of monetary policy regimes since the Asian crisis, showing how ASEAN-5 countries accommodated the constraints imposed by the "impossible trinity" of a fixed exchange rate, an open capital market, and independent monetary policy. The clarification of price stability objectives, including the adoption of explicit inflation targets in some countries, and the strengthening of central bank operations and transparency, have been major milestones in the evolution of monetary policy frameworks. The transition to more consistent forward-looking frameworks allowed ASEAN-5 economies to withstand the global financial crisis well, as well as the commodity price cycle and the recent low-inflation environment. Moreover, the ASEAN-5 gradually moved toward flexible exchange rate regimes, which strengthened monetary independence and facilitated adjustment to external shocks. Finally, active and independent liquidity management to align market conditions with the

Figure 1.2. Inflation: ASEAN-5 and Peers
(Year-over-year percent change, average)



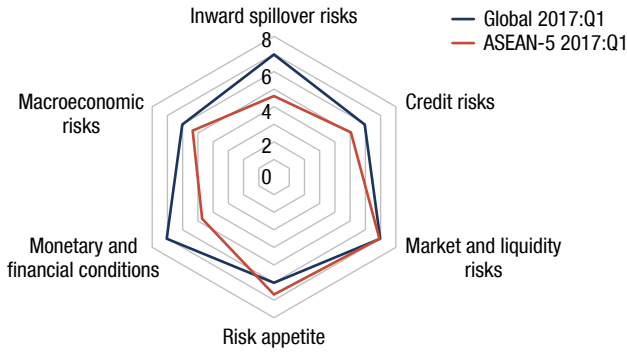
Sources: IMF, World Economic Outlook database; and IMF staff calculations.
Note: LAC-5 = Brazil, Chile, Colombia, Mexico, Peru; European EMs = Bulgaria, Hungary, Poland, Romania, Russia, Turkey, Ukraine.

announced policy stance and improved central bank communications were key ingredients to their success.

Major reforms of micro- and macroprudential policy frameworks allowed ASEAN-5 financial systems to build significant resilience. Chapter 3, by Pablo Lopez Murphy, takes stock of these major initiatives. ASEAN-5 countries overhauled financial regulation and supervision; bank supervisors embraced Basel core principles, strengthened supervisory policies, required banks to hold more capital, and aligned regulations with best practice. The ASEAN-5 also worked to restructure nonfinancial corporations, including by establishing centralized asset-management companies and relying on out-of-court debt workouts as a speedy, cost-effective, and market-friendly alternative to court-supervised workouts. To cap it off, ASEAN-5 countries developed bond markets in local currencies to reduce foreign exchange mismatches, lower credit and maturity risks in banks, and store away a spare tire should the banking system be impaired.

All these efforts helped ASEAN-5 countries navigate the global financial crisis well and preserve financial stability. Following the global crisis, ASEAN-5 financial systems were in much better shape than those of many advanced economies

Figure 1.3. ASEAN-5 Financial Stability Map 2017 versus Global, 2017[1]



Source: IMF staff estimates.
[1]Lower values indicate lower risks.

because ASEAN policymakers routinely responded to emerging systemic risks. Nowadays, ASEAN-5 financial systems differ in size, access, efficiency, and financial supervision structure, partly reflecting varying stages of economic development. But they also have important similarities, including the increasing importance of shadow banks and financial markets, the large presence of financial conglomerates, and the high participation of the government. A bird's-eye view suggests that macro-financial risks are contained and generally lower in ASEAN-5 countries than in the global financial system (Figure 1.3), a testament to the benefits of decades of strong reform efforts.

2. Global spillovers will continue to test policy frameworks in ASEAN-5 countries.

In the wake of the global financial crisis, ASEAN-5 policymakers were compelled to adapt their frameworks to strengthen policy autonomy and mitigate risks from global spillovers. Chapter 4, by Shanaka J. Peiris and others, considers the channels through which global financial factors have impacted domestic financial markets and monetary conditions in the ASEAN-5. Principal component analysis of domestic financial conditions identifies two key macro-financial channels of transmission of global financial shocks: one is related to the Chicago Board Options Volatility Index (VIX) and affects largely capital flows and asset prices; the other is linked to US interest rates and affects mainly monetary and credit conditions. The chapter also assesses empirically the transmission of reserve currency monetary policy to domestic short- and long-term market interest rates, as well as to retail bank rates, given their importance in domestic monetary policy transmission (Figure 1.4). Macro-financial spillovers to the real economy are also investigated through Bayesian vector autoregression models. Results suggest that global financial cycles emanate from changes in US monetary policy and that

Figure 1.4. Global Bond Yields
Change since January 2010 (basis points)

Sources: Bloomberg L.P.; and Haver Analytics.
Note: AEs = advanced economies; EMs = emerging markets; LCY = local currency.

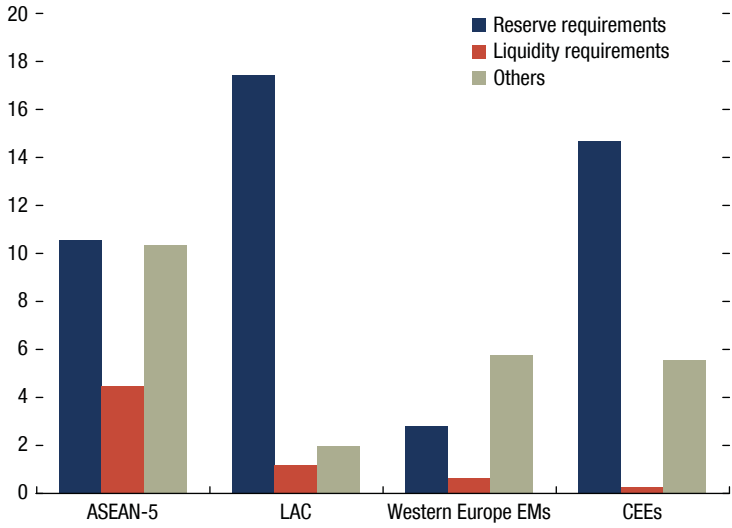
global risk aversion drives domestic financial and macroeconomic conditions in the ASEAN-5.

Looking ahead, several global scenarios could shape the outlook and spillover to emerging markets against the backdrop of elevated uncertainty. Illustrative model-based simulations show that faster-than-anticipated monetary policy normalization in the United States or an abrupt growth slowdown in China would hit the ASEAN-5 economies hard through weaker external demand and higher financing costs, warranting a policy response.

Chapter 5, by Hoe Ee Khor and others, explores how monetary and exchange rate policies responded to spillovers during and after the global financial crisis. The chapter presents results from country-specific Taylor rule reaction functions, which show that central banks responded predominantly to domestic inflation developments, although external considerations also played a role. Policy rates are found to be susceptible to global monetary shocks, controlling for the interdependence of economic cycles, while the degree of monetary policy autonomy varies across the ASEAN-5, with monetary transmission influenced by global financial and commodity price shocks.

The move to more flexible exchange rate regimes in the region was instrumental in facilitating adjustment to external shocks and discouraging a buildup of short-term foreign exchange debt. This was a big departure from the pre–Asian financial crisis period, and allowed the exchange rate to act as an effective shock absorber during the global financial crisis. Alongside this policy shift, international reserves in these economies also rose significantly, strengthening external positions and allowing the use of reserve buffers to avoid disorderly market

Figure 1.5. Use of Macroprudential Policies
(Number of policy changes, 1990–latest)



Sources: Bank for International Settlements database; and IMF staff calculations.
Note: CEEs = central and eastern European economies; EMs = emerging markets; LAC = Latin America and Caribbean.

conditions. Calibrated model simulations also suggest that foreign exchange market intervention, in some circumstances, could help reduce business cycle fluctuations in response to capital flow shocks. A key aspect of the policy responses to the global financial crisis and other capital outflow episodes was the timely use of different policy levers, taking into account macro-financial linkages.

The ASEAN-5 economies have been well ahead of other regions in realizing the value of macroprudential policies for financial stability. Chapter 6, by Sohrab Rafiq, documents the increasing use of macroprudential policies in the ASEAN-5 and analyzes the effectiveness of such policies in maintaining financial stability. The past 30 years witnessed a shift in the types of macroprudential tools used by ASEAN-5 countries, with greater focus on the real estate sector and credit-specific domestic prudential tools (Figure 1.5). This responded to the need to address financial stability risks marked by rising household debt and asset price cycles.

The use and effectiveness of macroprudential policies is a frontier area in macroeconomic policymaking globally and one in which we are still very much in learning mode. Event studies and panel data estimations for the ASEAN-5 show that macroprudential tools have been effective in containing systemic vulnerabilities and procyclical dynamics between asset prices and credit over the past two decades. In particular, the use of loan-to-value ratios and real-estate-related taxes have effectively mitigated property price appreciation and housing sector credit

growth. Macroprudential policies have also complemented monetary policy and enhanced the monetary policy transmission mechanism via the bank lending channel. Moreover, the increased use of macroprudential tools has mirrored shifts in the management of bank capital across the region, coincided with lower risk taking and less reliance on noncore funding by banks, and led to more prudent bank balance sheet management. The ASEAN-5's successful experience with macroprudential policies thus holds lessons for other advanced and emerging market economies.

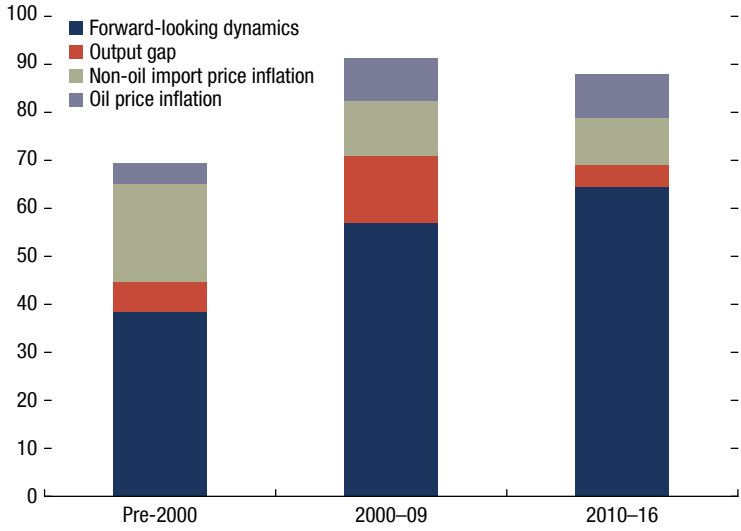
The more active use of macroprudential policies is a sign that ASEAN-5 policymakers have long recognized that financial imbalances can build up even during periods of economic tranquility and benign inflation pressure. Evidence for the ASEAN-5 implies that financial stability will not necessarily emerge as a natural by-product of a so-called appropriate monetary policy stance. The findings in the chapter suggest that central banks therefore have strong incentives to pursue macroprudential policies to safeguard financial stability. Still, policymakers should be mindful that macroprudential policy entails costs and trade-offs. Moreover, for macroprudential policy to be effective, its objectives need to be defined clearly and supported by a strong accountability framework. In this respect, ASEAN-5 countries continue to develop appropriate institutional underpinnings.

3. Challenges ahead call for upgrading policy and institutional frameworks, exploiting policy synergies, and reaping the benefits of regional integration.

A decade after the global financial crisis, the global macroeconomic and financial landscape is still influenced by some of its legacies. ASEAN-5 countries faced a protracted period during which most advanced economies' expansionary monetary policies were not well aligned with domestic economic conditions in emerging market economies. The global outlook is for gradual normalization of monetary policy in advanced economies amid relatively low inflation pressure. However, an inflation surprise could suddenly tighten global financial conditions and spark capital flow volatility, with serious implications for emerging market and developing economies across the globe.

As discussed in Chapter 7, by Juan Angel Garcia Morales and others, monetary policy in ASEAN-5 countries must continue to adapt to the new normal of uncertain and volatile global conditions. The chapter first analyzes the evolution of inflation dynamics in the region over the past two decades. The primary focus on price stability has enhanced the effectiveness of ASEAN-5 monetary policy frameworks. Since the Asian financial crisis, inflation expectations have gradually become the most important driver of inflation dynamics, confirming the forward-looking orientation of monetary policy frameworks in the region (Figure 1.6). The analysis in the chapter also suggests the impact of economic slack on inflation has declined in recent years. This flattening of the Phillips curve may have important implications for monetary policy in ASEAN-5 economies. For example, in countries particularly affected by low-oil-price shocks and facing below-target inflation, the recovery in inflation could be weaker than in the past. Moreover, the decline in natural rates of interest in some of these economies,

Figure 1.6. Contributions to Inflation in the ASEAN-5
(Average)



Source: IMF staff estimates.

mirroring developments in other countries around the globe, may constrain the scope for monetary policy to counter the next economic slowdown.

Differences in inflation performance vis-à-vis central bank targets and financial sector vulnerabilities call for different responses to the global challenges in the new normal. Potential further refinements in monetary policy frameworks may well be asymmetric across ASEAN-5 countries. Yet all ASEAN-5 economies are in a position to continue to adapt their monetary policy frameworks through enhanced communication and better monitoring of inflation expectations. In this respect, the authors present novel estimates of inflation expectations based on trend inflation that complement existing survey-based measures. Transparency about the response to a rapidly changing and uncertain outlook, as well as the adjustments in monetary policy frameworks to cope with it, will likely be essential features of effective central bank communication in the period ahead.

The ASEAN-5 weathered the global financial crisis well, but crisis legacies continue to linger, and some financial vulnerabilities have been on the rise. Chapter 8, by Pablo Lopez Murphy and others, provides an analysis of systemic risks and discusses a policy agenda for strengthening financial stability frameworks. The authors first scrutinize the fast pace of credit growth since the global financial crisis. Yet they conclude that there is no evidence of generalized credit booms in the ASEAN-5 following the global crisis, unlike during pre–Asian crisis periods. However, the rapid increase in corporate leverage and household debt in some countries calls for careful monitoring. Moreover, the high degree of

interconnectivity within the financial sector and between the financial and the real sectors, while unavoidable in a financial deepening process, could be an emerging vulnerability. Finally, new technologies could bring benefits but also risks to ASEAN-5 financial systems.

The chapter discusses the challenges and policy agenda ahead for strengthening financial stability frameworks. Because they can smooth credit cycles, macroprudential policies are a key pillar for containing the dangers of rapid credit growth. Policymakers should consider upgrading toolkits with systematic countercyclical macroprudential policies to build buffers during booms. Financial system regulation and supervision and crisis management frameworks are other key pillars for resilience. The Basel III standards should be a benchmark all countries should aspire to meet. Similarly, the Key Attributes for Effective Resolution of Financial Institutions are the relevant metric for resolution frameworks. In turn, while regulatory frameworks for cryptocurrencies are still evolving, they should balance containing risk against promoting innovation.

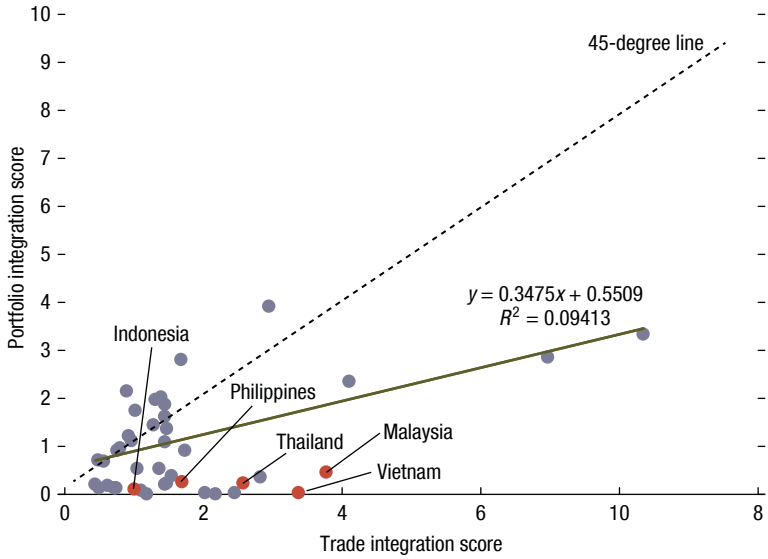
Managing boom-and-bust cycles in the presence of global spillovers remains a key policy challenge for ASEAN-5 economies. Chapter 9, by Manrique Saenz and others, documents that recessions that follow a bust have entailed both temporary and permanent output losses in the region. Moreover, growth downturns are magnified in the presence of financial vulnerabilities, such as excessive household and corporate debt. Countercyclical monetary policy can play a key role in managing boom-and-bust cycles but, on its own, its effectiveness can be limited. The chapter hence proposes exploiting synergies between monetary, macroprudential, and fiscal policies to manage fluctuations along the real and financial cycles and sustain growth.

Macroprudential policies can play an important role in complementing monetary policy. Model simulations show that countercyclical macroprudential tools targeted at financial imbalances, coupled with monetary policy focused on inflation and growth, can enhance macroeconomic and financial stability and deliver better macroeconomic results than a strategy that uses monetary policy as the only tool. This result is robust to a relative flattening in the Phillips curve. Countercyclical macroprudential tools are also shown to reduce systemic risks with minimal costs to real economic activity in response to a wide array of shocks.

Fiscal policy can also complement monetary policy in smoothing out the cycle while supporting medium- and long-term growth. Policy scenarios show the payoff to infrastructure investment under different monetary policy reaction functions. In particular, for countries facing persistently low inflation, an infrastructure push, coupled with monetary accommodation, can lead to significant increases in real GDP. The additional growth also allows them to protect their fiscal space, even if the investment scale-up is financed with debt. For countries with more limited fiscal space and high inflation, a focus on high-efficiency investment is likely the best option for achieving a higher multiplier.

Deepening regional financial integration could support financial resilience, stability, and development. Chapter 10, by Yiqun Wu and others, delves into the benefits and challenges posed by the ASEAN Economic Community's move

Figure 1.7. Trade and Portfolio Integration, 2001–15[1]



Source: IMF staff calculations.
[1]Trade intensity score is calculated as a country's share in global trade as a proportion of its GDP share. Portfolio investment intensity score is calculated as a country's share of the global financial portfolio as a proportion of its GDP share.

toward financial liberalization and freer capital flows by 2025. The chapter shows that regional financial integration has lagged not only regional trade integration, but also financial integration with countries outside the region (Figure 1.7). Based on evidence from panel data estimations, the chapter proposes that improving regulatory and institutional quality and reducing capital flow restrictions are promising avenues to promote regional financial integration. The chapter also provides empirical support for significant benefits from regional financial integration, ranging from enhanced resilience to global shocks to economic rebalancing and higher growth.

When advancing regional financial integration, it is crucial to harness the gains while minimizing the risks. Close attention must be paid to financial stability and safety nets. The opening up of financial markets requires, in the first place, strengthening domestic financial systems and improving macroeconomic fundamentals. At the regional level, cooperation must proceed to enhance information sharing, surveillance, and crisis management and to build an effective cross-country safety net. In recent years the regional safety net has been substantially enhanced. A multilateral currency swap arrangement among the ASEAN Plus Three countries (Chiang Mai Initiative Multilateralization, or CMIM) was established in March 2010, and a crisis prevention facility (the CMIM Precautionary Line) has been introduced. An independent regional

macroeconomic surveillance unit—the ASEAN+3 Macroeconomic Research Office—has been in operation since 2011 and was converted to an international organization in 2016. The office seeks to strengthen cooperative relationships with international financial institutions and inked a memorandum of understanding with the IMF in 2017 to enhance cooperation to respond more effectively to the needs of their common membership.

Given these preconditions and requirements, a gradual approach to regional financial integration is likely the right way forward. Appropriately sequenced liberalization and upgraded regulatory and policy frameworks to handle higher cross-border interconnectivity could help contain systemic risks while ASEAN-5 countries reap the benefits of regional financial integration.

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PART I

From the Asian Financial Crisis to the Present

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CHAPTER 2

Evolution of Monetary Policy Frameworks

INTRODUCTION

The experience of the economies of the Association of Southeast Asian Nations–5 (ASEAN-5) during the Asian financial crisis prompted central banks to rethink monetary policy frameworks and exchange rate regimes. Before the crisis, ASEAN-5 economies were characterized by tightly managed exchange rates and relatively open capital accounts, providing limited scope for central banks to set domestic interest rates. When the crisis hit in 1997–98, severe exchange rate depreciation exposed significant vulnerabilities in the ASEAN-5, such as excessive borrowing and currency mismatches by firms and banks. Major structural reforms followed the crisis, including rethinking the monetary policy framework, evaluating the appropriateness of the exchange rate regime, and revamping financial sector regulatory frameworks.

This chapter examines the evolution of the ASEAN-5 economies' monetary policy frameworks from the onset of the Asian financial crisis to the present.[1] It first assesses monetary policy frameworks in these economies using a core set of principles of effective frameworks in countries with scope for independent monetary policy. It then describes how the transition toward a more consistent forward-looking monetary policy framework was supported by greater exchange rate flexibility. The chapter concludes by highlighting the ASEAN-5 economies' monetary policy frameworks, which have, on the whole, performed well since the crisis, delivering both price and economic stability. The flexible inflation-targeting frameworks put in place after the crisis, alongside the move to greater exchange rate flexibility, have served the ASEAN-5 economies well and offer lessons for other emerging market and developing economies.

EFFECTIVE MONETARY POLICY FRAMEWORKS AND THE ASEAN-5

A consensus has emerged on the set of principles that characterize effective policy frameworks in countries with scope for independent monetary policy (IMF 2015). The monetary policy framework encompasses the institutional setup of

This chapter was prepared by Hoe Ee Khor, Jaime Guajardo, and Shanaka J. Peiris.

[1]Chapter 3 focuses on reforms related to the financial sector.

the central bank[2] as well as the specification of its goals, instruments, strategy, operating targets and procedures, and communication. The monetary policy strategy guides the setting of the central bank's operating targets and its operating procedures and specifies how its policy instruments should be adjusted to implement those targets. Central bank communication promotes transparency and accountability, helping shape market expectations and support the public's understanding of the policy framework and policy decisions.

Since the Asian financial crisis, ASEAN-5 monetary policy frameworks have evolved to embody the key principles of effective frameworks. The central banks gained operational independence to pursue their price-stability mandates. Several legal amendments explicitly give the ASEAN-5 central banks operational independence from fiscal dominance. In recognition of the importance of regulating the monetary and banking environment free from political considerations, the Bangko Sentral ng Pilipinas (BSP) and Bank Indonesia (BI) gained operational autonomy in monetary policy formulation in 1993 and 1999, respectively. Central bank acts were revised for Bank Negara Malaysia (BNM) in 2009 and the Bank of Thailand (BOT) in 2008 to enhance and formalize the central banks' operational independence. Meanwhile, since its establishment in 1971 and particularly since the revision of the Monetary Authority of Singapore (MAS) Act in 1999, the MAS has enjoyed de jure independence in setting policies to implement its goals and objectives. With de jure operational autonomy, the primary objective of monetary policy is price stability, although—as in other emerging market economies—many central banks must also consider output, employment, and external conditions.[3]

Operational autonomy helped establish clear governance structures that empowered independent policy decision-making processes. Although central bank board members and governors are generally appointed by heads of state or government, their legally mandated functions and duties clearly indicate that direct operational administration, as well as final decisions on monetary policy, fall within the powers of the central bank authorities (Table 2.1). To help the central banks' highest policymaking bodies evaluate the appropriate monetary policy stance, separate high-level committees and advisory groups—focusing on monetary policy assessment and implementation—were also put in place as an integral part of the overall institutional setting.

The ASEAN-5 economies have adopted forward-looking monetary policy frameworks aimed at achieving price stability. The frameworks recognize that a single policy instrument cannot be expected to deliver on multiple objectives (for example, growth, financial and external stability) and that monetary policy must be complemented by other policy instruments in order to meet the other objectives. With the aim of providing effective nominal anchors, Indonesia, the Philippines, and Thailand adopted flexible inflation-targeting frameworks to

[2]The institutional setup includes the central bank's statutory mandate, governance structure, and decision-making processes.

[3]External stability is also an explicit objective in Indonesia as observed in a few other emerging market economies (see Ostry and others 2012).

TABLE 2.1.

ASEAN-5 Central Banks' Governance Structure

	Indonesia	Malaysia	Philippines	Singapore	Thailand
Board Members					
Number of Members	At least 6, at most 9	At least 9, at most 12	7	At least 5, at most 14	12
Years of Term	5	Governor: 5; others: 3	Governor and 4 members: 6; 2 members: 3	3	Governor: 5; others: 3
Appointed by	President	Minister; others: Yang di-Pertuan Agong (elected monarch)	President	President	King and Cabinet of Ministers
Chairman	Governor	Governor	Governor	Appointee of the president	Appointee of the king
Decision-Making and Voting Process	Consensus	Simple majority vote in a quorum	Concurrence of at least 4 members	Majority vote in a quorum	Majority vote in a quorum
Minimum Number of Statutory Meetings	Once a week	Once a month	Once a week	Once every 3 months	Once a month
Governor					
Years of Term	5	5	6	Up to 5	5
Appointed by	President	Yang di-Pertuan Agong	President	President	King
High-Level Committee or Meeting on Monetary Policy	Board's once-a-week meeting	Monetary Policy Committee	Advisory Committee	Monetary and Investment Policy Meeting	Monetary Policy Board

Sources: Central bank laws; and official websites.
Note: ASEAN-5 = Indonesia, Malaysia, Philippines, Singapore, Thailand.

replace their previous monetary targeting approaches. Thailand adopted inflation targeting in May 2000, after the central bank had made an extensive appraisal of the Thai economy and external developments at the conclusion of the IMF-supported program.[4] The Philippines began to modify its monetary aggregate targeting approach in 1995 to put more emphasis on price stability and to address the variable time lags in the effects of monetary policy on the real economy. The BSP announced inflation targets in January 2000 and formally adopted the inflation-targeting framework in January 2002. Indonesia abandoned its crawling band exchange rate system in 1997 in the wake of the Asian financial crisis, and the central bank moved toward a new nominal anchor to achieve macroeconomic stability. The BI initially adopted monetary base targeting under the IMF program, but it began announcing inflation targets in early 2000, until July 2005, when it adopted a flexible inflation-targeting framework.

[4]The BOT found that the relationship between money supply and output growth had become less stable over time, particularly since the Asian financial crisis, and concluded that targeting the money supply would be less effective than directly targeting inflation.

Malaysia and Singapore followed different approaches, ultimately targeting price stability as the primary objective. The BNM adopted a fixed exchange rate regime in the aftermath of the Asian financial crisis, but in 2005 it moved to a flexible exchange rate regime. The BNM's monetary policy framework focuses on price stability and the sustainability of economic growth, as well as considering the impact of monetary policy on financial stability. Although the BNM does not have an inflation target, it communicates its inflation forecast along with drivers of and risks to the inflation outlook, which are factored into the decision on monetary policy. Meanwhile, Singapore has developed a unique, implicit exchange rate–based inflation-targeting regime centered on the small and open nature of its economy (Box 2.1 and Khor and others 2007).

The ASEAN-5 central banks have set medium-term objectives and intermediate targets that serve as the foundation for their monetary policy actions. Medium-term inflation targets[5] in Indonesia, the Philippines, and Thailand are debated and set by selected government agencies.[6] Upon the recommendation of the central banks, the Indonesian and Philippine governments announce their three- and two-year-ahead headline inflation targets, respectively (Figure 2.1). Thailand used quarterly average core inflation as the target in 2000–08, but shifted to a one-year-ahead core inflation forecast in 2009–14. In 2015, Thailand adopted a new inflation target using annual average headline inflation, with a corresponding tolerance band.

Malaysia and Singapore also announce year-ahead inflation forecasts as part of their macroeconomic outlook assessments. However, the BNM and the MAS have developed different intermediate targets to assist them in achieving their forward-looking policy objectives.[7] Singapore uses the nominal effective exchange rate (NEER) as an intermediate target, while the BNM uses the short-term interest rate as its policy instrument. In general, the view is that the medium-term objective needs to be both achievable and, over time, achieved, in order to be credible (IMF 2015a). However, when intermediate targets did not fall within the target range, ASEAN-5 central banks have explained to the public the reasons for missing the target, the rationale for the monetary policy decisions undertaken, and the policy approach going forward.

[5]The numerical medium-term inflation objective is distinct from the near-term inflation forecast. The inflation objective is modified rarely, and changes to it are not based on short-term political pressures or conjunctural circumstances, but rather as part of a systematic and transparent review of the entire monetary policy framework (IMF 2015a).

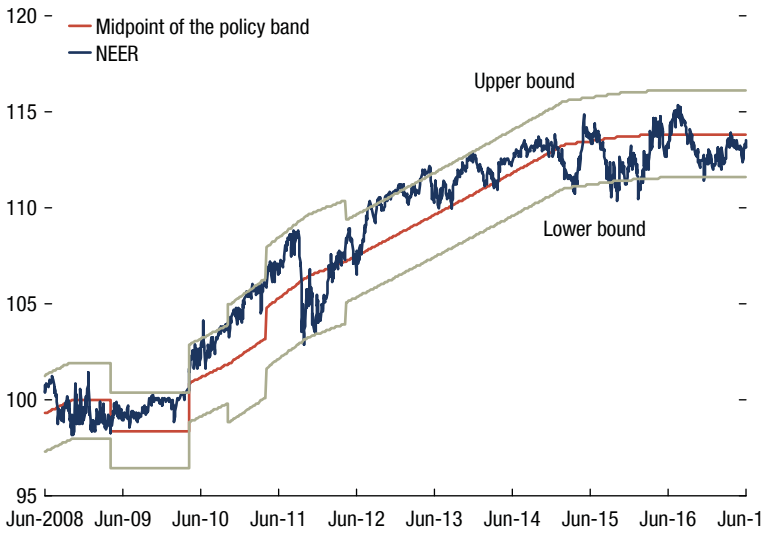
[6]The medium-term inflation objective is determined by the national government in Indonesia; by the Development Budget Coordinating Committee composed of government economic agencies in the Philippines; and by the BOT's Monetary Policy Committee and minister of finance, for the minister's endorsement for cabinet approval.

[7]The intermediate target refers to a variable correlated with the ultimate objective that monetary policy can affect more directly and that the central bank treats as if it were the target for monetary policy, or as a proxy for the ultimate policy objective (Laurens and others 2015). Intermediate targets are tools central banks use to help achieve policy objectives, but they are not policy objectives in themselves (IMF 2015a).

Box 2.1. Monetary Policy in Singapore

Singapore's monetary policy has been centered on the management of the exchange rate since the early 1980s, with the primary objective of promoting medium-term price stability as a sound basis for sustainable economic growth. This monetary policy regime choice is shaped by the small and open nature of the economy. The Singapore dollar is managed against a basket of currencies of Singapore's major trading partners. The Monetary Authority of Singapore operates a managed float regime for the Singapore dollar, and the trade-weighted exchange rate is allowed to fluctuate within a policy band. The exchange rate policy band is periodically reviewed to ensure that it remains consistent with the underlying fundamentals of the economy; the general direction has been gradual appreciation, which has been effective in keeping inflation rates below those of its major trading partners (Figure 2.1.1). Within this framework, the level, slope, and width of the nominal effective exchange rate (NEER) band can be adjusted to change the monetary policy stance. The exchange rate band facilitates short-term nominal exchange rate flexibility, while the slope and the width of the corridor anchor medium-term NEER expectations, which in turn anchor inflation expectations. The exact location and parameters of the band and the weights of the currencies in the NEER basket are not made public.

Figure 2.1.1. Nominal Effective Exchange Rate and Policy Band
(January 1, 2010 = 100)



Sources: IMF, Information Notice System; and IMF staff estimates.
Note: Midpoint, lower, and upper bounds of the policy band are IMF staff estimates.
NEER = nominal effective exchange rate.

Figure 2.1. ASEAN-5 Actual and Targeted or Forecast Inflation[1,2]

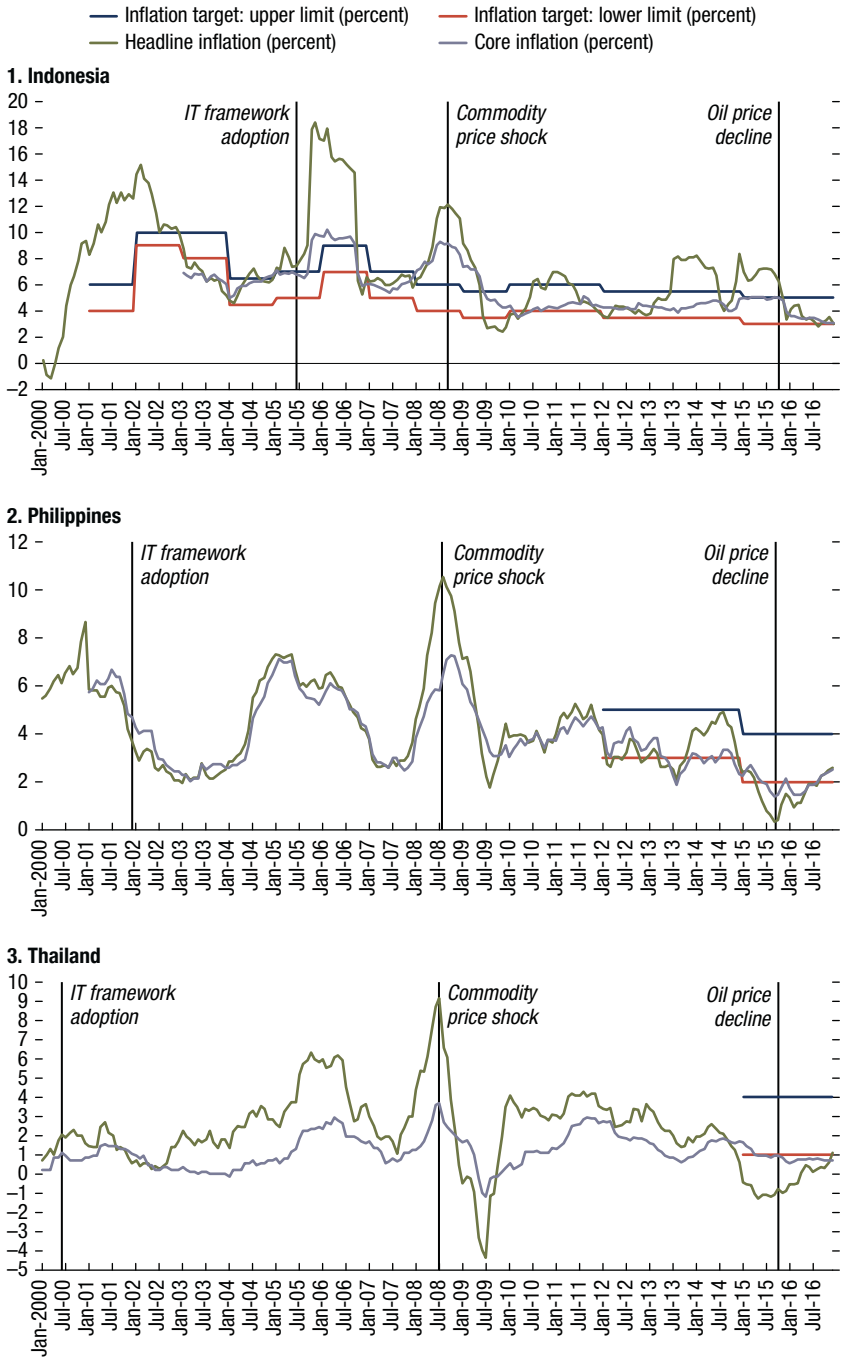
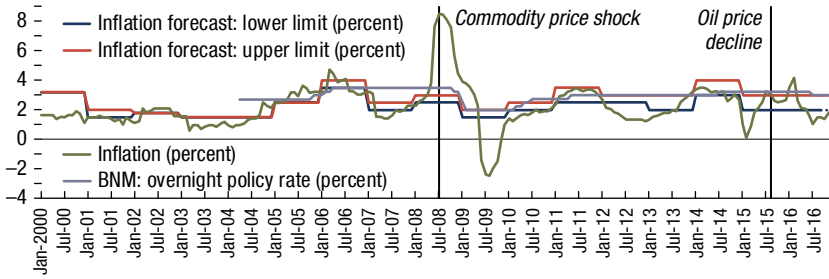
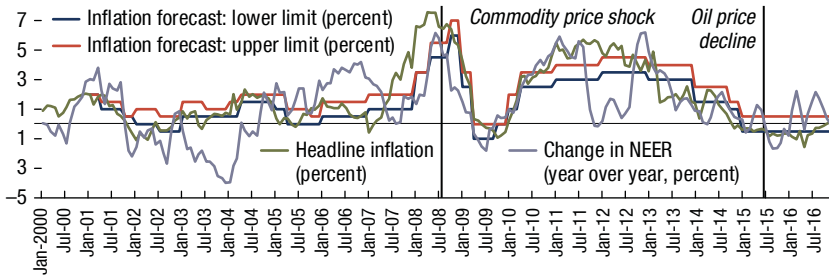


Figure 2.1 *(continued)*

4. Malaysia



5. Singapore



6. Selected Countries: Actual Inflation[3,4] (Percent)

	Indonesia	Philippines	Thailand	Korea	Australia	New Zealand
2000			0.83	1.87	4.48	3.01
2001			1.18	3.62	4.38	2.51
2002		3.01	0.25	2.97	3.00	2.66
2003		3.47	0.03	3.06	2.77	1.12
2004		5.96	0.63	2.93	2.34	2.29
2005	17.12	7.71	2.37	2.35	2.67	3.04
2006	6.60	6.27	1.70	1.80	3.54	3.37
2007	5.78	2.78	1.22	2.53	2.33	2.38
2008	11.06	9.28	2.04	4.67	4.35	3.96
2009	2.77	3.32	0.10	2.76	1.82	2.12
2010	6.96	4.11	1.17	2.96	2.85	2.30
2011	3.78	4.75	2.82	4.00	3.30	4.43
2012	3.65	3.17	1.82	2.19	1.76	0.88
2013	8.08	2.93	1.66	1.31	2.45	1.30
2014	8.36	4.18	0.64	1.27	2.49	0.91
2015	3.35	1.41	0.89	0.71	1.51	0.33

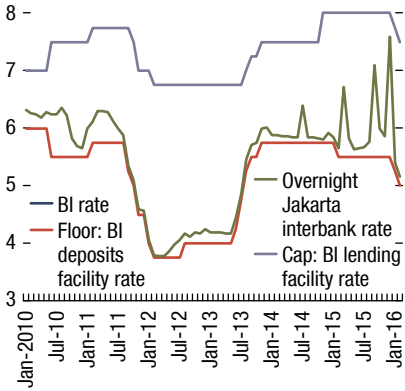
Sources: Central bank reports; and Haver Analytics.
Note: ASEAN-5 = Indonesia, Malaysia, Philippines, Singapore, Thailand; BNM = Bank Negara Malaysia; IT = inflation targeting; NEER = nominal effective exchange rate.
[1]Core inflation data in panels 1 through 6 exclude prices of food and fuel or energy prices in each of the ASEAN-5 countries, except in Singapore. Monetary Authority of Singapore core inflation excludes accommodation and private road transport.
[2]Thailand used quarterly average core inflation as the policy target in 2000–14 and has used average annual headline inflation since 2015.
[3]Actual inflation exceeded the upper limit of the inflation target if in red; fell below the lower limit of inflation if in pink; and was within the inflation target range if in green.
[4]Table figures represent actual headline or core inflation, depending on the country's policy target. Figures for Thailand refer to fourth-quarter average core inflation in 2000–14 and annual average headline inflation in 2015. For the Republic of Korea, annual average core inflation refers to 2000–06, and annual headline inflation refers to 2007 onward. In Indonesia, figures refer to end-year-month (December) year-over-year change in consumer price inflation. The rest of the countries use annual average inflation as the policy target.

The ASEAN-5 inflation-targeting central banks have developed forecasting and policy analysis systems to further enhance forecasting performance and communicate their use to anchor expectations. In Indonesia, the central bank's forecasting and policy analysis system involves several models, such as the Aggregate Rational Inflation-Targeting Model for Bank Indonesia, which is a stripped-down dynamic stochastic general equilibrium (DSGE)–type four-equation forecasting policy analysis system. It is the central bank's core forecasting model. This model is complemented by several small-scale and medium-term macroeconomic structural models (Warjiyo 2014). The BSP's workhorse inflation forecasting models include the Multiple Equation Model, Single Equation Model, and quarterly Medium-Term Macroeconometric Model (BSP 2014). The BSP also developed a semistructural forecasting and policy analysis system model in 2012 that can benefit from IMF Global Projection Model simulations for the external block. The BOT uses the Bank of Thailand Macroeconometric Model, which consists of 25 behavioral equations and 44 identities, and covers the real, monetary, external, and public sectors. Other BOT forecasting models include a DSGE model, vector autoregression models, and corporate and household models, couched within a macroeconomic modeling framework similar to its macroeconometric model. The MAS flagship model is the Monetary Model of Singapore (MMS), which is a macroeconomic computable general equilibrium model essentially derived from microeconomic optimization principles. It is used to analyze policy effects dynamically at both the economy and industry levels. The MMS is supported by the Satellite Model of Singapore, which is essentially a DSGE model.

The ASEAN-5 central banks have refined their operational frameworks to align market conditions with the announced policy stance and operate an interest rate corridor system (Figure 2.2), except for Singapore (see Box 2.1). The policy target rates are positioned in the middle of the corridor formed by the standing deposit and lending facilities. In general, the standing facility rates have been adjusted in tandem with the policy rate. By announcing changes to the policy rates, central banks signal their monetary policy stances to guide market interest rate movements that eventually act as benchmarks for lending and deposit rates. An effectively implemented monetary operations framework that supports the money markets allows banks to predictably place surplus liquidity with, and obtain short-term funding from, each other or the central bank at rates related to the policy rates (IMF 2015). For ASEAN-5 economies, central bank operations have been able to align market rates with the announced interest rate corridor over time. In the Philippines, short-term money market rates were for some years much lower than the de facto policy rate corridor. To address this issue, in 2015, the BSP adopted an interest rate corridor system and introduced a term deposit auction facility to absorb liquidity and support price discovery in the money market. In addition, it initiated in-house development of its systems for liquidity forecasting and auction-based monetary operations as part of the implementation of the interest rate corridor system (BSP 2015). As a result, the overnight interest rate has gradually increased. Similarly, Indonesia's overnight interbank rate was

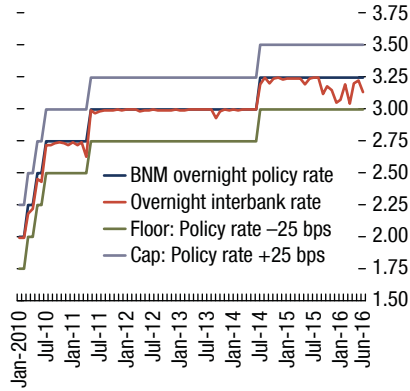
Figure 2.2. Policy and Market Interest Rates

1. Indonesia: Policy and Interbank Rates (Percent)



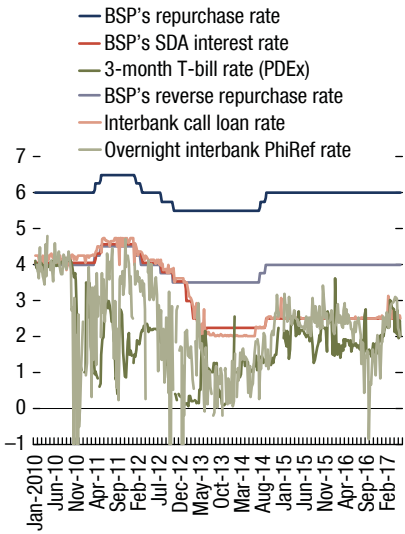
Sources: Haver Analytics; and CEIC Data Co., Ltd.
Note: BI = Bank of Indonesia.

2. Malaysia: Policy and Interbank Rates (Percent)



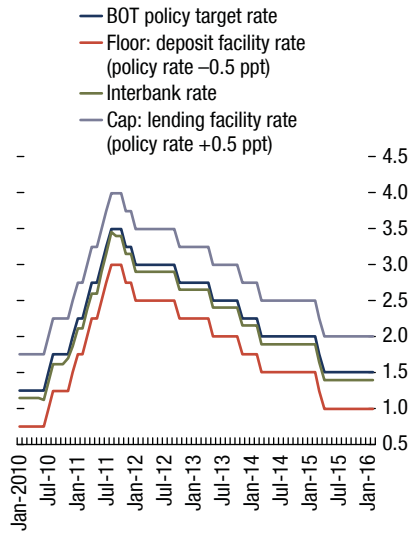
Sources: Haver Analytics; and CEIC Data Co., Ltd.
Note: BNM = Bank Negara Malaysia; bps = basis points.

3. Philippines: Policy, Interbank, and T-Bill Rates (Percent)



Sources: Bloomberg L.P.; Haver Analytics; and Philippine Dealing and Exchange Corp. (PDEX).
Note: BSP = Bangko Sentral ng Pilipinas; PDEx = Philippine Dealing and Exchange Corp.; PhiRef = Philippine Inter-Bank Reference Rate; SDA = Special Deposit Account.

4. Thailand: Policy and Interbank Rates (Percent)



Sources: Haver Analytics; and CEIC Data Co., Ltd.
Note: BOT = Bank of Thailand; ppt = percentage point.

effectively at the bottom of the policy interest rate corridor for some years, reflecting the challenges the central bank faced in ramping up open market operations with limited instruments. However, this has been addressed through the 2015 reform of the policy rate and the interest rate corridor system.

A range of policy instruments allows for different responses, depending on specific market conditions, to supplement monetary policy. Various policy toolkits have enabled ASEAN-5 central banks to guide their respective operational targets through liquidity management in the money market. Standing deposit and lending facilities, conducting open market operations in foreign exchange markets, outright buying and selling of government securities, imposing bank reserve requirement ratios, and establishing various banking regulations (that is, relaxing or tightening lending and deposit conditions) are some of the policy instruments already at the disposal of central banks to absorb or inject liquidity into the market (see Annex 2.1).

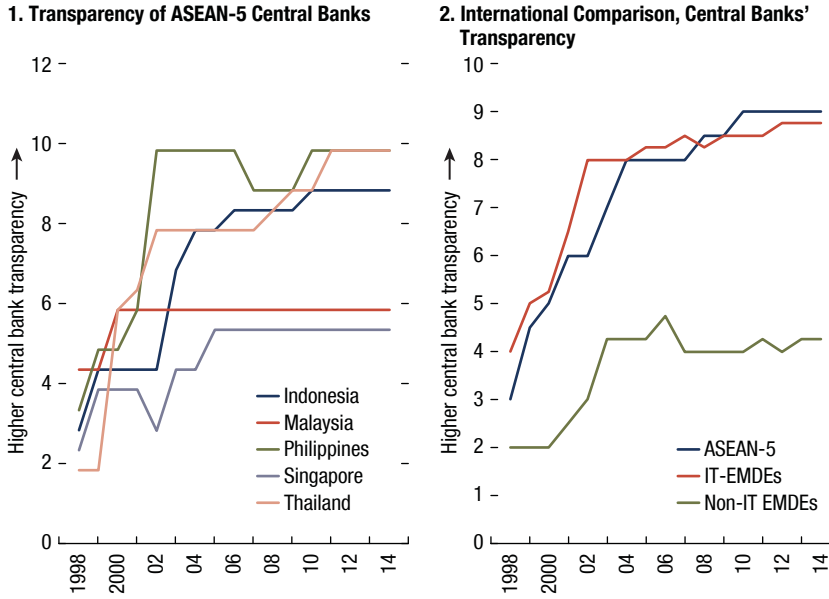
From a larger perspective, central bank policies implemented since the Asian financial crisis have molded the characteristics of the ASEAN-5 monetary policy frameworks. The exact characteristics of the frameworks differ, and refinements that central banks have made to the frameworks in response to liquidity shocks from capital flows have played an important role. However, the ASEAN-5 central banks have always highlighted the importance of clear statements of internally consistent policy goals, the institutional arrangements that give them the freedom to pursue these goals, and transparency and effective communication with respect to these goals and policy actions. Independent operational frameworks and clear communication of policy decisions to the general public and market participants through regular reports, press conferences, and dialogue enhance the central banks' accountability for fulfilling their objectives. The central bank transparency scores for the ASEAN-5 are comparable to those of other inflation-targeting emerging market economies, reflecting their strong communication and transparency practices (Figure 2.3).

TOWARD GREATER EXCHANGE RATE FLEXIBILITY

The transition to more consistent forward-looking monetary policy frameworks was supported by greater exchange rate flexibility. To present the evolution of the ASEAN-5's policy choices, monetary trilemma triangles are calibrated for each country following Aizenman, Chinn, and Ito 2013, with some adjustments (see Figure 2.4 and Annex 2.2).[8] The analysis focuses on three noncrisis periods—1990–96, 2000–07, and 2010–14—to avoid outliers. Comparing the post–global financial crisis period (2010–14) with the pre–Asian financial crisis

[8]This framework, first introduced by Mundell and Fleming in the 1960s, states that a country may simultaneously choose any two, but not all three, of the following policy goals: monetary policy autonomy, exchange rate stability, and capital account openness. In practice, however, countries rarely face the binary choices stated above. Instead, they choose intermediate levels of all three goals. The three indices are normalized to lie between 0 and 1 and to sum to 2 every year.

Figure 2.3. Degree of Central Bank Transparency



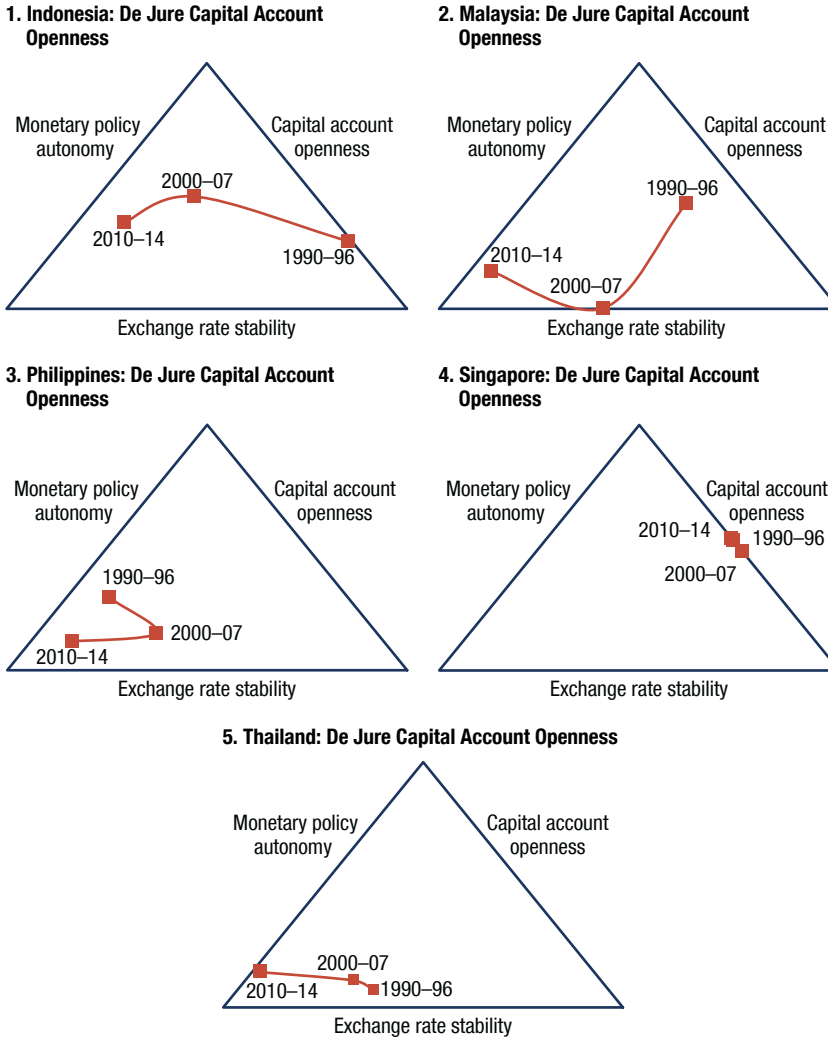
Source: Dincer and Eichengreen 2014.
Note: The de jure transparency index was developed by Dincer and Eichengreen (2014). It ranges from 0 to 15 and is the sum of scores on questions concerning political, economic, procedural, policy, and operational transparency. Median values of transparency scores were used for country groupings. EMDEs = emerging market and developing economies; IT = inflation targeting.

period (1990–96), all ASEAN-5 economies have moved toward greater monetary policy autonomy, generally by forgoing exchange rate stability (Figure 2.4). The move toward greater exchange rate flexibility took place alongside institutional and operational reforms, as in other emerging market economies (IMF 2015b).

However, the transition from the pre–Asian financial crisis to the post–global financial crisis regimes has been different across countries:

- Before the Asian financial crisis, Indonesia had a crawling peg exchange rate system and an open capital account, which limited its ability to set interest rates. After the crisis, Indonesia adopted a more flexible exchange rate regime, which allowed for greater independence in setting its interest rate. Since the global financial crisis, Indonesia has increased its exchange rate flexibility and introduced capital flow management measures, providing further autonomy for setting interest rates.
- Before the Asian financial crisis, Malaysia had a managed exchange rate and an open capital account, which provided limited scope for setting domestic interest rates. After the crisis, Malaysia fixed the exchange rate and managed the capital account to be able to gain some monetary independence. Malaysia

Figure 2.4. ASEAN-5: Trilemma Triangles



Sources: Aizenman, Chinn, and Ito 2013; and IMF staff estimates.

de-pegged its exchange rate in 2005, adopted a more flexible exchange rate regime, and liberalized its capital account, which provided it with greater autonomy for setting interest rates during and after the global financial crisis.

- Before the Asian financial crisis, the Philippines had a relatively closed capital account and a managed exchange rate regime, which allowed for a fair degree of monetary policy independence. After the crisis, the Philippines

gradually liberalized its capital account restrictions and continued to manage its exchange rate to build up foreign exchange reserves, reducing its independence in setting interest rates. In more recent years, the Philippines has adopted a more flexible exchange rate regime, which has increased its independence in setting interest rates.

- Singapore's position in the monetary policy trilemma has remained relatively unchanged. As a financial center, Singapore has a highly open capital account. It also has a unique monetary policy regime centered on the management of the exchange rate. Thus, it has limited control over the setting of interest rates, which are market determined.
- Before the Asian financial crisis, Thailand had a managed exchange rate regime and an open capital account, which provided limited scope for setting interest rates. After the crisis, Thailand adopted a more flexible exchange rate regime and managed its capital account more tightly, which provided some interest rate autonomy. In more recent years, Thailand has allowed even more exchange rate flexibility and gained more interest rate autonomy.

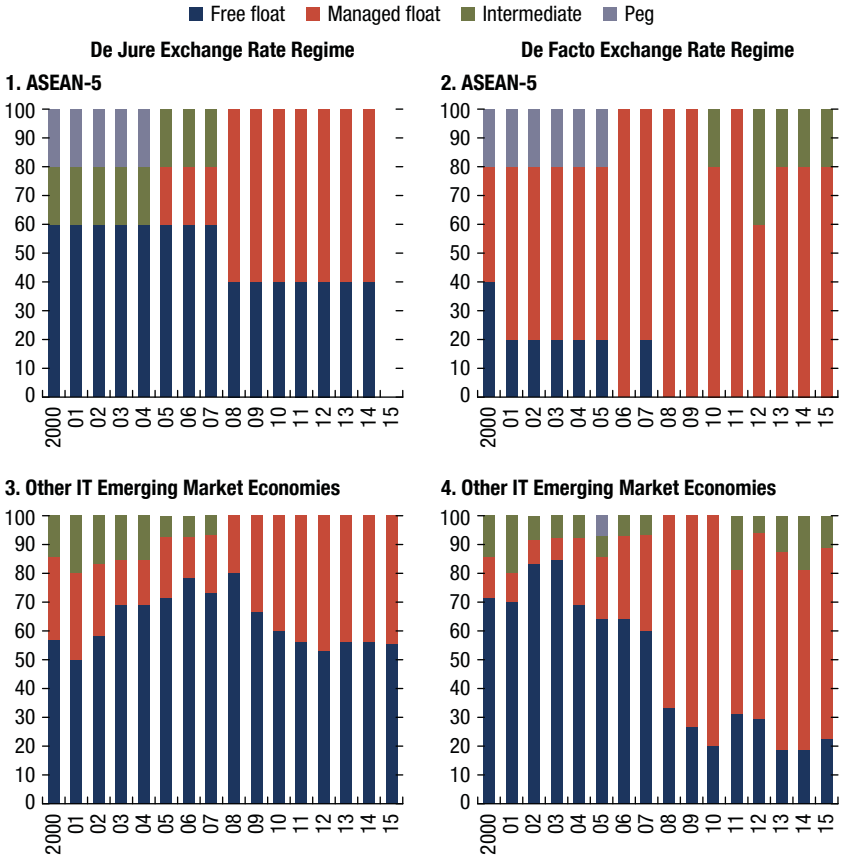
The IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER) shows a similar transition of exchange rate frameworks in the ASEAN-5 countries. Based on the AREAER classification, the ASEAN-5 economies have moved toward greater exchange rate flexibility, with all five classified as de jure managed or free floaters since 2008 (Figure 2.5).[9] However, this move has been less pronounced in the de facto classification, with four economies classified as managed floaters by 2015 and none classified as free floaters. This is consistent with the experience of many advanced and emerging market economies that have successfully adopted inflation targeting, where the move toward a floating exchange rate regime was gradual and exchange rate considerations continued to play a role in the conduct of monetary policy, especially during crisis periods (IMF 2015). In fact, the number of inflation-targeting emerging market and developing economies classified as de facto managed floaters has risen through time, although fewer countries have been classified in the intermediate category.

Empirical analysis also confirms that ASEAN-5 currencies became more flexible after the Asian financial crisis—even more so after the global financial crisis.[10]

[9]Singapore's monetary policy framework is an exception and classified by the AREAER (2016) as an exchange rate anchor, although the MAS is ultimately targeting price stability (inflation) as its main monetary policy objective.

[10]Consistent with this conclusion, Klyuev and Dao (2016) find little evidence that the ASEAN-5 currencies or a subset thereof are bound together in a tight "club" or peg to a reserve currency or basket of currencies. They provide formal unit root tests in the exchange rates of the ASEAN-5 currencies against the US dollar, the yen, and the renminbi, as well as against each other, for different periods. Results confirm the narrative of quasi dollar pegs before the Asian financial crisis. After the global financial crisis, the ASEAN-5 currencies remained nonstationary against the US dollar, the yen, and the renminbi, indicating the absence of a tight relationship with any of these major currencies.

Figure 2.5. De Jure and De Facto Exchange Rate Classifications



Source: IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions*, 2000–16.
Note: IT = inflation targeting.

Table 2.2 shows the coefficients of variation of the ASEAN-5 exchange rates against the US dollar at various horizons (10, 50, and 250 working days) between 1991 and 2015. Except for Malaysia during 1998–2005, the volatility of the ASEAN-5's exchange rates against the US dollar has risen since the Asian financial crisis for all time horizons, indicating that the ASEAN-5 central banks have let their exchange rates fluctuate more freely. The volatility of the ASEAN-5 currencies against the US dollar also increases with the length of the time horizon, suggesting that central banks try to dampen short-term volatility, but allow their exchange rates to move substantially over longer periods. Still, the ASEAN-5 exchange rates exhibit lower volatility at every horizon than other free-floating currencies, such as the Japanese yen, suggesting that the extensive use of foreign

TABLE 2.2.

Exchange Rate Volatility—Coefficient of Variation

	10-day				50-day				250-day			
	Pre-AFC	Pre-GFC	GFC	Post-GFC	Pre-AFC	Pre-GFC	GFC	Post-GFC	Pre-AFC	Pre-GFC	GFC	Post-GFC
ASEAN-5												
Indonesia	0.10	0.83	1.33	0.50	0.31	2.20	4.17	1.27	1.14	5.89	5.78	4.04
Malaysia	0.23	0.09	0.62	0.54	0.61	0.23	1.77	1.25	1.76	0.78	3.79	2.89
Philippines	0.24	0.40	0.75	0.39	0.78	1.04	1.87	0.88	3.09	2.99	5.60	1.91
Singapore	0.24	0.30	0.73	0.39	0.60	0.74	1.90	0.90	1.69	1.73	3.28	2.23
Thailand	0.18	0.47	0.43	0.33	0.40	1.18	1.01	0.87	0.79	3.17	4.34	2.15
Other Asian Free Floaters												
Australia	0.51	0.78	2.45	0.85	1.14	1.76	5.91	1.97	2.55	3.90	11.69	5.43
New Zealand	0.42	0.85	2.20	0.92	0.95	1.96	5.09	2.08	2.44	4.59	10.76	5.07
Japan	0.71	0.70	1.28	0.67	1.73	1.60	2.75	1.51	4.55	3.74	4.63	4.08

Source: IMF staff estimates.

Note: Time periods: Pre-AFC (1991 to June 1997); Pre-GFC (1999 to July 2008); GFC (September 2008 to February 2009); Post-GFC (March 2009 to latest data). AFC = Asian financial crisis; GFC = global financial crisis.

exchange intervention in the ASEAN-5 economies had an impact not only on short-term but also on longer-term exchange rate volatility.

The lower de facto exchange rate flexibility in the ASEAN-5 economies compared with advanced economies and some other emerging market economies does warrant closer examination to identify and understand the role of the exchange rate in the evolving monetary policy frameworks. In response to the global financial crisis, the ASEAN-5 central banks were compelled to adapt their policy frameworks and toolkits to strengthen policy autonomy and dampen risks. Part of the response included foreign exchange intervention and the active use of reserve buffers during capital inflow and outflow episodes to avoid excessive exchange rate volatility. Macroprudential and capital flow management measures also supplemented monetary policy to address market pressures and the buildup of systemic risks. Part II of this book delves into the spillovers from global financial factors and the global financial crisis as well as the policy responses in the ASEAN-5.

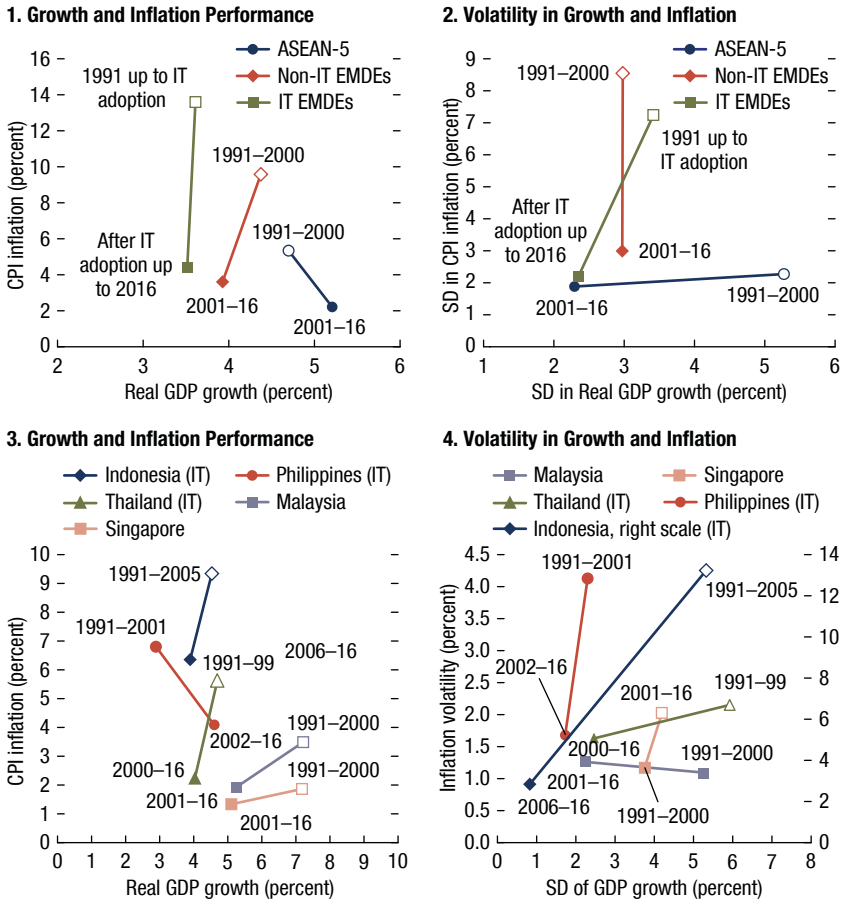
PERFORMANCE

The ASEAN-5 monetary policy frameworks have, on the whole, performed well since the Asian financial crisis, delivering strong inflation performance, similar to that of other inflation-targeting emerging market and developing economies. Most of these economies achieved lower inflation amid marginal declines in growth between 1991–2000 and 2001–14. However, countries that adopted inflation targeting have reduced inflation and volatility more than those that didn't (IMF 2015a, 2016a). The ASEAN-5 economies have also reduced output and inflation volatility, reaching levels achieved by inflation-targeting economies after adopting such regimes (Figure 2.6). Looking more closely, the ASEAN-5 inflation targeters (Indonesia, Philippines, Thailand) have performed even better, with higher GDP growth and lower inflation as well as lower volatility in GDP growth and inflation.[11] This outcome highlights the benefits of the flexible inflation-targeting frameworks put in place after the Asian financial crisis, alongside the move to greater exchange rate flexibility, for ASEAN-5 economies and provides lessons for other emerging market and developing economies.

Flexible inflation targeting has also generally achieved its objectives while accommodating global shocks. The run-up in commodity prices during 2007–08 was the first significant common global price shock affecting the ASEAN-5 economies since the Asian financial crisis. Although evidence shows that, in general, countries with inflation-targeting frameworks managed shocks better than their nontargeting counterparts (Habermeier and others 2009), in some ASEAN-5 economies (Indonesia, Malaysia, Philippines), on average, headline inflation

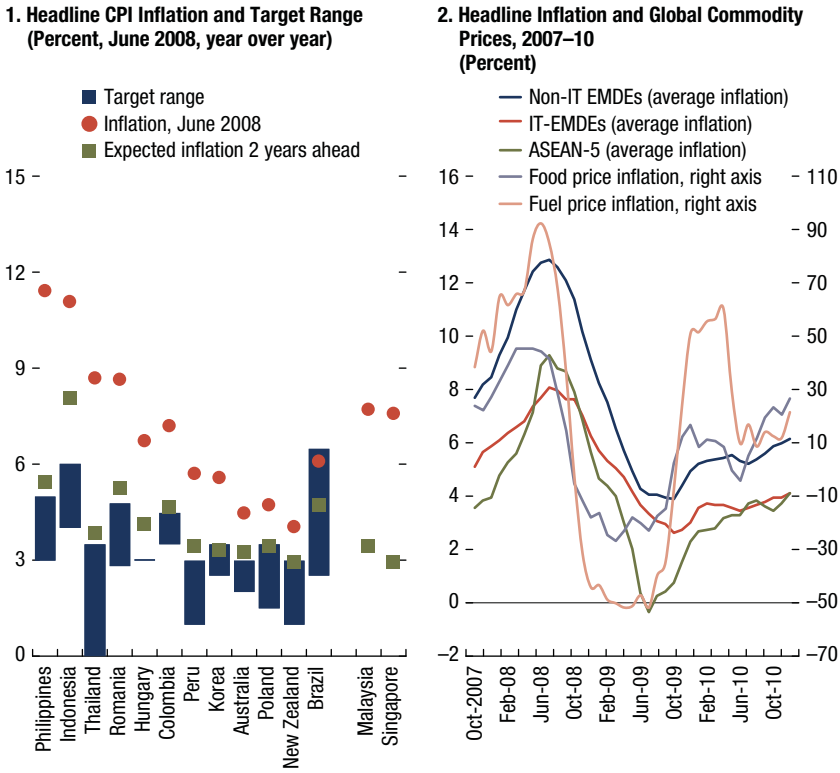
[11]A country's economic performance may not necessarily reflect the adoption of a specific monetary policy framework. Rather, some country-specific, one-off shocks may also have influenced growth and inflation performance in the period under consideration.

Figure 2.6. ASEAN-5: Growth and Inflation



Source: IMF staff calculations.
Note: Following Roger (2010), hollow symbols represent periods from 1991 to 2000 or up to the year of IT adoption. Filled-in symbols represent periods from 2001 or a year after IT adoption to 2014. Straight lines represent the direction of movement between the two periods. Median values of country averages were used for real GDP growth, median of median values for inflation. Median standard deviations for growth and inflation were used for volatility. CPI = consumer price index; EMDE = emerging market and developing economy; IT = inflation targeting; SD = standard deviation.

Figure 2.7. Global Commodity Prices and Inflation, 2007–10



Sources: Haver Analytics; and CEIC Data Co., Ltd.
Note: EMDEs = emerging market and developing economies; IT = inflation targeting. Samples for emerging market, developing, and ASEAN-5 economies comprise 50 countries.

increased more than in other inflation-targeting emerging market and developing economies in 2007–08 (Figure 2.7). However, the increase in headline inflation did not become anchored at the higher level and fell back within the target range thereafter. Following the global financial crisis, inflation pressure remained subdued across the globe, and in most emerging markets, inflation declined during 2015–16, mainly because of lower prices for oil and other commodities (IMF 2016b). ASEAN-5 central banks took a variety of monetary policy actions during this period, depending on their assessments of the first- and second-round effects of the lower commodity prices. Inflation in some countries (Indonesia, Malaysia, Philippines) picked up in 2016 (reflecting partly the removal of subsidies on energy prices in Indonesia and Malaysia), but in Singapore and Thailand, it has remained low. Chapter 7 elaborates on the challenges of low inflation following the global financial crisis and the implications for monetary policy frameworks in the years ahead.

CONCLUSION

In the past two decades, monetary policy frameworks in the ASEAN-5 economies have evolved substantially. Before the Asian financial crisis, these economies had tightly pegged exchange rates, which became a source of vulnerability along with excessive borrowing and currency mismatches by firms and banks. As a result, exchange rates came under severe pressure and depreciated sharply when the regional currencies came under speculative attack and investors panicked, leading to massive capital outflows. After the Asian financial crisis, the ASEAN-5 economies adjusted their policy frameworks to allow for more exchange rate flexibility and have gained more monetary policy autonomy in the context of more open capital accounts. The ASEAN-5 countries also embarked on substantial reforms to strengthen financial regulatory frameworks and built up their foreign reserves as insurance against external volatility.

On the whole, the ASEAN-5 economies' monetary policy frameworks have performed well, delivering both price and output stability during a period of significant domestic and regional turbulence and transformation. Flexible inflation-targeting frameworks, including a unique exchange rate–based targeting approach in Singapore, have served the ASEAN-5 economies well in response to external shocks and could provide lessons to other emerging market and developing economies. Not surprisingly, success—that is, positive outcomes—in most cases entailed significant changes to operating frameworks and refinement of policy objectives in response to challenges in the external environment. The ASEAN-5 economies' forward-looking monetary policy frameworks, active and independent liquidity management operations to align market conditions with the announced policy stance, and improved central bank transparency were important ingredients of their success.

ANNEX 2.1.

ASEAN-5: Monetary Policy Frameworks

	Indonesia	Malaysia	Philippines	Singapore	Thailand
Mandate, Objective, and Strategy					
1. Central Bank Mandate	Achieve and maintain a stable value for the rupiah	Promote price stability and the sustainability of economic growth, as well as considering the impact of monetary policy on financial stability	Promote and maintain price stability; provide proactive leadership in bringing about a strong financial system conducive to sustainable growth of the economy	Maintain price stability, foster a sound and reputable financial center and promote financial stability, ensure prudent and effective management of foreign reserves, and grow Singapore as an internationally competitive financial center	Maintain monetary stability and stability of the financial and payment systems
2. Primary Monetary Policy Objective	Stable prices of goods and services, stable exchange rate	Price stability	Price stability	Price stability	Price stability
3. Stated Monetary Policy Framework	Inflation targeting (as of 2005)	Other	Inflation targeting (as of 2002)	Implicit inflation targeting	Inflation targeting (as of 2000)
4. Medium-Term Inflation Target[1]	Government-approved inflation target 2013–15: 4.0% ±1 ppt	None	Government-approved inflation target 2015–18: 3.0% ±1 ppt	Comfort level of about 2%	Government-approved inflation target 2015: 2.5% ±1.5 ppt
5. Intermediate Monetary Policy Target[2]	BI inflation forecast • 2015: below midpoint of 4%	None	BSP inflation forecast • 2015: below the range of 3.0% ±1.0 ppt • 2016: low end of 3.0% ±1.0 ppt • 2017: midpoint of 3.0% ±1.0 ppt	*Explicitly stated:* NEER, with undisclosed location and parameters of the band and weights of currencies in NEER basket	BOT inflation forecast • 2015: –0.9% • 2016: 1.2%
Independence					
6. De Jure Operational Independence	Yes, with exceptional cases for lending to systemically important banks	Yes	Yes	Yes	Yes
7. Setting of De Jure Operational Targets (e.g., inflation or intermediate targets)	With government intervention on inflation target	Yes—BNM sets its own targets	Needs intergovernmental committee approval for inflation target	Yes—MAS sets its own inflation targets	Needs finance minister and cabinet approval for inflation target

(continued)

ANNEX 2.1 (*continued*)

ASEAN-5: Monetary Policy Frameworks

	Indonesia	Malaysia	Philippines	Singapore	Thailand
Policy Instruments					
8. Central Banks' Policy Rate or Stance	BI policy rate (7-day reverse repo rate), deposit and lending rates	BNM overnight policy rate	BSP overnight reverse repo or borrowing rate, overnight repo or lending rate, and Special Deposit Account rate	MAS indicates level, slope, and width of NEER band every 6 months	BOT 1-day bilateral repo rate
9. Reserve Requirement	Yes	Yes	Yes	Yes	Yes
Statutory Reserve Requirement Ratio (RRR)	Primary RRR (7%) + secondary RRR on liquid assets (2.5%)	3.5%, commercial banks	20%, universal and commercial banks	3%, all banks	1%, commercial banks
10. Open Market Operations	• Issuance of BI certificates • Repo and reverse repo transactions on government securities • Outright sale and purchase of government securities • Foreign exchange buying and selling against the rupiah	• Uncollateralized direct borrowing • Repo and reverse repo of government securities • Issuance of BNM notes • Outright sale and purchase of government securities • Foreign exchange swaps	• Repo and reverse repo transactions on government securities • Outright sale and purchase of government securities • Foreign exchange swaps	• Issuance of short-term MAS bills • Repo and reverse repo transactions on Singapore government securities • Foreign exchange swaps	• Issuance of BOT bills • Bilateral repo transactions on purchase and sale of securities • Outright sale and purchase of primarily BOT and government bonds • Foreign exchange swaps
11. Standing Facilities	Deposit and lending facilities	Deposit and lending facilities	• Fixed-term deposit (Special Deposit Accounts) facility • Lending (rediscounted rates) facility	• Overnight deposit and lending facilities • Overnight renminbi foreign currency lending facility	Deposit and lending facilities
Transparency and Communications					
Explanation of					
12. Monetary Policy Objective	Yes	Yes	Yes	Yes	Yes
13. Monetary Policy Framework	Yes	Yes	Yes	Yes	Yes
14. Intermediate Target	Yes, inflation target	Yes, short-term interest rate movements	Yes, inflation target	Yes, direction of NEER policy band	Yes, inflation target
15. Decision-Making Process	Yes	Yes	Yes	Yes	Yes

(continued)

ANNEX 2.1 (*continued*)

ASEAN-5: Monetary Policy Frameworks

	Indonesia	Malaysia	Philippines	Singapore	Thailand
16. Rationale or Basis for Monetary Policy Decisions or Stance	Yes	Yes	Yes	Yes	Yes
Timing of Publication					
17. Inflation Report	Monthly	Not available	Quarterly	Semiannual	Quarterly
18. Public Release of Monetary Policy Stance	Same day	Same day	Same day	Same day	Same day
19. Minutes or Highlights of Monetary Policy Meetings	Each month	Not available	One month after meeting date	Not available	Two weeks after meeting date
Accountability					
20. Report on Monetary Policy Operation	Yes, quarterly report to Parliament and the public	Yes, regular reporting to the minister of finance on policies related to principal objectives	Yes, annual report to the president and Congress and to the public	Yes, semiannual monetary policy statement and report on macroeconomic developments to the public	Yes, semestral report to the cabinet
21. Public Document or Explanation if Target is Missed	Yes, report to Parliament and the public		Yes, open letter to the president		Yes, open letter to the minister of finance

Sources: IMF, ASEAN-5 desk survey; and central banks' websites.
Note: BI = Bank Indonesia; BNM = Bank Negara Malaysia; BOT = Bank of Thailand; BSP = Bangko Sentral ng Pilipinas; MAS = Monetary Authority of Singapore; NEER = nominal effective exchange rate; ppt = percentage point.
[1]The numerical *medium-term inflation objective* is distinct from the near-term inflation forecast. The inflation objective is rarely modified, and not as a result of short-term political pressure or critical circumstances, but rather as part of a systematic and transparent review of the entire monetary policy framework (IMF 2015).
[2]The *intermediate target* refers to a variable correlated with the ultimate objective that monetary policy can affect more directly and that the central bank treats as if it were the target for monetary policy, or as a proxy for the ultimate policy objective. Intermediate targets are tools to assist in achieving the policy objectives and not policy objectives in themselves (IMF 2015).

ANNEX 2.2. ASEAN-5 MONETARY POLICY REGIMES: A VIEW THROUGH THE IMPOSSIBLE TRINITY

The impossible trinity, or trilemma, is a simple framework that can illustrate the evolution of monetary policy regimes in the ASEAN-5 economies. This framework states that a country may simultaneously choose any two, but not all three, of the following policy goals: monetary policy autonomy, exchange rate stability, and capital account openness. In practice, however, countries rarely face the binary choices stated above. Instead, they choose intermediate levels of capital account openness and exchange rate stability to retain some monetary policy autonomy. A key message of the impossible trinity is that policymakers face a trade-off: greater achievement of one policy goal requires less achievement of either or both of the other two.

A major challenge of the impossible trinity framework is gauging the achievement of each policy goal. Previous studies have measured these variables for a large sample of countries, with different levels of complexity in their specifications. For example, Aizenman, Chinn, and Ito (2013) use a simple specification to construct trilemma indices for 184 countries between 1970 and 2010. Monetary policy autonomy was measured as the reciprocal of the annual correlation of the monthly market interest rates of the home country and the base country (the United States in most cases). Exchange rate stability was defined as the inverse of the annual standard deviations of the monthly bilateral exchange rate between the home and the base country. Capital account openness was measured by the de jure index developed by Chinn and Ito (2006). Each index was normalized to lie between zero and one, in which one is full achievement.

Although intuitive and publicly available, the Aizenman, Chinn, and Ito 2013 indices suffer from several shortcomings: (1) exchange rate stability and monetary policy autonomy are measured in relation to only one other country and thus may be biased if the local currency is tied to a currency basket; (2) monetary policy autonomy is subject to spurious correlation in the presence of common shocks, in which case home and base country interest rates may move in the same direction even though monetary policy is fully autonomous; (3) the framework may not capture non–interest rate monetary policy moves such as changes in banks' reserve requirements; and (4) capital account openness measures the existence of de jure capital controls, but not their intensity or their de facto impact.

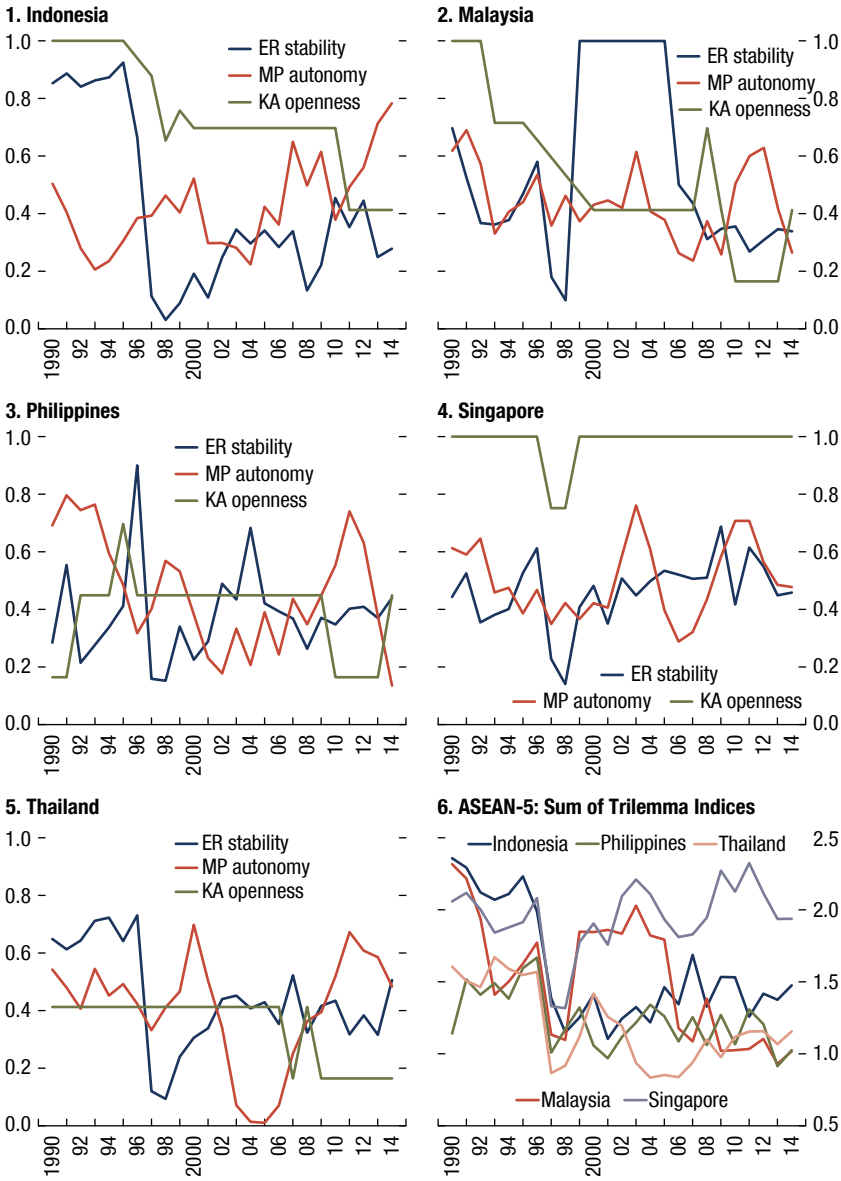
Ito and Kawai (2012) built a more robust set of trilemma indices, addressing some of the issues associated with the Aizenman, Chinn, and Ito 2013 indices; however, the Ito and Kawai indices are not publicly available. Thus, Aizenman, Chin, and Ito 2013 indices are used here to assess the evolution of monetary policy regimes in the ASEAN-5 economies since 1990. This annex also explores how the picture changes if a de facto capital account openness measure is used.

Impossible Trinity Indices—Aizenman, Chinn, and Ito 2013

Annex Figure 2.2.1 presents Aizenman, Chinn, and Ito's (2013) impossible trinity indices for the ASEAN-5 economies between 1990 and 2014. Several messages emerge:

- Exchange rate stability in Indonesia and Thailand was high before the Asian financial crisis, fell substantially during 1997–99, and has returned to

Annex Figure 2.2.1. ASEAN-5: Impossible Trinity Indices



Sources: Aizenman, Chinn, and Ito 2012; and IMF staff calculations.
Note: KA openness is measured as the sum of foreign assets (excluding foreign reserves) and foreign liabilities divided by GDP. These series for 1990–2010 are from the Wealth of Nations database of Lane and Milesi-Ferretti (2007), complemented with net international investment position data for 2012–14. This ratio is divided by that of the 70th percentile to normalize it between 0 and 1. A country is considered to have a fully open capital account (a value of 1) if the ratio is equal to or larger than the 70th percentile. ER = exchange rate; KA = capital account; MP = monetary policy.

middle levels since the early 2000s. Exchange rate stability in the Philippines and Singapore was stable during the whole period. In Malaysia it was at the middle level before the Asian financial crisis, fell during 1997–98, and rose sharply during 1999–2005 as the ringgit was pegged to the US dollar. It has fallen to middle levels since 2006. All five countries had similar exchange rate stability levels in the wake of the global financial crisis.

- Monetary policy autonomy in Malaysia and Singapore was at the middle level during the whole period; in Indonesia it was at the middle level during 1990–2012, but it was high during 2013–14 following the taper tantrum episode. Monetary policy autonomy in the Philippines was more volatile: high in the early 1990s, mid to low during 1994–2008, high during 2010–12, and low during 2013–14. In Thailand it was at the middle level during 1990–2002, low during 2003–06, and high during 2010–14.
- The Chinn and Ito 2006 de jure capital account openness index suggests that the capital accounts of Indonesia and Malaysia have become less open over time. The index also suggests that the Philippines and Thailand had relatively closed capital accounts during the whole period, especially since 2010. Singapore had an open capital account during the whole sample period.

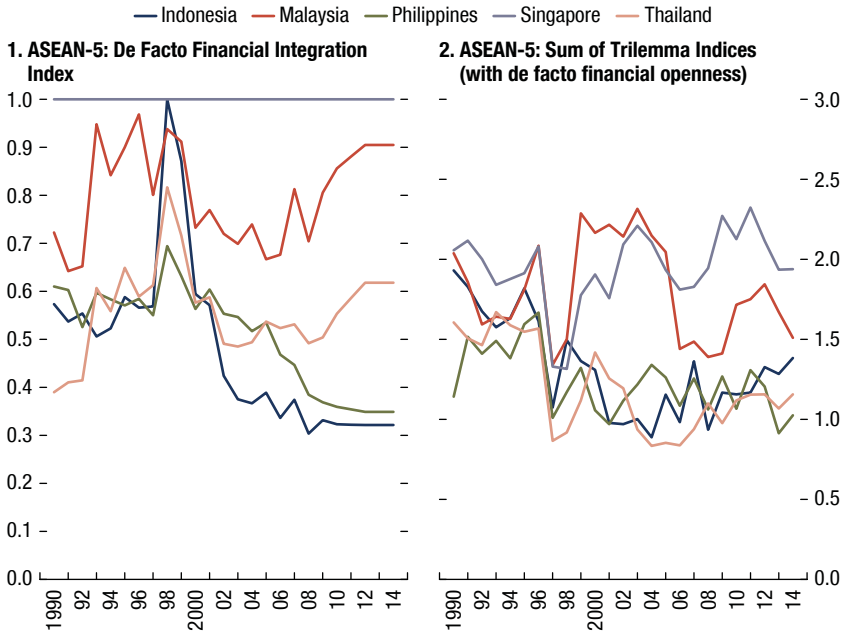
One issue with these trilemma indices is that their sum is generally less than two.[12] Singapore, Indonesia (1990–96), and Malaysia (1999–2005) are the only cases in which the indices sum close to two. For all other countries and periods, the sum of the indices is well below two, suggesting that countries did not make full use of their policy space. However, this outcome may reflect mismeasurement, especially the de jure capital account openness index, which considers only the existence of capital controls, but not their intensity nor their de facto impact. The next section explores how this assessment changes when a de facto capital account openness measure is used.

Adding a De Facto Measure of Capital Account Openness

De facto capital account openness is measured as the sum of foreign assets (excluding foreign reserves) and foreign liabilities divided by GDP. These series in 1990–2010 are from the Wealth of Nations database of Lane and Milesi-Ferretti (2007), complemented with net international investment position data for 2012–14. This ratio is divided by that of the 70th percentile to normalize it between zero and one. A country is considered to have a fully open capital account (a value of one) if the ratio is equal to or larger than the 70th percentile. Consistent with the de jure index, the de facto index suggests that Singapore had a fully open capital account during the whole period (Figure 2.2.1). For Malaysia, however, the de facto index suggests a more open capital account than the de jure index. For Indonesia, on the other hand, the de facto index suggests a more closed

[12]Full achievement of one policy goal means an index equal to one. If a country fully achieves two goals, it must give up the third completely, with the sum of the indices equal to two. If the indices are linear, intermediate achievement means index values between zero and one, with the sum of the three indices equal to two.

Annex Figure 2.2.2. ASEAN-5: De Facto Capital Account Openness Index



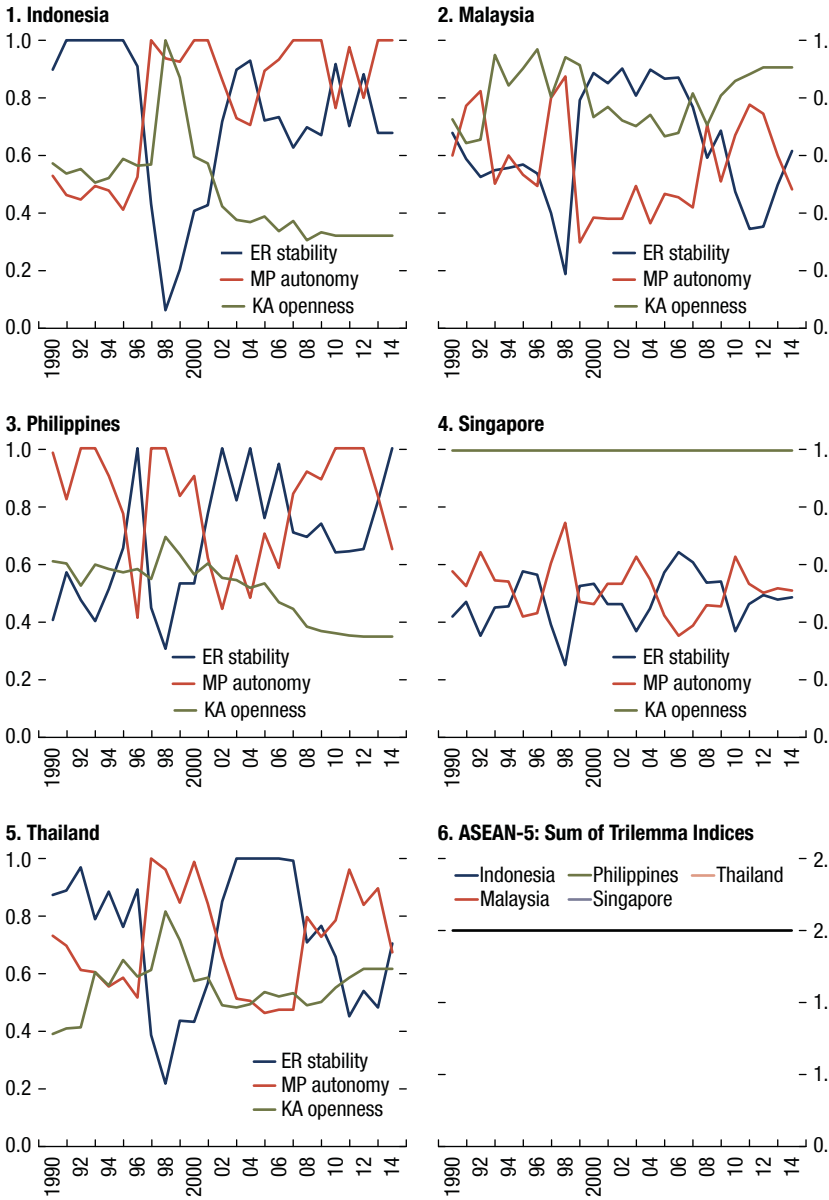
Sources: Aizenman, Chinn, and Ito 2012; and IMF staff calculations.

capital account than the de jure index. The Philippines and Thailand had low capital account openness during 1990–2005 under both measures, but the de facto measure suggests that Thailand achieved higher capital account openness following the global financial crisis, while it remained low in the Philippines during this period.

Using the de facto capital account openness index instead of the de jure index yields a sum of trilemma indices close to two for Singapore and Malaysia, but below two for Indonesia, the Philippines, and Thailand (Figure 2.2.2). This result suggests that the mismeasurement of capital account openness does not explain the low value of this sum for the latter three countries; rather, it reflects problems with the measurement of exchange rate stability and monetary policy autonomy. Improving these measures is beyond the scope of this annex, but to illustrate the point, the exchange rate stability and monetary policy autonomy indices are renormalized proportionally so that the trilemma indices sum to two in each year for each country, with no index larger than one. This is done while keeping the de facto measure of capital account openness.

The normalized trilemma indices, with de facto capital account openness, indicate that the ASEAN-5 economies have moved toward greater monetary policy autonomy since 2010 (Annex Figure 2.2.3).

Annex Figure 2.2.3. ASEAN-5: Normalized Impossible Trinity Indices with De Facto Financial Openness



Source: Aizenman, Chinn, and Ito 2012.
Note: ER stability and MP autonomy have been renormalized proportionally so that all three indices sum to two each year. ER = exchange rate; KA = capital account; MP = monetary policy.

Evolution of Monetary Policy Regimes—Impossible Trinity Triangles

Having trilemma indices that sum to two in each year allows us to analyze the evolution of monetary policy regimes in the ASEAN-5 countries using impossible trinity triangles. The analysis focuses on three periods (to exclude crisis years): 1990–96, 2000–07, and 2010–14. Comparing the post–global financial crisis period (2010–14) with the pre–Asian financial crisis period (1990–96), all ASEAN-5 economies have moved toward greater monetary policy autonomy, generally by forgoing exchange rate stability, and in some cases by reducing capital account openness. However, the transition from the pre–Asian financial crisis to the post–global financial crisis regime has been different across countries (as in Figure 2.1):

- Indonesia raised its monetary policy autonomy after the Asian financial crisis by forgoing exchange rate stability and some capital account openness. Its autonomy remained high after the global financial crisis, but its exchange rate stability rose at the expense of lower capital account openness.
- Malaysia reduced its monetary policy autonomy and capital account openness after the Asian financial crisis to achieve greater exchange rate stability, but raised its monetary policy autonomy and capital account openness significantly after the global financial crisis as the ringgit was allowed to float.
- The Philippines reduced its monetary policy autonomy following the Asian financial crisis to achieve greater exchange rate stability, but its autonomy rose following the global financial crisis at the cost of lower capital account openness and somewhat lower exchange rate stability.
- Singapore maintained middle levels of exchange rate stability and monetary policy autonomy, and a fully open capital account, during all three periods.
- Thailand marginally raised its monetary policy autonomy and capital account openness following the Asian financial crisis at the cost of lower exchange rate stability, but raised its autonomy more markedly after the global financial crisis by forgoing exchange rate stability.

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CHAPTER 3

Toward a Resilient Financial Sector

INTRODUCTION

Financial systems in the Association of Southeast Nations–5 (ASEAN-5) countries weathered the 2008–09 global financial crisis well. There were no systemic banking crises or significant signs of distress, such as bank runs, losses in the banking system, or bank liquidations. In contrast, many advanced economies and some emerging market economies dealt with systemic banking crises in the run-up to the global crisis and the period that followed and had to nationalize banks, freeze deposits, declare bank holidays, provide extensive liquidity support, purchase assets, or grant guarantees.[1]

In contrast, the Asian financial crisis of the late 1990s was a traumatic episode for the ASEAN-5 financial systems. In Indonesia, of 237 banks, 70 were closed and 13 nationalized. Nonperforming loans reached 32 percent of total loans, and the fiscal cost of the banking crisis was 57 percent of GDP. In Malaysia, the number of finance companies dropped from 39 to 10 through intensive mergers. Nonperforming loans reached 30 percent of total loans, and the fiscal cost was 16 percent of GDP. In the Philippines, 1 commercial bank, 7 of 88 thrift banks, and 40 of 750 rural banks were placed under receivership. Nonperforming loans climbed to 20 percent of total loans, and the fiscal cost was 13 percent of GDP. In Thailand, 59 of 91 financial companies and 1 domestic bank were closed, and 4 banks were nationalized. Nonperforming loans reached 33 percent of total loans, and the fiscal cost of the banking crisis was 44 percent of GDP.[2]

This chapter takes stock of major initiatives by ASEAN-5 countries following the Asian financial crisis, describes and benchmarks the current structure of financial systems, and assesses financial stability risks. Financial systems built a level of resilience that allowed ASEAN-5 economies to successfully weather the major challenges posed by the global financial crisis. Nowadays, ASEAN-5 financial systems differ in size, access, efficiency, and financial supervision structure. However, they are similar with regard to key players, the presence of financial conglomerates, and the influential role of governments, as well as their evolving structures and emerging risks.

This chapter was prepared by Pablo Lopez Murphy.

[1]These systemic banking crisis episodes are described in Laeven and Valencia (2012).

[2]Laeven and Valencia (2008) discuss the impact of the Asian financial crisis in Indonesia, Malaysia, the Philippines, and Thailand. The statistics mentioned in the paragraph come from Table 1 in that paper.

MAJOR REFORMS SINCE THE ASIAN FINANCIAL CRISIS

In response to the Asian financial crisis, ASEAN-5 countries introduced significant reforms that made financial systems much more resilient. The reform efforts were concentrated in the following areas:

- Regulation and supervision practices and institutional architecture
- Development of bond markets in local currencies
- Restructuring of firms under financial stress

Regulation, Supervision, and Institutional Architecture

Before the Asian financial crisis, ASEAN-5 financial frameworks suffered from several structural weaknesses in regulation and supervision. Banks and companies relied extensively on short-term foreign currency loans to fund projects that generated receipts in domestic currency. This approach created both maturity and currency mismatches. In some cases, supervisory agencies did not have enough capacity, authority, and independence; fit-and-proper rules for owners and managers of financial institutions were weak or did not exist; loan classification and provisioning rules were inadequate; policies limiting connected lending and foreign exchange exposure were not effective; and financial institutions' publicly available data were scarce—neither supervisors nor the market had access to timely reports on banks' balance sheets and exposures.

Financial systems' regulation and supervision were overhauled in ASEAN-5 countries after the Asian financial crisis. All countries made efforts to improve their supervisory capacity and powers. Bank supervisors embraced Basel core principles, strengthened their supervisory policies and regulations, and required banks to hold higher levels of capital. Regulations on loan classification, provisioning, and income from nonperforming loans were aligned with international best practices in all countries. Regulations on connected lending, liquidity management, foreign currency exposure, and large exposures were improved. Fit-and-proper rules for owners and managers were revamped. Measures were taken to strengthen accounting, disclosure, and auditing standards.[3]

ASEAN-5 countries followed different models for the institutional structure of financial regulation and supervision:

- In Indonesia, the Financial Services Authority was established in 2011 as an integrated regulator to oversee the entire financial system. It assumed oversight responsibilities for capital markets and nonbank financial institutions by the end of 2012 and for banks by the end of 2013. Bapepam-LK was previously in charge of supervising capital markets and nonbank financial institutions, while the central bank (Bank Indonesia) was responsible for the

[3]Lindgren and others (1999) describe in detail the weaknesses in regulation and supervision of financial systems before the Asian financial crisis and the institutional reforms the crisis triggered.

oversight of banks. In the taxonomy spelled out in Box 3.1, Indonesia moved from the third to the fourth category.

- In Malaysia, the central bank (Bank Negara Malaysia) regulates banks, insurers, and prescribed development financial institutions. Securities Commission Malaysia supervises capital markets. Malaysia falls into the third category in the taxonomy in Box 3.1.
- In the Philippines, the central bank (Bangko Sentral ng Pilipinas) supervises banks and some nonbank financial institutions. The Insurance Commission supervises insurance, and the Securities and Exchange Commission supervises capital markets. The Philippines is in the second category in the taxonomy in Box 3.1.
- In Singapore, the central bank (Monetary Authority of Singapore) oversees the entire financial system. Singapore is in the fifth category in the taxonomy in Box 3.1.
- In Thailand, the central bank (Bank of Thailand) supervises banks and some nonbank financial institutions. The Office of the Insurance Commission oversees the insurance sector, and the Securities and Exchange Commission is in charge of capital markets. Thailand falls into the second category in the taxonomy in Box 3.1.

There is no consensus on whether integrated financial supervision is optimal. Cihak and Podpiera (2006) review the literature and conclude that each setup has advantages and disadvantages. In principle, integrated financial supervision is more effective for dealing with financial conglomerates. However, the integrated supervisor could become too large an organization to be managed effectively. Moreover, it is easier to capture a single supervisor than multiple supervisors. To a large extent, the optimal structure of supervision is country-specific and driven by practical considerations.

Development of Bond Markets in Local Currency

Since the Asian financial crisis, ASEAN-5 countries have undertaken several efforts to develop bond markets in local currencies. Private sector credit was perceived to be excessively reliant on banks and on loans in foreign currency. The development of bond markets in local currencies would help simultaneously reduce foreign exchange mismatches and decrease the concentration of credit and maturity risks in banks. Bond markets in local currencies would open another financing channel, a financial spare tire for when the banking system is impaired. Bond contracts are typically of longer maturity than bank loans and, unlike bank loans, can be traded, allowing the transfer of risks. This flexibility suggests that bonds provide larger funding and longer maturities than bank loans.

The Asian Bond Market Initiative, created by the ASEAN+3—an organization that fosters cooperation between the ASEAN countries and China, Japan, and Korea—promoted the development of local currency bond markets, especially by facilitating national and regional market infrastructures for trading bonds. The

Box 3.1. Institutional Structures of Financial Regulation and Supervision

Institutional structures for financial supervision vary widely across countries. Several factors can influence the choice of a specific structure for a given financial system, including the size of the financial system, its structure, the presence of conglomerates, the degree of independence of the central bank, the number of financial crises in the country, and other considerations.

Melecky and Podpiera (2013) describe five possible institutional structures:

1. Sectoral supervision with banking supervision in an agency other than the central bank
2. Sectoral supervision with banking supervision in the central bank
3. Partial integration, in which two subsectors are supervised by the same institution, either the central bank or an agency outside the central bank
4. Integration of supervision of financial subsectors in a financial supervisory authority
5. Integration of supervision of financial subsectors in the central bank

Over the past decades, there has been a tendency to integrate prudential supervision of financial systems. Melecky and Popdiera (2013) document a decrease in the proportion of countries with the traditional sector-by-sector approach to supervision from 62 percent in 1999 to 44 percent in 2010. Moreover, the proportion of countries with integrated (also called unified or consolidated) supervision increased from 14 percent to 33 percent. This shift was a response to the increasing integration of financial institutions across different segments of the financial system (that is, the formation of financial conglomerates).

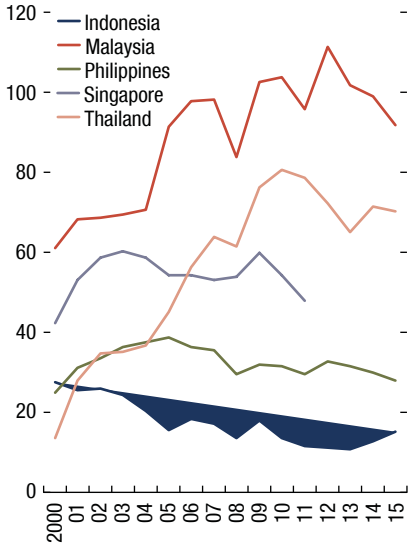
initiative set up working groups to study various topics (for example, issuance of new securitized debt instruments, establishment of a regional bond guarantee agency, development of a regional settlement and clearance system) and make recommendations. With regard to country-specific initiatives, Felman and others (2011) report that the Philippines introduced a new Securities Regulation Code, institutionalized delivery versus payment through a real-time gross settlement system, and launched an interdealer platform to encourage exchange trading of fixed-income instruments. Malaysia introduced a regulatory environment with no withholding tax, no capital gains tax, and no restrictions on investing in Malaysian ringgit bonds. Foreign exchange and interest rate hedging instruments were also introduced.

Figure 3.1 shows that the market capitalization of bond markets in local currencies has increased significantly in Malaysia and Thailand since the mid-2000s. Less progress was made in Indonesia, the Philippines, and Singapore. Figure 3.2 shows that private debt dominates local currency bonds in Malaysia and Thailand, whereas public debt prevails in Indonesia, the Philippines, and Singapore.

Nonfinancial Corporate Sector Restructuring

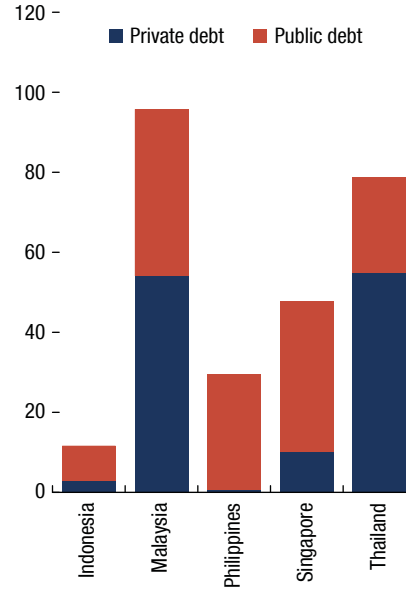
Corporate sector restructuring and reform were essential to the recovery of most ASEAN-5 countries after the Asian financial crisis. Many firms in financial distress were not viable and were liquidated, allowing resources to be reallocated to

Figure 3.1. Outstanding Debt in Local Currency
(Percent of GDP)



Source: World Bank, Global Financial Development Database.

Figure 3.2. Outstanding Debt in Local Currency, 2011
(Percent of GDP)



Source: World Bank, Global Financial Development Database.

more productive uses. Some other firms in financial distress were viable and got some debt or operational restructuring to start hiring and investing again. Although the formal bankruptcy regime was the natural vehicle with which to support the corporate restructuring process, it became clear, given the extent and magnitude of financial distress, that additional government intervention would be necessary to jump-start and sustain the restructuring process.

Governments established out-of-court frameworks to facilitate corporate restructuring. Greater reliance on out-of-court debt workouts was a speedy, cost-effective, and market-friendly alternative to court-supervised workouts. Formal bankruptcy regimes suffered from poor creditor rights and an inefficient judicial system that hindered in-court restructuring and out-of-court deals: a credible threat from the bankruptcy system was necessary to make out-of-court deals effective. Indonesia, Malaysia, and Thailand upgraded their bankruptcy laws following the Asian financial crisis and took measures to strengthen their judicial systems to support restructuring. The Jakarta Initiative Task Force (JITF) in Indonesia, the Corporate Debt Restructuring Committee (CDRC) in Malaysia, and the Corporate Debt Restructuring Advisory Committee (CDRAC) in Thailand were the government-created coordinating bodies for

promoting out-of-court restructuring. Claessens 2005 documents the CDRC's resolution of 77 percent of the distressed debt it managed by 2003, compared with the JITF and the CDRAC, which resolved 56 percent and 48 percent, respectively.

Governments also intervened more directly to support corporate restructuring by establishing centralized asset management companies. The Indonesian Bank Restructuring Agency, Danaharta (for Malaysia), and the Thai Asset Management Corporation took over most nonperforming loans a few years after the Asian financial crisis. In principle, asset management companies were expected to play a key role in the restructuring process given their relatively large bargaining power. However, in practice, their contribution was somewhat disappointing because they were slow in resolving distressed debt (Claessens 2005). Political interference and other institutional weaknesses limited their effectiveness.

FINANCIAL SYSTEM STRUCTURES: WHERE DO THEY STAND NOW?

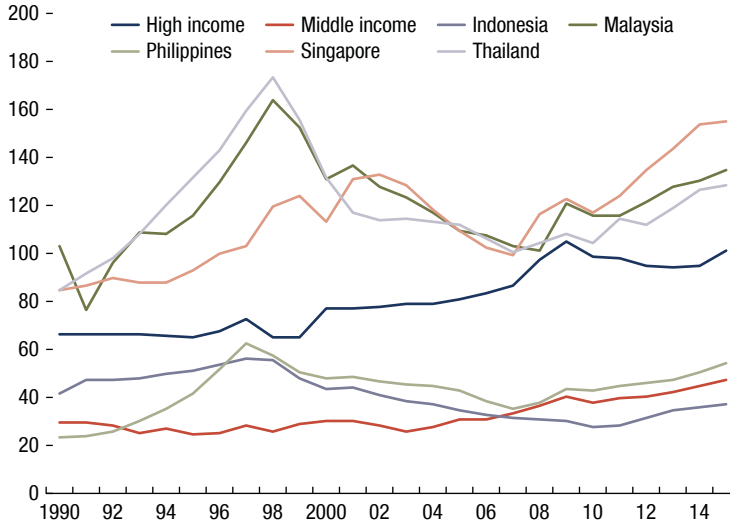
The major reforms introduced after the Asian financial crisis paid off by increasing the resilience of financial systems in the ASEAN-5. To describe and compare ASEAN-5 financial system structures, this section focuses on three key dimensions: (1) financial depth, the size of financial institutions and markets; (2) access, the degree to which individuals and nonfinancial firms can use financial institutions and markets; and (3) efficiency, the ability of the financial system to provide financial services at the lowest cost. This section also zooms in on other prominent structural issues raised in IMF Financial System Stability Assessment reports that are characteristic of financial systems in ASEAN-5 countries. First, in many countries, financial conglomerates—groups of companies under common control that provide significant services in at least two different financial segments (banking and insurance, for instance)—have a large presence. Second, in most countries, governments tend to have a large influence in the financial sector beyond regulation.

Financial Depth

The most common way to characterize financial depth is by the size of financial institutions and financial markets. Financial institutions are central banks, commercial banks, insurance companies, pension funds, public financial institutions, and other financial institutions. Financial markets are bond (sovereign and corporate) and stock markets.

Figure 3.3 shows deposit money banks' assets as a percentage of GDP. Malaysia, Singapore, and Thailand have much larger banking systems than Indonesia and the Philippines. In Malaysia, Singapore, and Thailand, banks' assets were well above the average for high-income countries in 2015. In contrast, banks' assets in Indonesia and the Philippines were less than the average for

Figure 3.3. Deposit Money Banks' Assets
(Percent of GDP)



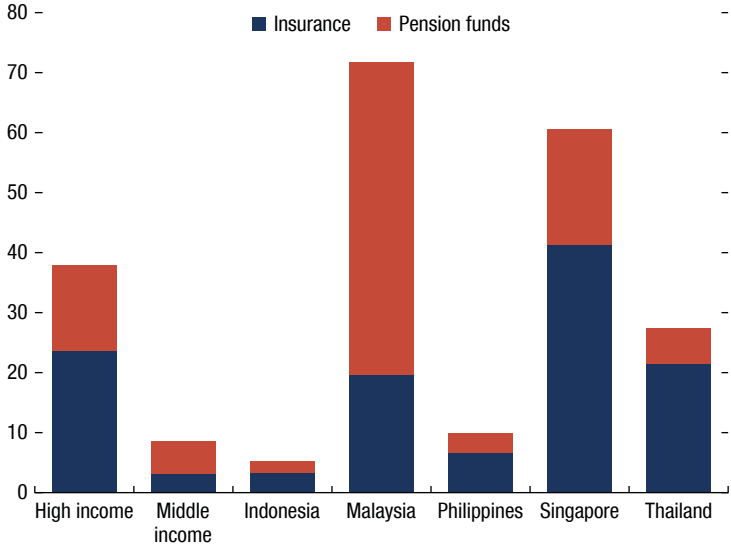
Source: World Bank, Global Financial Development Database.

middle-income countries. Banking system size increased significantly during 1989–2014 in the Philippines, Singapore, and Thailand. In contrast, it remained almost unchanged in Indonesia and Malaysia.

Data availability and comparability for nonbank financial institutions is much more limited than for deposit money banks. However, insurance companies and pension funds are usually important players within the universe of nonbank financial institutions for which there are comparable statistics. Figure 3.4 shows that insurance company assets in Malaysia, Singapore, and Thailand were larger than the average for high-income countries in 2011, suggesting that insurance markets are well developed. Insurance markets in Indonesia and the Philippines are smaller than in the other ASEAN-5 countries but larger than the average for middle-income countries. Figure 3.4 also shows that pension fund assets are remarkably large in Malaysia and much more modest in Indonesia, the Philippines, and Thailand.

Financial systems in ASEAN-5 countries are still dominated by banks, but shadow banks are gaining ground. Shadow banks comprise a mix of institutions (Box 3.2). In Indonesia, banks accounted for 62 percent of financial institution assets in 2015, and in Singapore they accounted for 66 percent (Figure 3.5). The share of shadow banks in financial institution assets increased to 9 percent from 5 percent during 2005–15 in Indonesia and to 10 percent from 4 percent in Singapore (Figure 3.5).

Figure 3.4. Insurance and Pension Fund Assets, 2011
(Percent of GDP)



Source: World Bank, Global Financial Development Database.

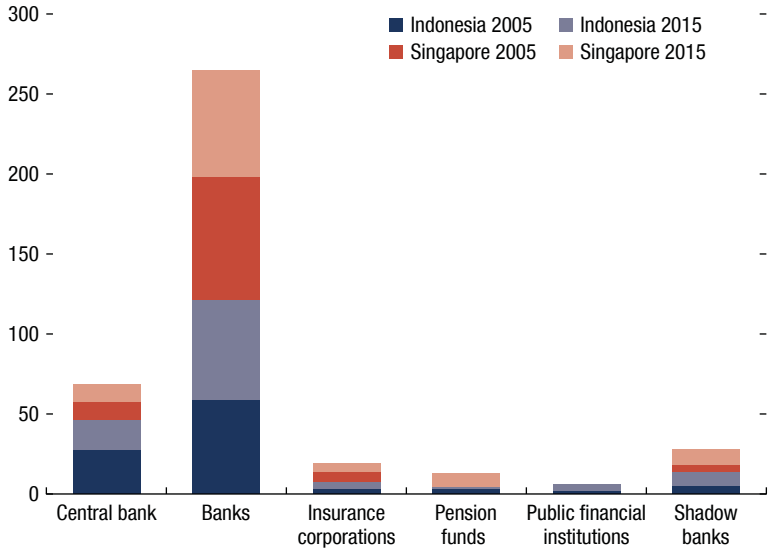
In financial markets the size of stock markets is measured by computing their capitalization (that is, the value of listed firms times the number of shares). The size of stock markets has increased sharply in most ASEAN-5 countries since 2000 (Figure 3.6). Yet stock market size varies even more than the size of deposit money banks. In all ASEAN-5 countries except Indonesia, stock markets were larger in 2015 than the average market in high-income countries. In Malaysia, the

Box 3.2. Shadow Banks: What Are They?

The Financial Stability Board has been carefully monitoring nonbank financial institutions to assess global trends and risks in the shadow banking system since 2011. The annual monitoring exercise relies on a common methodology for measuring nonbank financial institutions and covers 28 countries, including Indonesia and Singapore. It distinguishes between the following financial institutions: central banks, banks, insurance corporations, pension funds, public financial institutions, and other financial institutions.

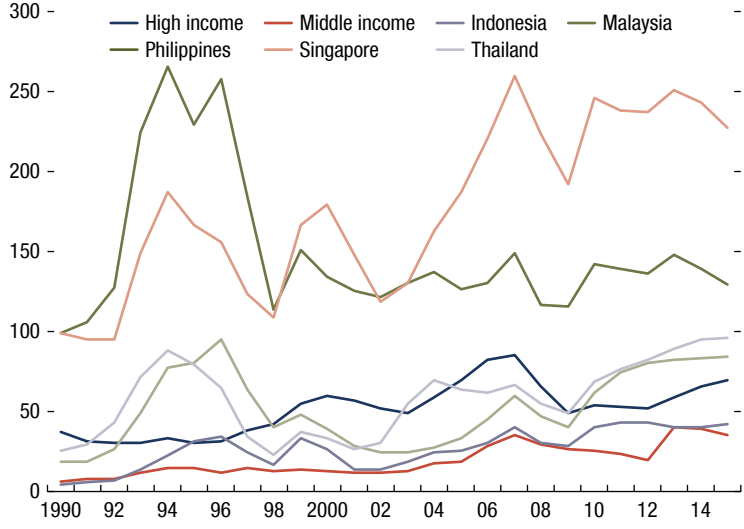
The Financial Stability Board considers "other financial institutions" to be a conservative proxy for or broad measure of shadow banks. These include money market funds, hedge funds, other investment funds, real estate trusts, trust companies, finance companies, broker-dealers, structured finance vehicles, central counterparties, and captive financial institutions and money lenders. The Financial Stability Board also estimates a narrow measure of shadow banks focused on activities that pose higher financial stability risks.

Figure 3.5. Composition of Financial Institution Assets
(Percent)



Source: Financial Stability Board, Global Shadow Banking Monitoring Report 2016 Dataset.

Figure 3.6. Stock Market Capitalization
(Percent of GDP)



Source: World Bank, Global Financial Development Database.

relatively large market in 2015 was still smaller than in the years before the Asian financial crisis.

The relative importance of financial markets compared with financial institutions in the financial system has been rising. Demirgüç-Kunt, Feyen, and Levine (2011) show that as economies develop, they tend to demand the services of financial markets more than those of banks. Figures 3.3 and 3.6 show that the size of stock markets relative to that of the banking system increased in all countries over the past 25 years.

Access

Access to financial services is a key element for inclusive financial systems that aim to promote growth and reduce inequality. Financial services help households smooth consumption and invest in education and health. Credit allows businesses to invest, hire, and grow. An account at a financial institution is the first step toward financial inclusion. Figure 3.7 shows that almost all the population in Singapore has an account at a formal financial institution, in line with the patterns observed in high-income countries. Account ownership in Malaysia and Thailand is well above the average for middle-income countries. In contrast, it is relatively low in Indonesia and especially low in the Philippines.

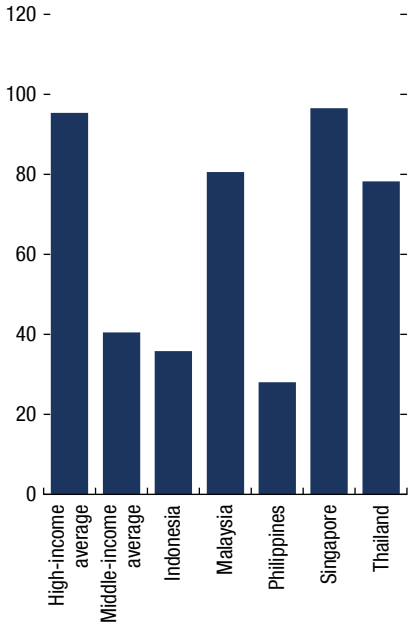
Demirgüç-Kunt and Klapper (2012) write that surveys point to several factors discouraging financial institution accounts that are relevant for middle- and low-income countries. These include having no money with which to open an account, the cost of opening an account, the documentation requirements for opening an account, the cost of maintaining an account (for example, annual fees), and distance from the bank (especially in rural areas).

To estimate access to stock and bond markets, measures of market concentration are typically used (Figure 3.8). For stock markets, the percentage of market capitalization outside of the 10 largest companies should increase when there is greater access by smaller firms. In ASEAN-5 countries, except Indonesia, access to stock markets is higher than the average in high-income and middle-income countries. For bond markets, the percentage of nonfinancial corporate bonds to total bonds outstanding is a measure of access that should increase with greater access (Figure 3.2). Access by corporations to bond markets in Indonesia and the Philippines remains low.

Efficiency

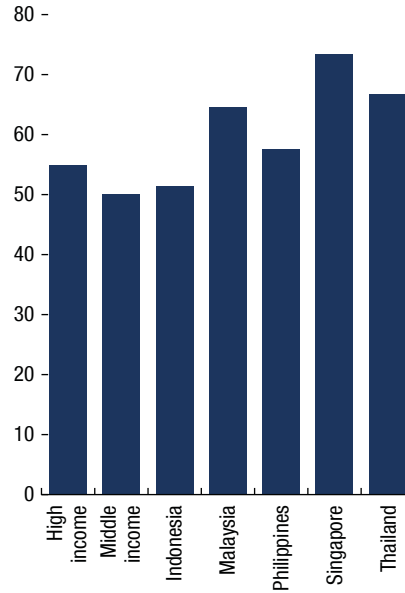
An efficient financial system performs its intermediation functions in the least costly way possible. A common measure of efficiency of banks is the net interest margin, defined as the accounting value of bank interest revenue net of interest expense, as a percentage of interest-earning assets. The purpose of net interest margins is to compensate banks for overhead costs, loan loss provisions, reserve requirements, and taxes on profits. In Malaysia and Singapore net interest margins are lower than the average for high-income countries (Figure 3.9). In

Figure 3.7. Account Owned at a Financial Institution, 2014
(Percent of population ages 15 and older)



Source: World Bank, Global Financial Development Database.

Figure 3.8. Market Capitalization outside of Top 10 Largest Companies, 2015
(Percent of total market capitalization)



Source: World Bank, Global Financial Development Database.

Thailand they are lower than in the Philippines, and in both countries they are lower than the average for middle-income countries.

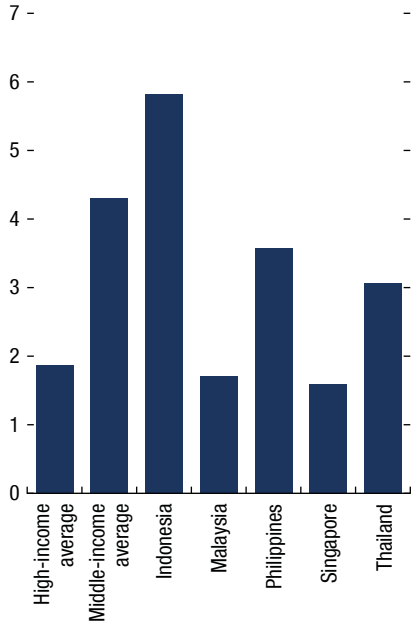
The stock market turnover ratio gauges financial market efficiency.[4] Thailand leads in financial market efficiency (Figure 3.10). Intuitively, the turnover ratio measures the liquidity of the stock market. Stock markets are significantly more liquid in Thailand than in the other ASEAN-5 countries and than the average for high-income countries.

The Presence of Conglomerates

The presence of financial conglomerates is a key feature in several countries. Because of their economic reach and their mix of regulated and unregulated activities, financial conglomerates pose a challenge to effective financial oversight. For example,

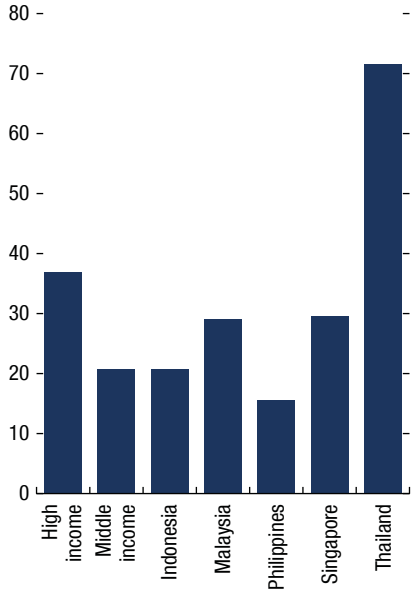
[4]The stock market turnover ratio is the total value of shares traded during a period divided by the market capitalization in that period.

Figure 3.9. Net Interest Margin, 2015
(Percent)



Source: World Bank, Global Financial Development Database.

Figure 3.10. Turnover Ratio, 2015
(Percent)



Source: World Bank, Global Financial Development Database.

- In Indonesia, 49 financial conglomerates account for 70 percent of the total assets of financial institutions. Bank-led conglomerates hold more than 90 percent of financial conglomerate assets and include insurance companies, securities firms, and finance companies. More than half of financial conglomerates have a horizontal structure with an unregulated holding company that controls the group. The absence of a regulated entity that leads the remaining entities in the financial conglomerate is a major challenge for consolidated supervision.
- In Malaysia, the central bank enhanced its oversight to financial groups. The central bank holds a licensed institution, or a financial holding company that is the apex of the financial group, responsible for ensuring compliance with group-wide prudential standards. The apex entity will also serve as a focal point for supervisory activities such as obtaining information for the purposes of assessing risks to the financial health of the group.
- In the Philippines, financial conglomerates own companies in telecommunications, energy, property, retail trade, and banking. About 60 percent of bank assets are controlled by banks belonging to conglomerates (7 of the 10 largest banks belong to conglomerates). Moreover, about 75 percent of total

stock market capitalization comes from companies that belong to conglomerates. The interconnection within each conglomerate exposes banks to problems in the subsidiaries.

- Thailand is home to large banking conglomerates, with significant ownership of nonbank financial institutions and considerable market share. The Bank of Thailand exercises consolidated financial supervision, but its regulatory perimeter extends only to banks.

Government Presence[5]

Extensive government ownership in the banking sector is another remarkable feature in ASEAN-5 financial systems. Government ownership is explained in part by the bailouts and takeovers in the aftermath of the Asian financial crisis. This dual role of owner and regulator generates conflicts of interest that can complicate effective oversight. It can also undermine crisis management and resolution.

- In Indonesia, Bank Mandiri, which is 60 percent state owned, is the country's largest bank, accounting for about 15 percent of total banking sector assets in 2015. It came about through a merger of four failed banks. Bank Rakyat Indonesia, the second-largest bank, specializing in small-scale borrowing and microfinance, is also majority state owned, accounting for 14 percent of total bank assets. Bank Negara Indonesia is the fourth-largest bank; it was recapitalized by the government during the Asian financial crisis and is 60 percent state owned, accounting for 8 percent of total bank assets.
- In Malaysia, the government owns a significant share of the financial sector via its seven government-linked investment companies. These companies are subject to government oversight and participation on their boards, usually by appointees of the Ministry of Finance or the prime minister's office. Government-linked investment companies control a large number of government-linked companies—commercial companies the government controls directly.
- In the Philippines, the two major state-owned lenders, the Development Bank of the Philippines and the Land Bank of the Philippines, are among the 10 largest banks as measured by assets. The United Coconut Planters Bank is also a large state-owned bank. The Development Bank of the Philippines, Land Bank of the Philippines, Government Service Insurance System, and Social Security System were the four government financial institutions that funded an ambitious public-private partnership program aiming to revamp infrastructure.
- In Singapore, the government share in the financial system is small.

[5]This section draws on several IMF Financial System Stability Assessment reports (IMF 2009, 2010, 2013a, 2013b, 2017).

- In Thailand, the government has a significant equity stake in the commercial banking sector. During the 1997 financial crisis the government had to rescue several banks. Since then, the government has been reducing its stake, but it still controls Krung Thai Bank, the third-largest bank as measured by assets. Specialized financial institutions are policy banks fully owned by the government; they account for about 30 percent of financial system assets. The largest are the Government Savings Bank and the Bank for Agriculture and Agriculture Cooperatives—both deposit-taking institutions. The Bank of Thailand has been granted supervisory powers related to specialized financial institutions since 2015, which help mitigate concerns about conflict of interest.

FINANCIAL STABILITY

Financial stability means that the financial system can smoothly deliver the financial services it provides and is also resilient to shocks. Financial systems provide essential services such as taking deposits and investments for savers, loans and securities for investors, liquidity and payment services for both, and risk-diversification and insurance services. Financial instability impedes some (or all) of these key services.

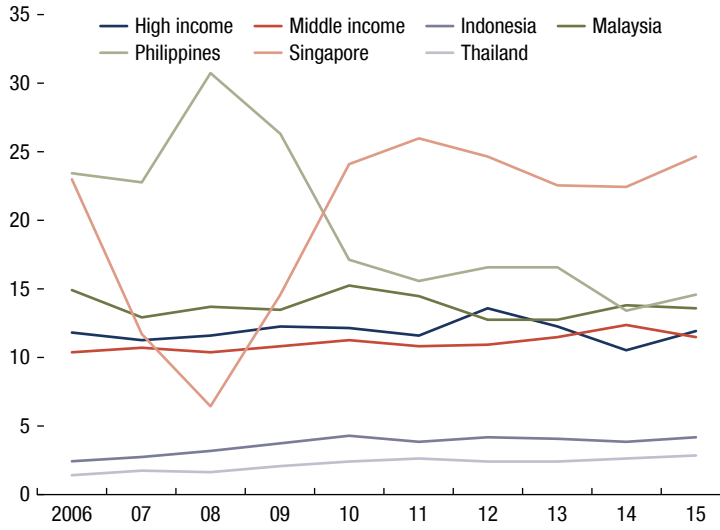
Macroprudential surveillance is a key element of the analytical framework for assessing financial stability. It focuses on the financial system as a whole and complements the micro surveillance of individual financial institutions by supervisors. Some well-known quantitative analytical tools for macroprudential surveillance are analysis of *z*-scores, monitoring of financial soundness indicators, and stress testing. The analysis of macro-financial linkages is another important element of the analytical framework for assessing financial stability. Such analysis aims to assess the effect of various shocks on macroeconomic conditions through the financial system. Historical evidence, including in the ASEAN-5 as shown in Chapter 4, suggests that financial systems can amplify the effects of shocks on the economy. The Country Financial Stability Maps developed by Cervantes and others (2014) are a relatively novel quantitative tool used for the analysis of macro-financial linkages.

This section analyzes *z*-scores, examines financial soundness indicators, discusses financial stability maps, and assesses stock market volatility to shed some light on financial stability in ASEAN-5 countries.

Z-scores

To measure the degree of stability of financial institutions, Cihak and others (2012) aggregate individual financial institutions' stability measures (*z*-scores) to get a system-wide measure by weighting each individual *z*-score by the financial institution's size. A higher *z*-score implies a lower probability of insolvency and hence higher financial stability. *Z*-scores in Malaysia, the Philippines, and

Figure 3.11. *Z*-scores



Source: World Bank, Global Financial Development Database.

Singapore have been generally higher than the average for high-income and middle-income countries (Figure 3.11). *Z*-scores in most countries declined in 2008, at the outset of the global financial crisis. *Z*-scores in Indonesia and Thailand are below average for middle-income countries, but have been consistently improving since the mid-2000s.

The *z*-score is defined as $z = (k + \mu)/\sigma$, in which k is equity capital as a percentage of assets, μ is return as a percentage of assets, and σ is standard deviation of the return on assets. It can be shown, with a little algebra, that *z*-scores are inversely related to the probability of a financial institution becoming insolvent. (There are two limitations that should be kept in mind when interpreting *z*-scores. First, they are computed from accounting data. Hence, if financial institutions can smooth out reported data, the *z*-score may underestimate the risk of insolvency. Second, *z*-scores neglect the interconnectedness of financial institutions in the sense that the probability of insolvency of a financial institution is likely to be higher when the rest of the financial institutions have a higher probability of insolvency.)

Financial Soundness Indicators

Financial soundness indicators are indicators of the current financial health of a country's financial institutions. Financial soundness indicators aggregate individual financial institutions' indicators (microprudential indicators) into financial soundness indicators (macroprudential indicators). The deposit-to-loan ratio,

TABLE 3.1.

Balance Sheet Soundness

	2009:Q4	2010:Q4	2011:Q4	2012:Q4	2013:Q4	2014:Q4	2015:Q4	2016:Q4
Indonesia	n.a.	n.a.	L	L	L	M	L	L
Malaysia	L	L	L	L	L	L	L	L
Philippines	L	L	L	L	L	L	L	L
Singapore	M	M	M	M	M	M	M	M
Thailand	L	L	L	L	L	L	L	L

Source: IMF staff estimates.
Note: Indicators are red (high, H) if the upper threshold is breached, blue (medium, M) if the indicator is between the lower and the upper thresholds, and green (low, L) if the indicator is below the lower thresholds. The thresholds are based on analyses in various issues of the IMF *Global Financial Stability Report* and on the Basel III leverage ratio; they are also informed by IMF experiences in Financial Sector Assessment Programs. n.a. = not available.

share of foreign exchange loans in total loans, and share of foreign exchange liabilities in total liabilities provide information on *structural risks* in the bank's balance sheet to exchange rate fluctuations and to shifts in market confidence. The leverage ratio, given by equity divided by assets, measures whether the banking system has a large enough *capital buffer* to absorb negative shocks (for example, losses). The leverage ratio will come under pressure if the nonperforming loan ratio is growing or if the sector is experiencing losses.

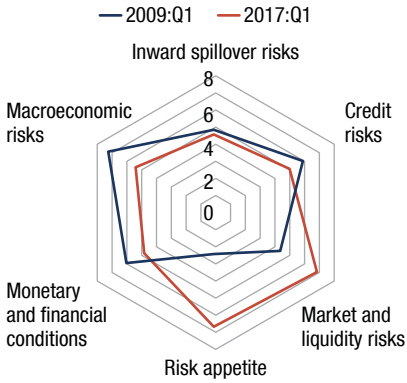
The financial soundness indicators heat map suggests that balance sheets are strong in all countries (Table 3.1). The blue indicators in Singapore are explained by the relatively large share of foreign exchange loans in total loans (and more recently, by some deterioration in asset quality). Given Singapore's position as a large international center, and the abundant funding sources in foreign exchange for banks, the large share of foreign exchange loans may not be a useful metric for comparison with the other ASEAN-5 emerging markets.

Macro-Financial Linkages

Country Financial Stability Maps identify potential sources of macro-financial risks for a specific country. They also enable assessment of these risks in a global context through comparisons with the corresponding Global Financial Stability Map from the IMF's *Global Financial Stability Report*.

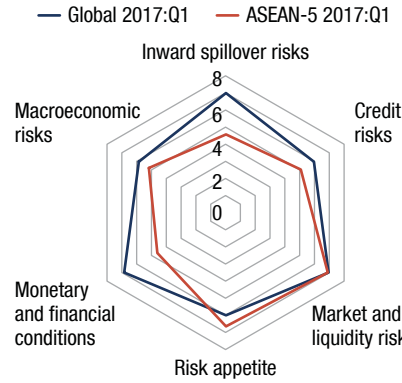
By and large, macro-financial risks in the ASEAN-5 have receded since the global financial crisis. Figure 3.12 shows that macroeconomic, spillover, and credit risks for ASEAN-5 countries in 2017 were lower than in the immediate aftermath of the global crisis. Risk appetite has also returned to the region, and has been higher recently than it was during the global financial crisis. However, in two dimensions, risks appear higher now than during the crisis. Market and liquidity risks have increased since the global financial crisis because in several countries credit has grown much more than deposits. This imbalance implies that the deposit-to-loan ratio, a standard metric for assessing liquidity, has been declining. Monetary and financial conditions have tightened because broad money and credit, key indicators with which to assess monetary and financial

Figure 3.12. ASEAN-5 Financial Stability Map, 2017 versus 2009



Source: IMF staff estimates.

Figure 3.13. ASEAN-5 Financial Stability Map 2017 versus Global, 2017



Source: IMF staff estimates.

conditions, were growing more slowly in the first quarter of 2017 than in the aftermath of the global financial crisis.

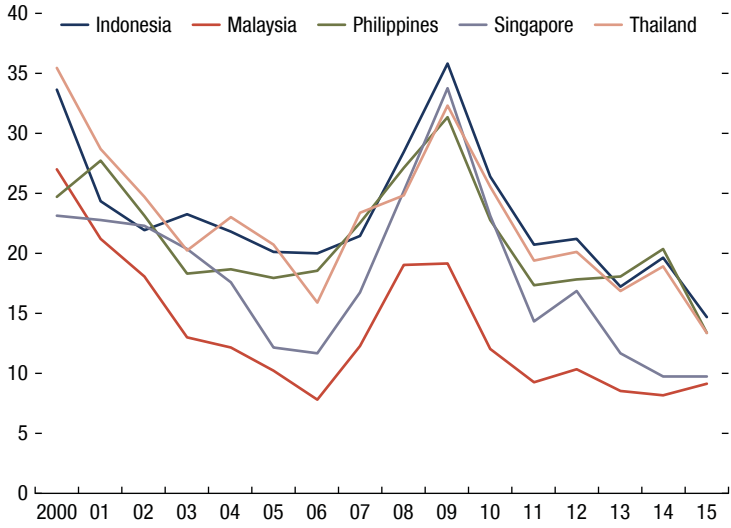
Moreover, the ASEAN-5 Country Financial Stability Map currently lies within the Global Financial Stability Map, which suggests lower vulnerability in the ASEAN-5 than in the global financial system. Figure 3.13 shows that macroeconomic, spillover, and credit risks for ASEAN-5 countries in the first quarter of 2017 were lower than in the Global Financial Stability Map, and risk appetite was relatively higher. However, monetary and financial conditions in the ASEAN-5 were tighter compared with global conditions and have been since the first quarter of 2015.

The Country Financial Stability Map captures four macro-financial *risk* categories (macroeconomic, inward spillovers, credit, market and liquidity) and two macro-financial *conditions* categories (monetary and financial conditions, risk appetite). Each category relies on several indicators, as discussed in Cervantes and others 2014. Each category is ranked from 0 to 10. A rank of 0 captures the lowest risk, the highest risk aversion, and the tightest monetary and financial conditions. A rank of 5 corresponds to long-term average risks and conditions in a five-year period.

Financial Market Volatility

One way to measure instability of financial markets is by the volatility of daily returns of the stock market index over a year (Figure 3.14). Stock market volatility has been declining in all ASEAN-5 countries since the global financial crisis, making stock markets more attractive for investors. Financial markets tend to be relatively more stable in Malaysia and, more recently, in Singapore.

Figure 3.14. Stock Price Volatility Index
(Standard deviation of the daily return of the stock market each year)



Source: World Bank, Global Financial Development Database.

TOWARD A RESILIENT FINANCIAL SYSTEM

ASEAN-5 countries overhauled the regulation and supervision of their financial systems in response to the Asian financial crisis. They also repaired balance sheets by restructuring not only the financial sector but also nonfinancial corporations. Finally, they actively developed bond markets in local currency to diversify the sources of funding for the real economy. All these efforts helped them navigate the global financial crisis and preserve their financial stability.

Currently, the size, composition, access, efficiency, and institutional structure of regulation and supervision are diverse in the financial systems in ASEAN-5 countries. To some extent these disparities reflect stages in economic development within the group of countries. Singapore, for example, is a high-income country and has a larger, more diversified, more efficient, and more extended financial system than the rest of the countries.

But financial systems in ASEAN-5 countries also have some important similarities, including the dominant role of banks, the increasing importance of shadow banks and financial markets, the large presence of financial conglomerates, and high participation of the government in financial systems.

A bird's-eye view of financial stability risks in ASEAN-5 countries suggests that they are contained. *Z*-scores are either relatively high or have been on an upward trend. Financial soundness indicators indicate that balance sheets are relatively strong, with few liquidity and solvency risks. Finally, macro-financial

risks are generally lower in the ASEAN-5 financial system than in the global financial system.

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PART II

Policy Responses to Global Spillovers

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CHAPTER 4

Global Spillovers

INTRODUCTION

Global financial cycles and spillovers pose a challenge for the Association of Southeast Asian Nations–5 (ASEAN-5) countries. Rey (2013) argues that capital flows, asset prices, and credit growth observe a global financial cycle and that the cycle (proxied by the Chicago Board Options Exchange Volatility Index [VIX]) is driven mainly by US monetary policy. Potential surprises from US monetary policy normalization and spikes in global risk aversion are sometimes accompanied by capital outflows and tighter domestic financial conditions, with significant macro-financial effects on ASEAN-5 countries.

This chapter takes stock of the impact of global shocks on ASEAN-5 economies and identifies the main transmission channels of global spillovers. It finds that one key channel related to the VIX affects largely capital flows and asset prices;[1] another, linked to US interest rates, affects mainly monetary and credit conditions.[2] The chapter estimates global financial factors' impact on ASEAN-5 growth cycles; these factors are transmitted partly through capital flows and are often amplified by equity prices and domestic credit friction.[3] Results show that real economy factors, such as external demand from the United States and more recently from China, are also relevant, but global financial shocks tend to dominate growth dynamics in the ASEAN-5. The policy response of ASEAN-5 economies to these global spillovers is further examined in Chapters 5 and 6.

The extensive global spillovers to the ASEAN-5 are likely to pose new challenges in the period ahead. The chapter concludes with simulations of the potential spillovers from the realization of downside risks facing the global outlook, calibrated to one ASEAN-5 economy (the Philippines). Illustrative model-based scenarios show that faster-than-anticipated monetary policy normalization in the United States, an unproductive US fiscal expansion, or an abrupt growth slowdown in China would hit the ASEAN economies hard through lower external demand and higher financing costs, warranting a policy response. Part III of this book delves deeper into the policy reform agenda necessary to face these new challenges.

This chapter was prepared by Shanaka J. Peiris, Minsuk Kim, and Sherillyn Raga.

[1]Ahmed and Zlate (2013); Nier, Sedik, and Mondino (2014); and Koepke (2015) list global risk aversion as among the most important global determinants of capital flows.

[2]Rey (2016) presents evidence that US monetary policy shocks are transmitted internationally and affect financial conditions even in inflation-targeting economies with large financial markets.

[3]Financial spillovers, as discussed in IMF 2016a and Diebold and Yilmaz 2014, can be transmitted across borders in part via capital flows (IMF 2016b).

GLOBAL FINANCIAL FACTORS AND DOMESTIC FINANCIAL CONDITIONS

Domestic financial conditions in the ASEAN-5 economies are sensitive to global factors.[4] Following Miranda-Agrippino and Rey (2015), a principal component model is used to identify the underlying global factors that can explain the variability of a comprehensive set of domestic financial indicators.[5] The principal component analysis shows that the first two common components explain about 53 to 65 percent of the variation in domestic financial conditions in the ASEAN-5 economies (Figure 4.1; Table 4.1). In general, in each economy, one of the first two principal components seems to be associated with global interest rates and local currency sovereign bond and retail bank interest rates, while the other component is more closely associated with the VIX, which is related to asset prices and bank credit (see Table 4.2).[6] The results indicate that there are potentially two key transmission channels of global financial shocks to domestic financial conditions: one related to the VIX, which affects mainly capital flows and asset prices, and another linked to US interest rates, which affects predominantly monetary and credit conditions. These are examined further in the remainder of the chapter.

Both global financial conditions and domestic policy rates seem to influence domestic financial conditions, with the former having a greater impact (Figure 4.2). Simple recursive vector autoregression (VAR) models of the first two factors of domestic financial conditions in the ASEAN-5, following the approach of IMF 2017a, show that US interest rates, the VIX, or both have a significant impact in all countries.[7] Policy rates also have a significant impact in most cases, albeit of a lesser magnitude. Variance decompositions of the domestic financial conditions factors confirm that for most ASEAN-5 economies, a greater proportion is explained by global factors than by domestic policy rates. Still, the share of the first two principal components explained by global factors is lower than the share explained by a country's own shocks, suggesting that other domestic variables and structural factors continue to influence domestic financial conditions in the ASEAN-5.

[4]See Adrian and Liang 2016 and IMF 2017a for a broader look at drivers and use of domestic financial conditions.

[5]The domestic financial factors included about 25 to 30 financial variables for each economy used to estimate financial conditions indices for Asia in Box 1.4 of IMF 2015.

[6]The 10-year US Treasury yield is used as a proxy for global interest rates in this section because it acts as a benchmark for the global yield curve. In following sections, alternative US interest rates, including the federal funds rate, are used to represent global interest rates as the key reference reserve currency, with other systemic economies' (China, euro area, Japan, United Kingdom, United States) interest rates less significant a factor in the ASEAN-5.

[7]The recursive VAR is ordered as follows: US 10-year Treasury yield, VIX, net capital inflows, policy rates, and principal components. For parsimony, figures show only the impulse response functions of the first two principal components for each country in response to global and domestic shocks.

Figure 4.1. Comovement of Latent Factors with Global Factors

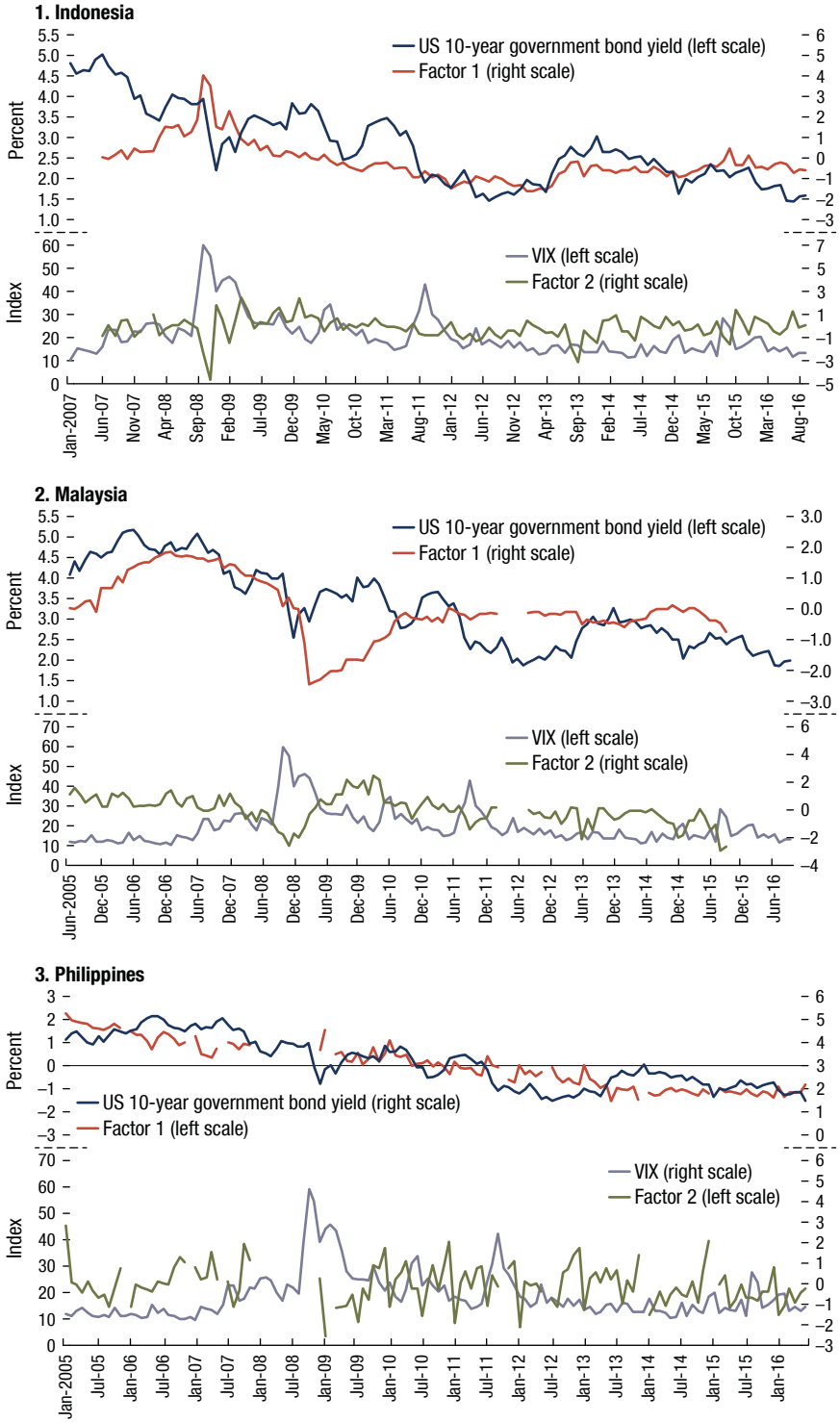
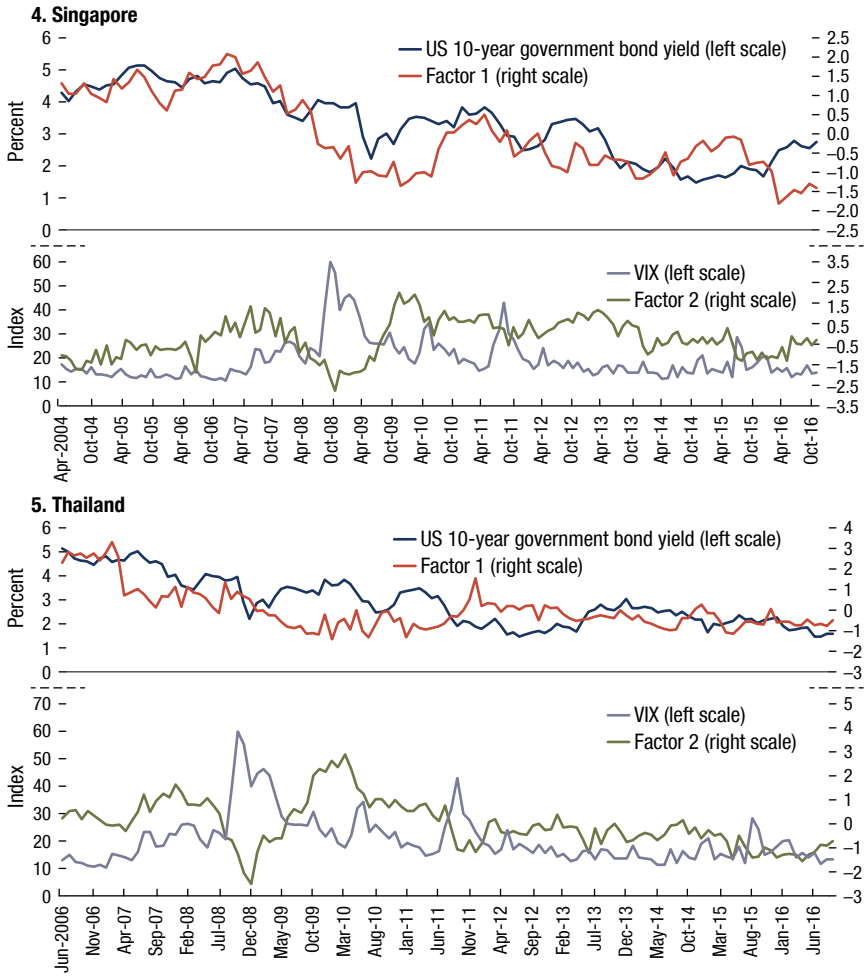


Figure 4.1 *(continued)*



Sources: Bloomberg Finance L.P.; CEIC Data Co. Ltd.; Haver Analytics; and IMF staff estimates.
Note: VIX = Chicago Board Options Exchange Volatility Index.

TABLE 4.1.

Proportion of Variance Explained by Principal Factors *(Share)*

	Factor 1	Factor 2
Indonesia	0.41	0.22
Malaysia	0.31	0.24
Philippines	0.45	0.18
Singapore	0.45	0.19
Thailand	0.30	0.23

Source: IMF staff calculations.

TABLE 4.2.

Cross-Correlation of the Principal Factors with Global and Domestic Variables

		US 10-year Government Bond Rate	VIX Index	Net Portfolio Flows	Policy Rate[1]	Domestic 10-year Government Bond Rate	Lending Rate	Growth of Credit to Private Sector[2]
Indonesia	Factor 1	0.670370*	0.456806*	−0.167171***	0.678629*	0.980260*	0.738652*	0.174695**
	Factor 2	0.284439*	−0.216273**	0.229517*	0.235127*	0.107123	0.360456*	−0.551433*
Malaysia	Factor 1	0.529747*	−0.302444*	0.030279	0.855638*	−0.062190	0.757896*	−0.069818
	Factor 2	0.512834*	−0.328599*	0.455342*	−0.325326*	0.190464**	0.279002*	−0.309277*
Philippines	Factor 1	0.799873*	0.053589*	0.153588***	0.799903*	0.909129*	0.946136*	−0.352955*
	Factor 2	0.097824	−0.224954**	0.147841	0.105539	0.011971	0.008761	0.586609*
Singapore	Factor 1	0.776220*	−0.332237*	0.311110*	0.069523	0.612826*	−0.782458*	−0.082982
	Factor 2	−0.127999	−0.239292*	0.199834**	0.153374***	−0.321578*	0.370595*	0.474466*
Thailand	Factor 1	0.564757*	−0.079831	−0.034819	0.850952*	0.593241*	−0.396958*	0.113971
	Factor 2	0.521675*	−0.079250	0.240941*	0.004379	0.514422*	−0.667889*	−0.201467**

Source: IMF staff estimates.

Note: VIX = Chicago Board Options Exchange Volatility Index.

*$p < 0.01$; **$p < 0.05$; ***$p < 0.10$.

[1]For Singapore, NEER month-over-month growth was used for the variable "policy rate."

[2]Month-over-month growth of credit to private sector, minus inflation (month-over-month c growth).

Figure 4.2. Global Financial Shocks and Domestic Financial Indicators

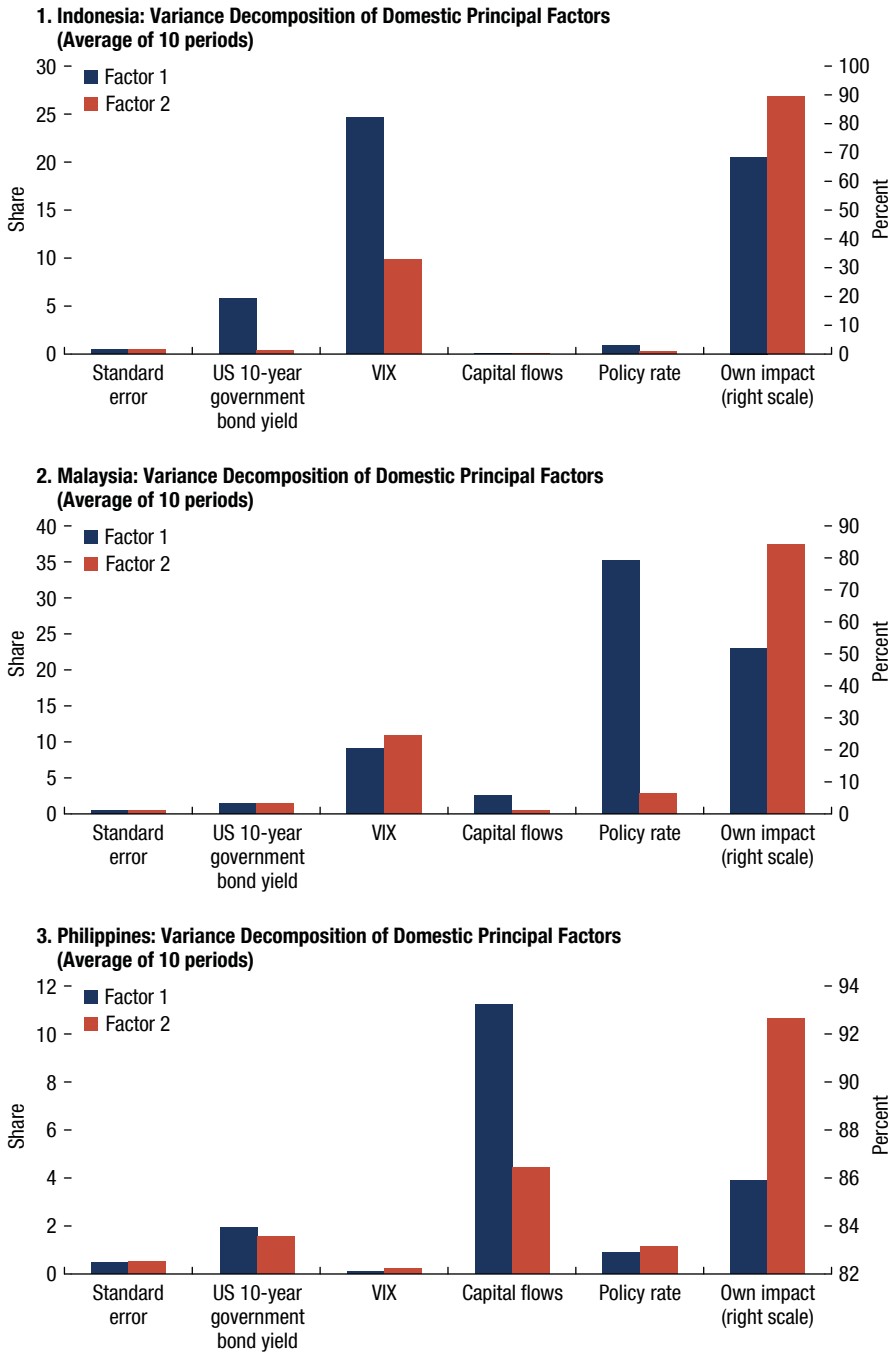
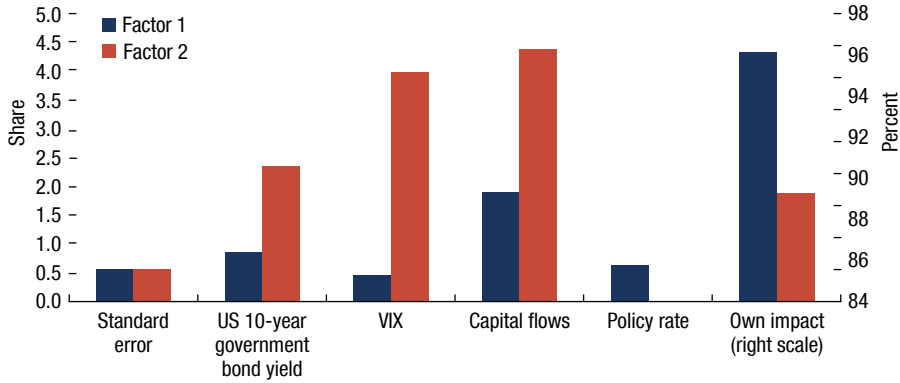
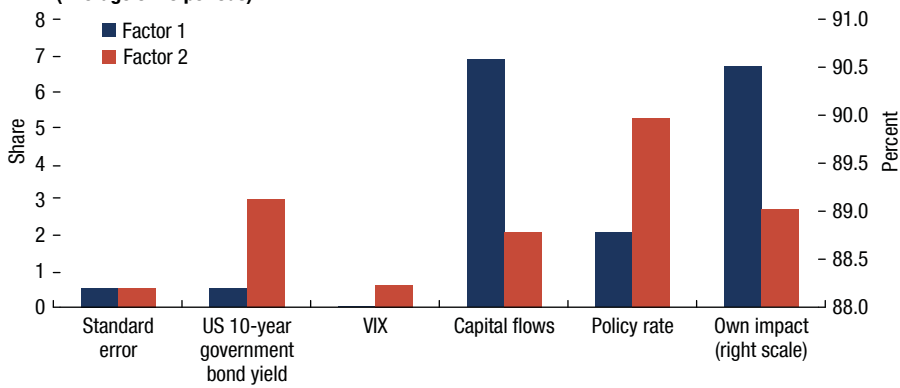


Figure 4.2 *(continued)*

4. Singapore: Variance Decomposition of Domestic Principal Factors (Average of 10 periods)



5. Thailand: Variance Decomposition of Domestic Principal Factors (Average of 10 periods)



Source: IMF staff estimates.
Note: Cholesky ordering: (1) US 10-year government bond yield, (2) VIX, (3) net capital flows in domestic economy, (4) domestic policy rate, (5) principal factors (F1 or F2). "Own impact" refers to the impact of a country's own shocks on the principal factors. VIX = Chicago Board Options Exchange Volatility Index.

EXTERNAL FACTORS, CREDIT SHOCKS, AND BUSINESS CYCLES

The role of external factors in driving emerging market economic growth is well established.[8] The approach in this section follows IMF 2014a and analyzes the relationship between emerging market business cycles and external conditions by

[8]Studies analyzing the role of external conditions in emerging markets' growth include Österholm and Zettelmeyer 2007 for Latin America; Utlaut and van Roye 2010 for Asia; and Adler and Tovar 2012, Akinci 2013, and Houssa, Mohimont, and Otrok 2013 for a more diverse group of emerging markets.

assuming that global economic conditions are exogenous to small open emerging market economies, at least on impact.[9] Thus, the impact of external shocks on a particular economy depends on how exposed the economy is to these shocks via cross-border links and on how domestic policy stabilizers are allowed to work. Over time, the cumulated effect on domestic growth may be amplified or dampened as domestic policies respond further to external shocks. Although the framework assumes that any contemporaneous feedback effects from emerging market economies' domestic conditions within a quarter are small enough to be ignored, it allows for these domestic conditions to affect global conditions with a lag.

The chapter uses a Bayesian structural VAR model to quantify the growth effects of external shocks. The external variables ("external block") include US real GDP growth, the 10-year US Treasury bond rate, the VIX, and economy-specific terms-of-trade growth. Within the external block, the structural shocks are identified using a recursive approach, based on the above order. In other words, US growth shocks can affect all other variables within a quarter, whereas shocks to other variables can affect US growth only with a lag of at least one quarter. Taken together, the US variables in the external block serve as a proxy for advanced economy economic conditions.[10] Changes in emerging market financing conditions arising from factors other than external demand conditions are incorporated through the VIX, a measure of global risk aversion. IMF 2014a also shows the rising importance of economic activity in China, directly and indirectly through changes in terms-of-trade growth, to represent factors other than changes in demand from advanced economies.

The impact of external shocks on economic activity could be transmitted through different channels and amplified by structural features and domestic policies. The baseline specification for domestic variables ("internal block") includes real GDP growth, domestic credit growth to the private sector, the domestic short-term interest rate, the rate of appreciation of the economy's real exchange rate against the US dollar, and domestic lending rates.[11] This specification captures the more traditional transmission channels of external demand and global financing conditions through trade channels and the domestic monetary policy response, including credit, interest, and exchange rate channels. However, as highlighted in the previous section, there may be an additional channel more closely related to the VIX operating through capital flows and asset prices. Thus, an alternative specification includes net capital flows, the foreign exchange sovereign bond yield (from the

[9]On the other hand, see IMF 2017b for the impact of external factors on trend or medium-term growth in emerging markets.

[10]With the federal funds rate at or near zero and the Federal Reserve's focus on lowering US interest rates at the long end following the global financial crisis, the 10-year Treasury bond rate or term premium is likely a better proxy for US monetary policy for the analysis. That said, results are robust to using alternative US interest rates.

[11]The baseline model is estimated individually for each ASEAN-5 economy using quarterly data from the first quarter of 2000 through the first quarter of 2017. An alternative specification to the baseline to include real estate prices did not significantly change the results and is not reported here.

JPMorgan Emerging Market Government Bond Index [EMBIG]), local currency 10-year government bond yield, and equity prices, with the latter a proxy for net worth of corporations to reflect financial accelerator effects.[12]

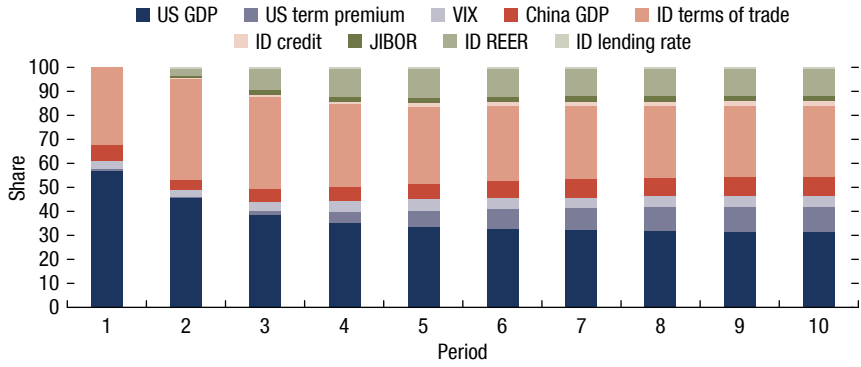
The ASEAN-5 are sensitive to both real and financial external shocks (Figure 4.3). External demand shocks from the United States and China have a significant impact on real economic activity, as expected, with a rising role for China. Chinese GDP shocks have a greater impact than US GDP on Singapore and Thailand, possibly reflecting their role as hubs of regional supply chains in Asia. On the other hand, country-specific global commodity prices, which are partly affected by Chinese shocks, have an additional significant impact in most countries, particularly in Indonesia and Malaysia. Global financial shocks also have a large and significant impact on real economy dynamics. The VIX, a measure of global risk aversion, or US interest rates—or both—are consistently a major influence on growth dynamics in all ASEAN-5 countries, with a rise in the VIX or US interest rates tightening domestic financial conditions and having a contractionary impact on economic activity. Higher US interest rates associated with rising global economic activity are also at times related to higher growth in the ASEAN-5, albeit with the contractionary effect dominating, on average. Variance decompositions corroborate the view that global shocks, in particular global financial shocks, are a major driver of growth dynamics in the ASEAN-5.

External shocks have a pervasive impact on the economy, operating partly through traditional monetary transmission mechanisms. Global financial factors such as US interest rate or VIX shocks have a strong influence on the traditional interest rate, credit, and exchange rate channels of monetary transmission, with a subsequent impact on real economic activity. Short-term interest rates, in particular, appear to be driven largely by global factors, raising the question as to whether financial globalization has weakened monetary autonomy in the ASEAN-5 countries despite the greater exchange rate flexibility observed since the Asian financial crisis (Chapter 2). Real exchange rate dynamics are driven by global financial shocks as well, with the Philippines and Thailand also affected by domestic credit and terms-of-trade shocks. Singapore's real effective exchange rate, with its unique, nominal effective exchange rate–based inflation-targeting regime, is influenced by a more diverse set of factors. Domestic bank credit to the private sector is determined by a more balanced set of global and other domestic shocks, including policy variables, suggesting that it may be more amenable to

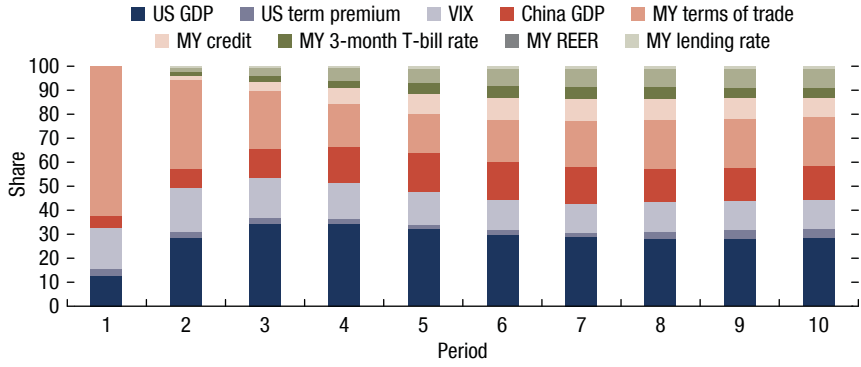
[12]The model is estimated individually for each ASEAN-5 economy using quarterly data from the first quarter of 2000 through the first quarter of 2017. The focus is on the period after the 1990s, given the significant structural breaks (for example, the Asian financial crisis) and shifts in policies in these economies during this time. The number of variables and lags chosen for the specification results in a generous parameterization relative to the short sample length. As a result, degrees of freedom are limited such that standard VAR techniques may yield imprecisely estimated relationships that closely fit the data—a problem referred to as "overfitting." A Bayesian approach, as advocated by Litterman (1986), is adopted to overcome this problem. This approach allows previous information about the model's parameters to be combined with information contained within the data to provide more accurate estimates (see IMF 2014a).

Figure 4.3. Domestic Activity and External Shocks (Baseline Model)

1. Indonesia: Variance Decomposition of Domestic Activity (Share of own shock excluded)



2. Malaysia: Variance Decomposition of Domestic Activity (Share of own shock excluded)



3. Philippines: Variance Decomposition of Domestic Activity (Share of own shock excluded)

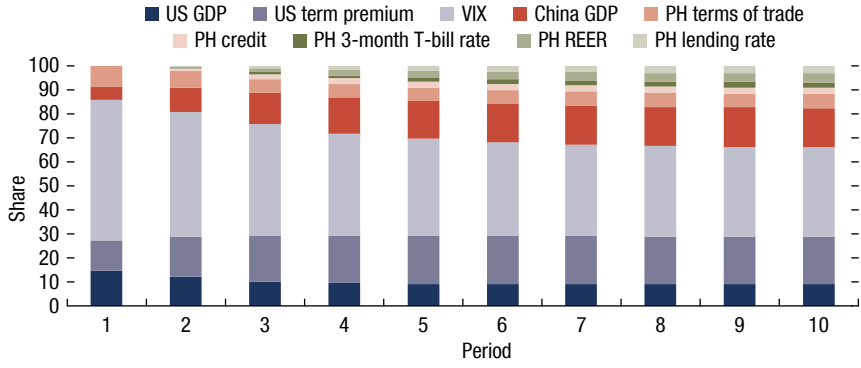
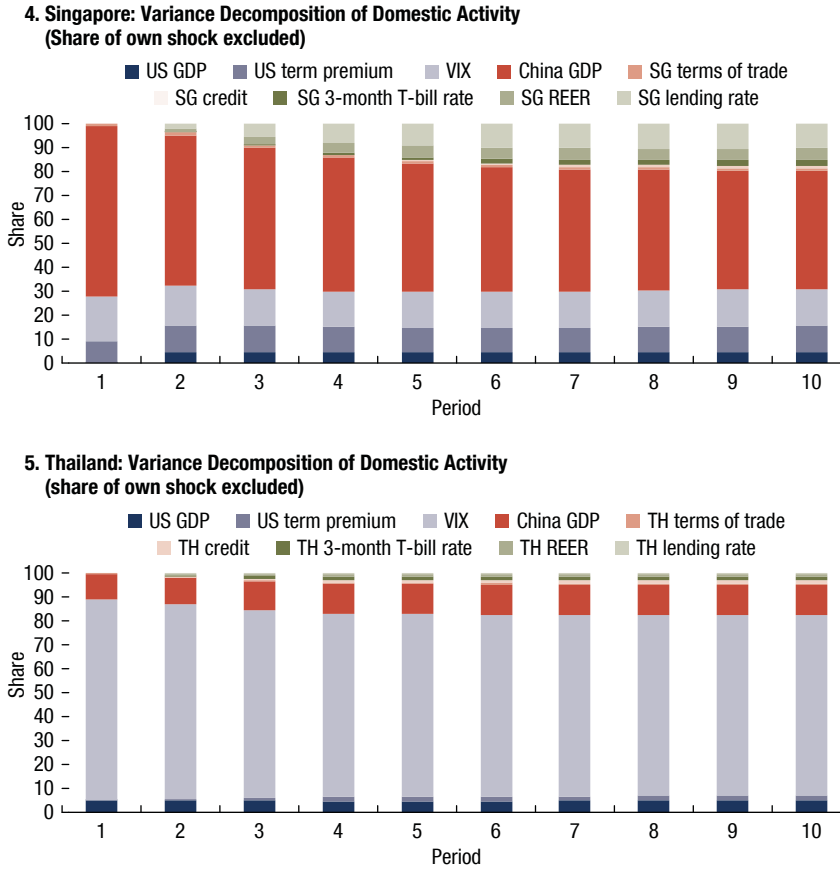


Figure 4.3 ***(continued)***



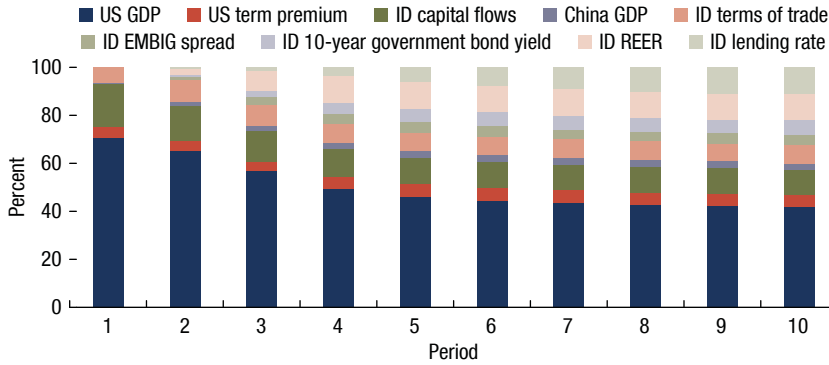
Source: IMF staff estimates.
Note: Cholesky ordering: (1) external factors: US GDP, US interest rate, VIX, and China GDP; (2) domestic factors: terms of trade, GDP, domestic credit, short-term interest rate, REER, and lending rate. ID = Indonesia; JIBOR = Jakarta interbank offered rate; MY = Malaysia; PH = Philippines; REER = real effective exchange rate; SG = Singapore; TH = Thailand; VIX = Chicago Board Options Exchange Volatility Index.

policy actions. Both credit demand and credit supply factors appear to be at play, with real lending rates only one of many factors affecting credit growth paths.

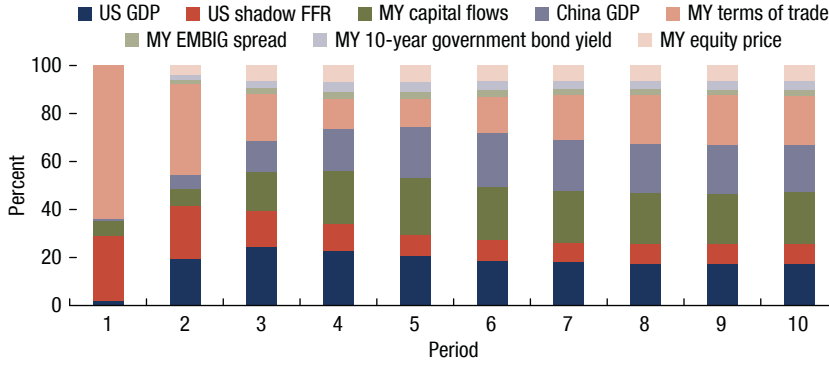
External shocks are also amplified and intermediated through the domestic financial system, partly channeled through capital flows (Figure 4.4). Impulse response functions of alternative specifications including more asset price and balance sheet variables suggest an amplification of global financial shocks through the financial system. The role of capital flows in transmitting and amplifying global shocks is unambiguous in all countries (IMF 2014b). However, the transmission

Figure 4.4. Global Factors, Net Capital Flows, and Domestic Activity (Alternative Model)

1. Indonesia: Variance Decomposition of Domestic Activity (Share of own shock excluded)



2. Malaysia: Variance Decomposition of Domestic Activity (Share of own shock excluded)



3. Philippines: Variance Decomposition of Domestic Activity (Share of own shock excluded)

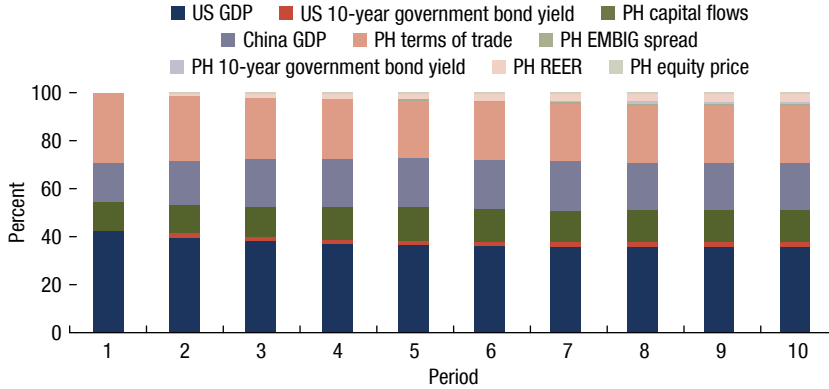
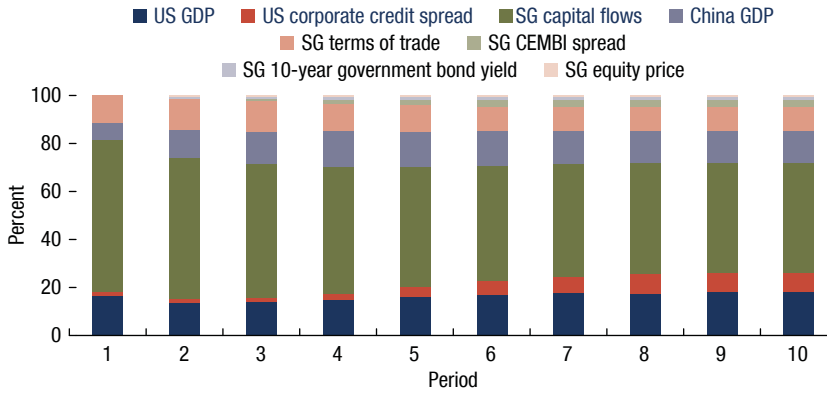
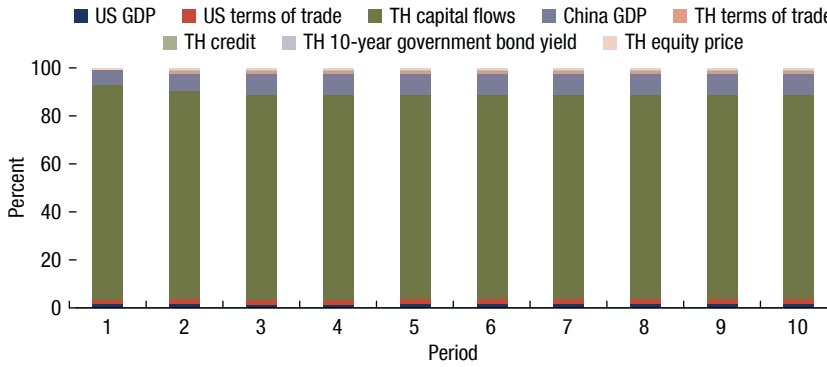


Figure 4.4 ***(continued)***

4. Singapore: Variance Decomposition of Domestic Activity (Share of own shock excluded)



5. Thailand: Variance Decomposition of Domestic Activity (Share of own shock excluded)



Source: IMF staff estimates.
Note: Cholesky ordering: (1) external factors: US GDP, US interest rate, capital flows, and China GDP; (2) domestic factors: terms of trade, GDP, emerging market spread, 10-year sovereign bond yield, REER, equity prices, and lending rate. CEMBI = JPMorgan Corporate Emerging Markets Bond Index; EMBIG = JPMorgan Emerging Market Government Bond Index; FFR = federal funds rate; ID = Indonesia; MY = Malaysia; PH = Philippines; REER = real effective exchange rate; SG = Singapore; TH = Thailand.

channels are country specific and depend on external exposures, structural factors, and policies. For example, in Indonesia, real lending rates seem to be an important source of economic fluctuations, with yields of domestic government bonds with a substantial foreign exposure significantly explaining their evolution. In other ASEAN-5 economies, equity prices play a significant role in amplifying global financial factors and capital inflows, perhaps through financial accelerator effects that reduce the external finance premium and borrowing costs to firms. Interestingly, local-currency-denominated borrowing from the domestic financial system through

bank credit or bonds appears more important than external financing spreads of the sovereign (EMBIG) or firms (JPMorgan Corporate Emerging Markets Bond Index), indicating that reliance on foreign-currency-denominated borrowing has diminished since the Asian financial crisis (see Chapter 3).

INTEREST RATE SPILLOVERS

Although the influence of global risk aversion on emerging market equity prices has been carefully studied (IMF 2014b; Yilmaz 2010), a closer look at spillovers on ASEAN-5 countries' domestic interest rates is needed, given their direct implications for the monetary and financial policy framework. How "reserve currency" monetary policies are transmitted to domestic long-term sovereign bond yields is of particular interest given that they act as a benchmark for pricing corporate bonds and household mortgages. The influence of global financial factors and risk aversion on domestic retail bank rates, directly or indirectly, through the monetary transmission mechanism is also important given the dominance of banks in the ASEAN-5 economies.[13]

Spillovers of Global Financial Shocks on Domestic Long-Term Sovereign Bond Yields

The methodology follows Peiris 2013, estimating an exponential generalized autoregression conditional heteroscedastic (EGARCH [1,1]) model of sovereign bond yields in the ASEAN-5 economies during 2000−15 using a comprehensive set of macro-financial variables including global factors. The results show that a decline in the shadow US federal funds rate[14] reduces long-term government bond yields in all ASEAN-5 economies. An increase in the US term premium, such as during the so-called taper tantrum episode in 2013, also results in higher long-term bond yields in all ASEAN-5 economies. The results indicate that a rise in the shadow federal funds rate and US term premium could have a greater impact on Indonesia and the Philippines (Table 4.3). Greater global risk aversion proxied by the VIX has a mixed effect on long-term rates, with a rise in the VIX increasing yields in Indonesia and the Philippines while lowering yields in Thailand, probably reflecting the greater home bias of Thai financial institutions. Robust fundamentals such as stronger current account balances and lower public debt tend to keep bond yields down. Expectations of currency depreciation can also drive bond yields higher. On an interesting note, better growth expectations often result in lower bond yields

[13]This section is focused on estimating global spillovers on ASEAN-5 interest rates since 2000, taking into account unconventional monetary policies in advanced economies. For a more detailed focus on the impact of unconventional monetary policies and their potential unwinding on emerging markets, see Chen, Mancini-Griffoli, and Sahay 2014 and Eichengreen and Gupta 2014.

[14]The federal funds rate provides the conventional measure of the US monetary policy stance, but at a near-zero rate since the end of 2008 it cannot capture the role of unconventional monetary policy. This prompts the consideration of other measures, including a shadow short rate (Krippner 2014). The shadow short rate is computed using estimates from a two-state variable shadow yield curve and has historically tracked the actual federal funds rate very closely, before reaching the zero lower bound.

TABLE 4.3.

Determinants of Sovereign Bond Yields *(Ten-year government bond)*[1,2]

	Domestic Factors						External Factors		
	Debt-to-GDP	Expected GDP (real % change, 1-yr forecast)	Inflation	Current Account Balance in % of GDP (−1)	Expected Exchange Rates (1-yr forecast)	Share of Foreign Holdings in Total LCY Government Bonds	VIX	Effective Federal Funds Rate	US Term Premium
Indonesia	0.062333*	−2.080023*	0.227762*	0.11060			0.04632**	0.37055**	0.803245*
	−0.046404**	−0.519522	0.274776*		0.000656*	−0.174364*	0.033914**	0.110244	0.63379*
Malaysia	0.018206	−0.194963***	0.08196**	0.013592			−0.005650	0.095469	0.142382
	−0.004524	0.112354	0.048385**		0.455059*	−0.013591	0.000604	−0.034009	0.174713*
Philippines	0.093204*	−0.899722*	0.024455	−0.178439*			0.015214*	0.41316*	0.527717*
	0.118536*	−0.642977**	0.208446*		0.187917*		−0.003698	0.10768	0.605144*
Singapore	−0.008626*	−0.148974*	−0.085395*	−0.019263			0.003095	0.181435*	0.309268*
	−0.007277**	−0.029602	−0.041678***		1.686303*		−0.004503	0.051912	0.218736*
Thailand	−0.03336**	0.140961	0.046901	−0.045019*			−0.00817	0.269024*	0.411737*
	−0.107366	0.163451	0.10453*		0.066449*	0.05807**	0.001842	0.288077*	0.48909*

Source: IMF staff estimates.

Note: LCY = local currency; VIX = Chicago Board Options Exchange Volatility Index; yr = year.

*$p < 0.01$; **$p < 0.05$; ***$p < 0.10$.

[1]The coefficients reflect the marginal increase in interest rates, in percent, of a 1 percentage point rise in the explanatory variables.

[2]Results of alternative specification considering changes in economy-specific terms of trade remain robust.

TABLE 4.4.

Determinants of Deposit Rates[1,2]

	Domestic Factors			External Factors		
	Policy Rate	Reserve Money Gap	Deposit Interest Rate (−1)	VIX	Federal Funds Rate	US Term Premium
Indonesia	0.027175**	−0.0000005	0.933521*	−0.000949	0.008974	0.027535
	0.148977*	−0.000002		−0.009033	0.395125*	0.607063*
Malaysia	0.043452*	−0.00000099**	0.941046*	−0.001112*	0.002053	0.013723*
	0.051323	0.0000126*		−0.00359**	0.094911*	0.085377*
Philippines	0.064288***	0.000000	0.888499*	0.001056	−0.004274	0.022956
	0.693344*	−0.00000269*		−0.003013	−0.050155	0.241218*
Singapore	−0.000592	0.000001	0.025152*	0.001321*	0.017002*	−0.002479
	−0.001191	0.000000		0.001087*	0.029868*	0.015474*
Thailand	0.051272**	0.000112	0.87608*	−0.002416	0.000888	0.009568
	0.309664*	−0.000103		−0.008819**	0.07583*	0.022943

Source: IMF staff estimates.
Note: NEER = nominal effective exchange rate; VIX = Chicago Board Options Exchange Volatility Index.
*$p < 0.01$; **$p < 0.05$; ***$p < 0.10$.
[1]For Singapore, NEER month-over-month growth was used for the variable "policy rate."
[2]The coefficients reflect the marginal increase in interest rates, in percent, of a 1 percentage point rise in the explanatory variables.

than vice versa, suggesting that investors may see better growth prospects as a sign of improved creditworthiness rather than just a cyclical consideration. Overall, the susceptibility of long-term bond yields to global factors is consistent with the high degree of foreign participation in the ASEAN-5 economies, with foreign portfolio capital flows being a key channel of spillovers, albeit with expectations and domestic residents continuing to play a significant role.[15]

Spillovers of Global Shocks on Retail Bank Interest Rates

Spillovers of global factors to retail bank rates in the ASEAN-5 countries were investigated following the approach of Ricci and Shi (2016) by estimating the domestic and global determinants of both deposit and loan rates (Tables 4.4 and 4.5).[16] In addition, the specification allows for liquidity effects and rigidities in interest rate transmission. The results indicate that global financial factors significantly affect bank behavior in the ASEAN-5 economies except possibly for

[15]The degree of foreign participation has a direct impact on sovereign bond yields in the ASEAN-5 as in other emerging markets (see Peiris 2013), while the role of global financial factors also remains significant. The impact of quantitative easing in the euro area and Japan was not distinguishable with US financial variables, which are the dominant global factor for the ASEAN-5. The increasing spillovers from China to emerging markets' financial markets, as reported in IMF 2016b, were also not discernible in the quarterly data from 2000–15 given the frequency of the sample.

[16]The empirical methodology follows Ricci and Shi 2016 in assessing the robustness of the findings to alternative specifications and subsample estimations, but the results were largely unchanged from the ordinary least squares estimates below for the full sample period, allaying concerns of omitted variable bias and structural breaks. The robustness of the results to alternative publicly available retail bank rate data was also tested, although supervisory data on bank deposit and loan rates were unavailable and may provide a more accurate measure of financing costs.

TABLE 4.5.

Determinants of Lending Rates[1,2]

	Domestic Factors				External Factors		
	Policy Rate	Reserve Money Gap	Lending Interest Rate (−1)	Equity Prices (−1)	VIX	Federal Funds Rate	US Term Premium
Indonesia	0.062514*	−0.0000005	0.955839*		0.002044	−0.014678	−0.011645
	0.072285	−0.0000066			0.01471***	0.674774*	0.829765*
	−0.011667	−0.000002		−0.000707*	0.005535	0.277657*	0.16202**
Malaysia	0.025667	0.0000012	0.912929*		−0.00141***	0.032964*	0.027321**
	0.029859	0.0000133*			0.009545*	0.383984*	0.243941*
	0.540194*	0.000004		−0.001056*	0.000506	0.206565*	0.189615*
Philippines	0.198824**	−0.0000002	0.73675*		0.008107	0.059109	0.152256**
	0.832216*	−0.00000247*			0.027624*	0.189371**	0.627367*
	0.337952*	−0.000001		−0.000486*	0.014131**	0.161869**	0.05785
Singapore	0.000107	−0.0000008*	0.982296*		0.000065	0.000525	0.001203
	0.004795	−0.0000006			0.001331*	−0.00896*	0.000812
	0.003364	−0.0000005		0.00003*	0.001496*	−0.00692*	0.006025*
Thailand	0.051432*	0.000246	0.976985*		−0.000205	−0.03145*	−0.008097
	0.167468*	−0.000223			−0.010757***	−0.49984*	−0.636922*
	0.016985	0.000284		0.002209*	0.019712*	−0.130755*	−0.173794*

Source: IMF staff estimates.

Note: NEER = nominal effective exchange rate; VIX = Chicago Board Options Exchange Volatility Index.

*$p < 0.01$; **$p < 0.05$; ***$p < 0.10$.

[1]For Singapore, NEER month-over-month growth was used for the variable "policy rate."

[2]The coefficients reflect the marginal increase in interest rates, in percent, of a 1 percentage point rise in the explanatory variables.

Thailand.[17] Lending rates are also affected by lagged equity prices, which are a proxy for net worth of firms and reflect balance sheet or financial accelerator effects affecting the cost of bank credit. However, the domestic policy rate and liquidity conditions (measured by the deviation of reserve money from a Hodrick-Prescott trend) also matter, affirming the important role of domestic monetary policy and liquidity management in influencing credit cycles.

WHAT LIES AHEAD? SPILLOVERS FROM ALTERNATIVE GLOBAL SCENARIOS

Global policy uncertainties are currently elevated, and global shocks could have large spillovers on the ASEAN-5 and emerging markets in general in the period ahead. For instance, faster-than-expected monetary policy normalization in the United States could tighten global financial conditions and trigger reversals in capital flows to emerging market economies, along with US dollar appreciation (Obstfeld 2017). Moreover, despite a decline in election risks, policy uncertainty could well rise further, reflecting, for example, difficult-to-predict US fiscal policies (Obstfeld 2017). In China, failure to address financial stability risks and curb excessive credit growth could result in an unwanted, abrupt growth slowdown, with adverse spillovers to other countries through trade, commodity price, and confidence channels.

This section uses a four-region version of the IMF's Global Integrated Monetary and Fiscal Model—consisting of China, the Philippines, the United States, and the rest of the world—to quantify potential spillover effects to the Philippines informed by the empirical analyses in the previous sections.[18] The simulations are based on three alternative scenarios that illustrate the global outlook under the realization of different downside risks: (1) a faster-than-expected pace of US monetary policy normalization that leads to an unexpected tightening of global financial conditions, (2) an unproductive US fiscal expansion, and (3) a funding shock in China that leads to lower-than-expected growth in China over the medium term.

Faster Monetary Policy Normalization in the United States

In this scenario, faster-paced monetary policy normalization in the United States, including through a gradual reduction in the Federal Reserve's securities holdings, causes a greater-than-expected tightening of global financial conditions. As discussed in IMF 2014c, this unexpected tightening could be triggered by market misperceptions about the speed of future monetary policy normalization in the United States. The US term premium rises by 20 basis points in 2018 and 2019,

[17]The increase in provisioning rates by the Bank of Thailand and tightening of banks' lending standards, probably related to rising household leverage, may explain the different results for Thailand.

[18]See Anderson and others 2013 for simulation properties of the Global Integrated Monetary and Fiscal Model.

and by 15 basis points in the subsequent two years (Bonis, Ihrig, and Wei 2017). This increase in the US term premium, in turn, raises the term premiums in other countries, consistent with the historical correlation for this type of shock. Furthermore, sovereign bond yields in the Philippines increase temporarily in 2018 (based on the estimates in Table 4.3) as investors become more reluctant to hold bonds issued by emerging markets.

Results: As financial conditions unexpectedly tighten, US real GDP falls by 0.5 percent in 2018 and 0.7 percent in 2019 (Figure 4.5). The Federal Reserve responds to market fears quickly by easing its monetary stance relative to the baseline, which helps contain the rise in US short-term interest rates. The adverse spillover to the Philippines could be significant, with real GDP falling by close to 1 percent in 2018 and 2019. The increases in the sovereign risk premium and the term premium raise the real interest rate and the external financing premium for leveraged firms, leading to weaker investment. The increase in the user cost of capital also reduces firm profitability and dividend payments to households and lowers production and labor demand, leading to weaker consumption. In response to weaker domestic private demand and the resulting moderate decline in inflation, the authorities lower the nominal policy interest rate and increase government spending. Improvement in the trade balance, which reflects mainly lower imports and a weaker currency, partially offsets the output loss.

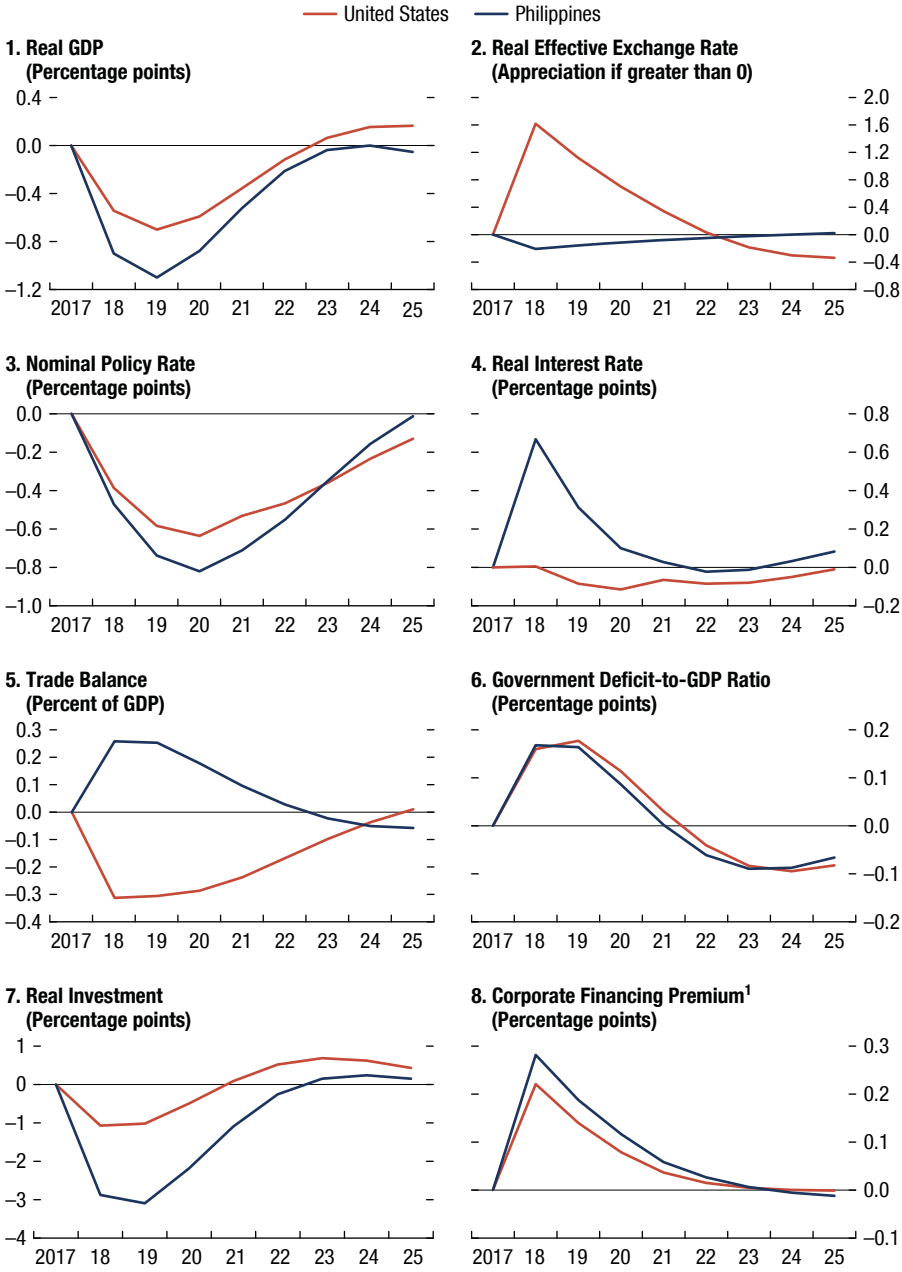
Unproductive US Fiscal Expansion

In this scenario, the United States embarks on a four-year debt-financed fiscal expansion (2018–21) through a combination of reduced taxes on labor and corporate income and increased infrastructure spending (IMF 2017c).[19] After four years, the US government adjusts its policy to stabilize the long-term government-debt-to-GDP ratio. During the first two years, households and firms take the fiscal stimulus as temporary in nature and behave accordingly. While US monetary policy responds endogenously to the change in demand, the rest of the world—except China and the Philippines—keeps policy rates at the effective lower bound. The infrastructure spending is assumed to be unproductive, leading to higher US inflation and faster normalization of the US term premium than with productive infrastructure spending. Labor tax cuts go mostly to wealthy households.

Results: During the fiscal expansion period, US real GDP rises by about 0.5 percent, and US monetary policy tightens in response to higher domestic demand and inflation (Figure 4.6). Real US interest rates also rise, and the US dollar appreciates in real effective terms. The US fiscal expansion affects the Philippine economy through the interest rate and the trade channels. The net

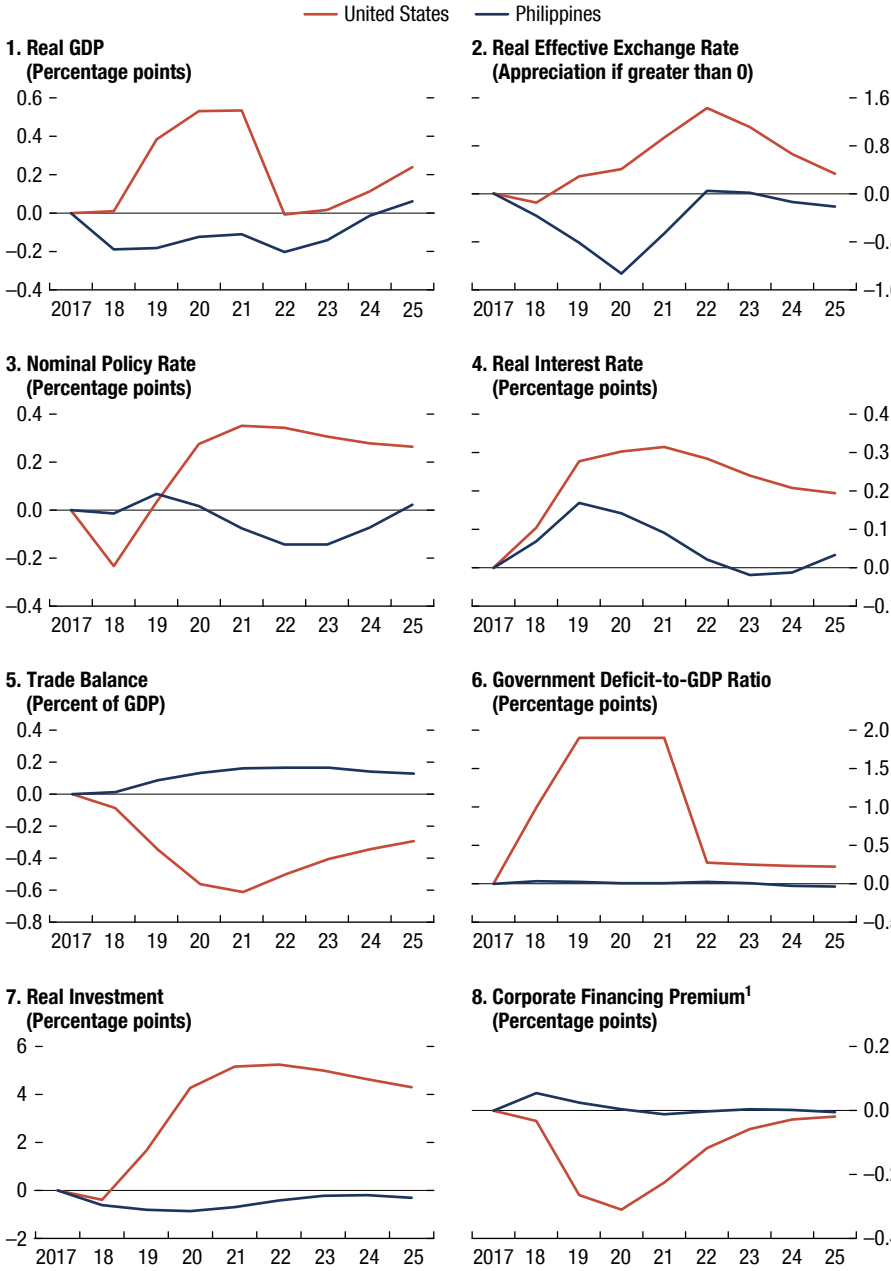
[19]This scenario is based on the "unproductive" infrastructure spending scenario in Scenario Box 1 of the April 2017 *World Economic Outlook* (IMF 2017c). The latter, however, used the IMF's G20 model for simulation. The estimation results here and in the *World Economic Outlook* are qualitatively similar, although the magnitude is generally smaller in this simulation.

Figure 4.5. Faster-than-Expected Monetary Policy Normalization in the United States
(Deviation from case with no shocks)



Source: IMF staff estimates.
[1]For firms in the tradables sector.

Figure 4.6. US Fiscal Expansion with Unproductive Infrastructure Investment
(Deviation from case with no shocks)



Source: IMF staff estimates.
[1]For firms in the tradables sector.

spillover impact on Philippine GDP is negative (about 0.2 percent) in the short term because global financial conditions tighten more than enough to offset the expected positive gains in trade.

Funding Shock and Lower Growth Path in China

In this scenario, China follows a lower growth path over the medium term owing to a temporary but persistent funding shock. The shock could be triggered by system-wide turbulence in the Chinese wholesale funding market or a run on short-term asset management products issued by nonbank financial institutions, as described in IMF 2017d. Under this scenario, real GDP growth falls about 2.5 percentage points below the baseline in 2018 and 2019, and remains below the baseline over the medium term. Furthermore, sovereign risk premiums rise in 2018, by 100 basis points in China and by 25 basis points in other economies, excluding the United States.

Results: Notwithstanding the significant output decline in China, the estimated spillovers to the Philippines are relatively moderate (Figure 4.7). Real GDP declines by about 0.6 percent in 2018 and 2019. The external financing premium for Philippine firms rises about 15 basis points in 2018. The currency remains broadly stable in real effective terms, but depreciates by almost 1 percent against the US dollar in real terms.

CONCLUSION

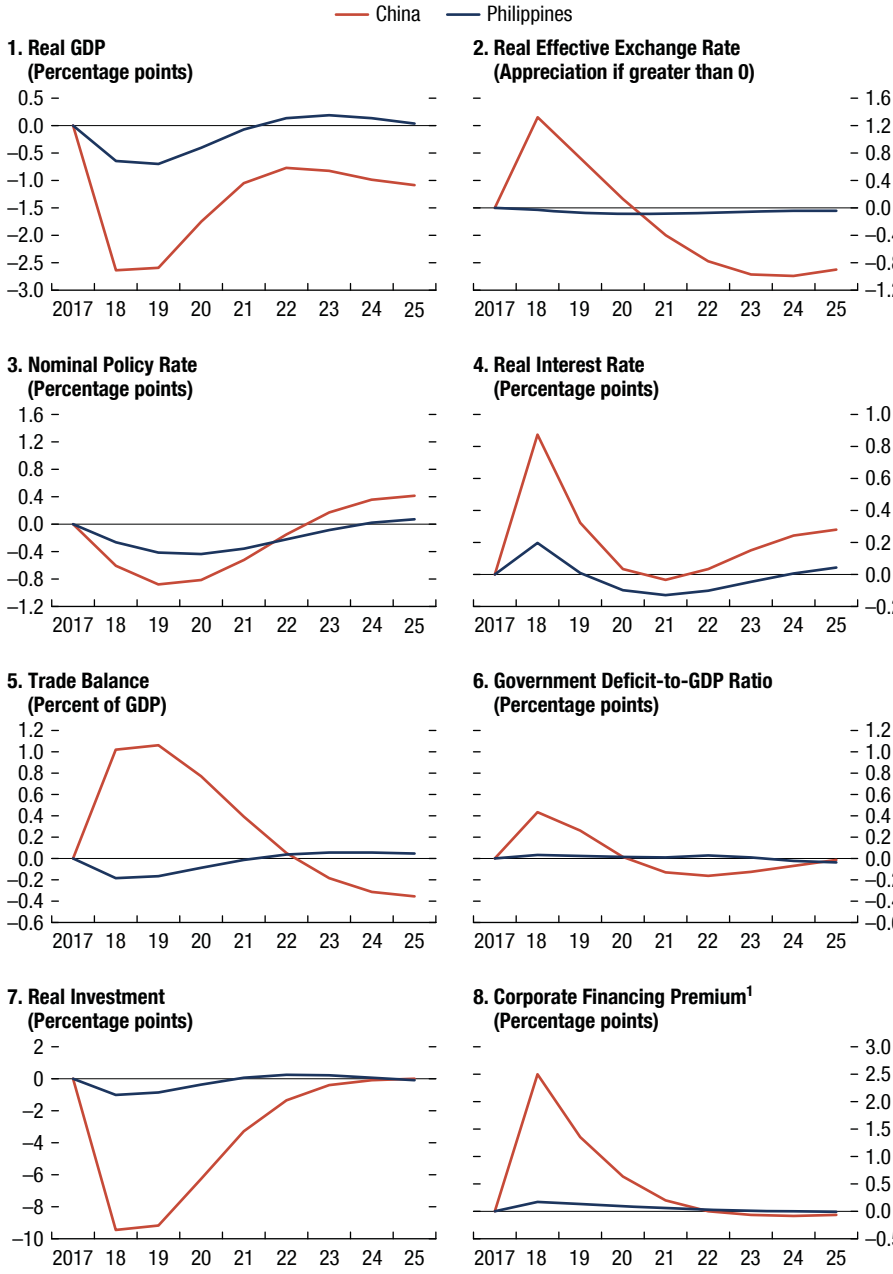
The rising sensitivity of domestic financial conditions in the ASEAN-5 countries to global financial factors is a key macro-financial transmission channel for external shocks. In the ASEAN-5 economies, two key macro-financial channels transmit global financial shocks: one is related to the VIX and affects largely capital flows and asset prices and the other is linked to US interest rates and affects mainly monetary and credit conditions.

The estimated macro-financial transmission of US interest rate and VIX shocks suggests a significant and pervasive impact of global financial factors on ASEAN-5 business cycle fluctuations, transmitted partly through capital flows. The global shocks tend to be amplified by asset prices ("financial accelerator" effects) and credit friction, with domestic short-term rates one of many factors driving business cycles. The susceptibility of asset prices to global factors, particularly via the interest rate structure of the economy, raises the prospect that financial globalization has weakened monetary autonomy in the ASEAN-5 despite the greater exchange rate flexibility observed since the Asian financial crisis. Real economy factors, such as external demand from the United States and more recently China, are also important, but global financial shocks tend to dominate growth dynamics in the ASEAN-5.

The extensive global spillovers to the ASEAN-5 are likely to pose new challenges. Global policy uncertainty is high, and several global policy scenarios,

Figure 4.7. Lower Growth in China

(Deviation from case with no shocks)



Source: IMF staff estimates.

[1]For firms in the tradables sector.

particularly those emanating from China and the United States, could spill over significantly to emerging markets based on historical experience. Illustrative model-based scenarios show that faster-than-anticipated monetary policy normalization in the United States or an abrupt growth slowdown in China would hit the ASEAN-5 economies hard through lower external demand and higher financing costs, warranting a policy response.

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CHAPTER 5

Monetary and Exchange Rate Policy Responses

INTRODUCTION

Managing the global financial cycle is a key challenge for Association of Southeast Asian Nations–5 (ASEAN-5) monetary frameworks. The results presented in Chapter 4 suggest there is a global financial cycle emanating from changes in US monetary policy and global risk aversion that drives domestic financial conditions and business cycles in the ASEAN-5 economies. This discovery calls into question the traditional "trilemma" view of the independence of monetary policy with a flexible exchange rate because a flexible exchange rate alone is unable to fully insulate economies from the global financial cycle when the capital account is highly open and financial flows are driven by monetary conditions in the United States (Rey 2013). The domestic monetary policy response to changing financial conditions and the degree of monetary autonomy retained in such an environment are an open question (Edwards 2015; Obstfeld 2015). Although the observed co-movement of interest rates across countries could be the result of limited monetary autonomy, it could alternatively reflect the behavior of fully independent central banks that react to synchronized and interdependent economic cycles. This chapter revisits this question by estimating monetary policy reaction functions, or Taylor rules, and the degree of monetary autonomy in the ASEAN-5.

Volatile capital flows can complicate macroeconomic management. Greater exchange rate flexibility helped the ASEAN-5 retain a degree of monetary policy autonomy, but asset prices and credit conditions were susceptible to global financial factors and volatile capital flows. To lean against the wind of capital inflows, policymakers have relied on, among other tools, macroprudential and microprudential measures, capital flow management measures, countercyclical fiscal policy, and foreign exchange market intervention (IMF 2012). The effects of many of these policies—let alone their desirability—remain open to debate in the literature (Blanchard, Adler, and de Carvalho Filho 2015). While progress on financial sector reforms and microprudential supervision has helped mitigate financial

This chapter was prepared by Hoe Ee Khor, Shanaka J. Peiris, Mia Agcaoili, Ding Ding, Jaime Guajardo, and Rui Mano.

stability risks (see Chapter 3), ASEAN-5 central banks also broadened the policy toolkit to include macroprudential policies to address financial stability risks at the systemic and sectoral levels (see Chapter 6 and IMF 2015a). This chapter takes a closer look at the rationale for foreign exchange market intervention—in combination with other policies—in the ASEAN-5 in response to the global financial cycle, following a number of studies on emerging market economies (see Benes and others 2013; BIS 2013; Escudé 2013; Ostry, Ghosh, and Chamon 2012). In this respect, the chapter seeks to contribute to the literature on the optimal combination of policies used by emerging market economies to manage external shocks (IMF forthcoming).

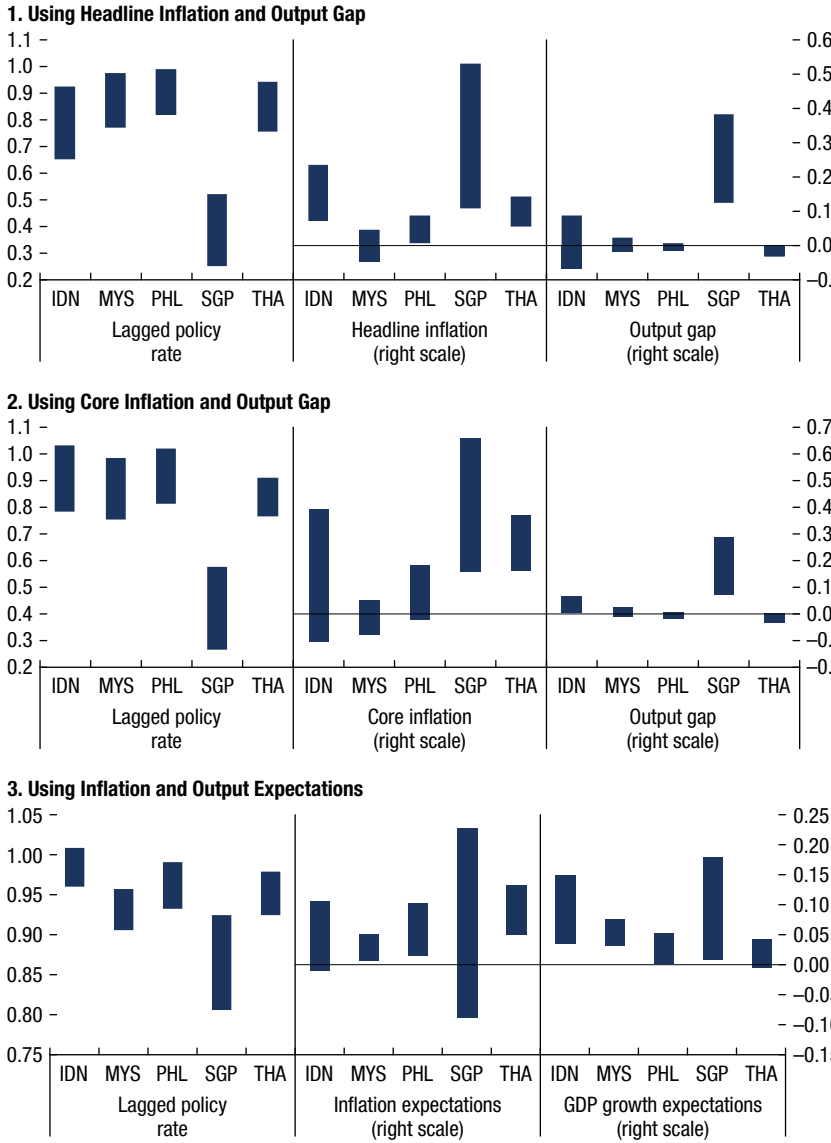
The policy responses to capital outflow episodes have drawn on lessons from past crises. The global financial crisis was a clear reminder of the risks of sudden stops of capital inflows. The chapter also outlines the policy responses to the postcrisis capital outflow episodes in the ASEAN-5. These economies used a wide range of policy tools to supplement monetary policy when addressing market pressures and their economic impact, based on the lessons from the Asian financial crisis of the late 1990s.

MONETARY POLICY RESPONSE

Estimates of Taylor rule reaction functions are used to gauge monetary policy responses and drivers (see Figure 5.1). The standard Taylor rule uses the output gap and inflation (or deviation from its target) and policy interest rate settings to estimate the policy reaction function (Taylor 1993). For Singapore, the rule is modified to reflect the country's use of the nominal effective exchange rate as the main monetary policy instrument (see, for example, McCallum 2006; Parrado 2004; MAS 2013). Augmentation of the Taylor rule to an open-economy setting permits analysis of the relevance of other variables, such as the exchange rate and global uncertainty, in monetary policy settings in the ASEAN-5 economies (Clarida, Galí, and Gertler 2001; Taylor 2001; Svensson 1999). This chapter uses a reduced form generalized method of moments estimation approach following the literature on the estimation of Taylor rules (Clarida, Galí, and Gertler 1998; Mohanty and Klau 2005).

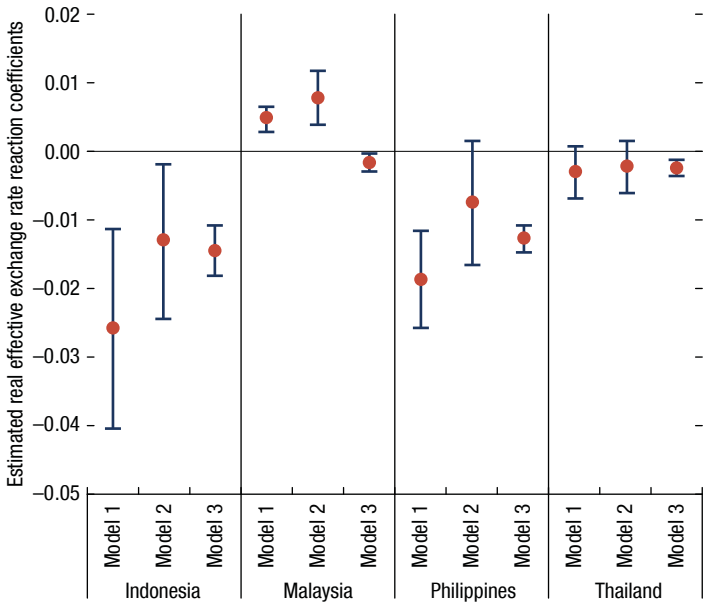
The Taylor rule estimations provide valuable insights into policy directions. The lagged dependent variable plays a large role in all ASEAN-5 economies, indicating a strong preference for interest rate smoothing, except in Singapore, which may be attributed to Singapore's use of the nominal effective exchange rate as its main policy instrument instead of interest rates. The analysis confirms the strong role of actual or expected headline inflation, or both, in guiding policy rate settings in all countries. Thailand, an inflation-targeting regime, stands out for its stronger response to core inflation; the inflation-targeting framework for many years focused on core inflation developments. On the other hand, the response to output developments among the ASEAN-5 appears to be more subdued or difficult to distinguish from their concern for inflation.

Figure 5.1. Taylor Rule Estimates for ASEAN-5



Source: IMF staff estimates.
Note: The bars represent the explanatory variables' coefficient values ±2 standard deviations, which were derived by estimating generalized method of moments models. For models using actual inflation and output gap data, quarterly data from 2000 to 2017:Q2 were used. Models using expectations data were of monthly frequency from January 2000 to June 2017. Labels in the figure use International Organization for Standardization country codes. ASEAN-5 = Indonesia, Malaysia, Philippines, Singapore, Thailand.

Figure 5.2. Estimated Coefficients in Policy Rates



Source: IMF staff estimates.
Note: Estimates were generated by running Taylor-type rules, augmented with nontraditional factors as follows: Model 1 includes the real effective exchange rate, Model 2 includes a dummy variable for the global financial crisis, and Model 3 includes the Chicago Board Options Exchange Volatility Index. The average coefficient estimates are represented by the red dots, while the range represents ±1 standard deviation.

Nontraditional factors also play a role in the ASEAN-5 economies (Figure 5.2). Previous studies have found the exchange rate to have an impact on monetary policy decisions in emerging market economies with inflation-targeting regimes (Ostry, Ghosh, and Chamon 2012; Mohanty and Klau 2005).[1] The coefficient estimates are statistically significant and negative in some countries and specifications, but the marginal impact is very small, of only a few basis points, suggesting the real exchange rate played only a small role in affecting the policy interest rate in the ASEAN-5 countries. In Indonesia and the Philippines, the results indicate some resistance to raising policy interest rates when the real exchange rate is appreciating, perhaps out of concern that it may attract further capital inflows. The results for Malaysia and Thailand are generally not statistically and economically significant. Looking at the possible role of global shocks, a dummy variable for the global financial crisis is strongly negative. The Chicago Board Options Exchange Volatility Index (VIX) was also found to be significantly

[1]At a theoretical level, De Paoli (2009) shows that in the presence of terms-of-trade externalities, the central bank's loss function in a small open economy may also include the real exchange rate.

negative in most countries, as the policymakers attempted to cushion their economies from spikes in global risk aversion.

The role of US interest rates and degree of monetary autonomy are explored in more detail given the finding of US interest rate spillovers on domestic financial conditions.[2] Higher US interest rates are generally associated with higher policy and market rates in the ASEAN-5 countries (see Chapter 4), in line with studies of other emerging markets.[3] This relationship calls into question the prediction of the classical trilemma that floating exchange rates enable open economies to implement an independent monetary policy (Rey 2014; Hofmann and Takáts 2015). Although the observed co-movement of interest rates across countries could be due to limited monetary autonomy, it could alternatively reflect the behavior of fully independent central banks that react to synchronized and interdependent economic cycles (Caceres, Carrière-Swallow, and Gruss 2016). Whether these spillovers constitute evidence of impaired monetary autonomy will depend crucially on whether the policy decision was consistent with domestic developments or was above and beyond what can be explained by the pursuit of domestic objectives.

DEGREE OF MONETARY AUTONOMY IN THE ASEAN-5

The degree of monetary policy autonomy in the ASEAN-5 is estimated by a two-step approach, building on the Taylor rule estimates of the previous section following Caceres, Carrière-Swallow, and Gruss (2016) (see Annex 5.1). Autonomy-impairing spillovers correspond to those movements in domestic interest rates that are triggered by foreign shocks but are not aligned with domestic monetary objectives. The first stage of the regression approach estimates traditional Taylor rules, as in the previous section, as aligned with central banks' ultimate goal of maintaining price stability while fostering economic growth. The exercise then obtains the residuals from the first-stage regression that are unaligned with the objectives of monetary policy and then measures how much of the movement of these residuals is attributable to US interest rates.[4]

The regression results for the ASEAN-5 show that policy rates are susceptible to global monetary shocks, controlling for the interdependence of economic cycles. The effective federal funds rate and shadow federal funds rate were found to be significant factors for monetary policy movements in all of the ASEAN-5 economies (Table 5.1). Indonesia and the Philippines were the most responsive. The deeper bond markets of Malaysia and Thailand were less affected, whereas Singapore was more sensitive, reflecting its exchange-rate-based inflation-targeting

[2]In most settings, the theoretical literature has argued that the foreign monetary policy rate should not be included as an additional argument in the central bank's policy function (Woodford 2007).

[3]The concept of monetary autonomy is intimately related to the notion that interest rates "spill over" from large to small open economies or from reserve currency economies to non–reserve currency economies.

[4]The estimations considered various interest rates of reserve currency economies but report the results for US interest rates because they were the most robust factors.

TABLE 5.1.

Regression Estimates: US Monetary Policy Spillover to Domestic Policy Rates

	Effective Federal Funds Rate	VIX Index	Treasury Bond Yields
Indonesia	0.31***	0.00	0.07**
	(0.04)	(0.01)	(0.03)
Malaysia	0.04***	0.00	0.00
	(0.01)	(0)	(0.01)
Philippines	0.43***	−0.04***	0.50***
	(0.04)	(0.01)	(0.07)
Singapore	0.21***	−0.05***	0.03
	(0.06)	(0.02)	(0.1)
Thailand	0.13***	−0.02**	0.06
	(0.03)	(0.01)	(0.05)

Source: IMF staff estimates.
Note: Standard errors are in parentheses.
P denotes the *p*-value as the probability of obtaining a result equal to or more extreme than observed. VIX = Chicago Board Options Exchange Volatility Index.
*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

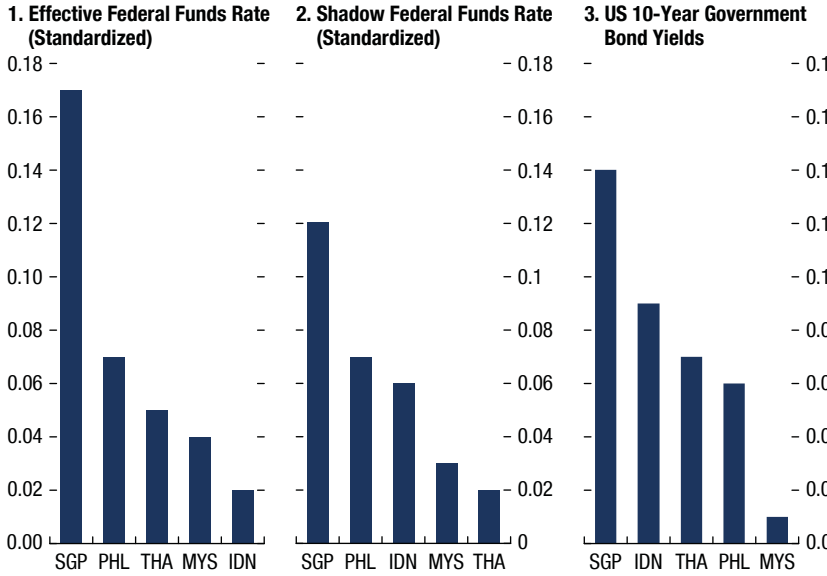
regime and highly open capital account. Finally, 10-year US Treasury bond rates were also found to be significant factors for the Philippines and Indonesia.

The dynamic interactions of domestic and external factors can provide further insights into policy responses. The single-equation regression approach above does not take into account the potential feedback effects of shocks to monetary policy rates on domestic macroeconomic factors. It also assumes contemporaneous relationships and does not fully capture inertial effects. To accommodate the dynamic relationships, the regression models are extended to structural vector autoregression (SVAR) models, following the methodology of Caceres, Carrière-Swallow, and Gruss (2016). The analysis imposes block exogeneity on global factors such that domestic conditions may only affect global factors with a lag, and only global factors may affect domestic factors contemporaneously.

The ASEAN-5 enjoy varying degrees of monetary autonomy, with policy rates continuing to respond largely to local factors despite significant spillovers to domestic interest rates.[5] The two-stage SVAR impulse response functions show that Singapore's domestic short-term interest rates are the most susceptible to movements in external monetary and financial markets, which is to be expected, as the trade-weighted nominal effective exchange rate nominal anchor and highly open capital account provide little autonomy for setting domestic interest rates (Figure 5.3). The Philippines and Indonesia also exhibited heightened sensitivity to the federal funds rate and US 10-year sovereign yield, respectively. Malaysia and Thailand showed less sensitivity to US interest rates. The variance decompositions showed a similar pattern but highlighted that policy rates continued to be determined largely by domestic factors, with most of the variance attributed to the countries' own

[5]Many studies have found that even if floaters enjoy more autonomy than peggers, the pass-through of international to domestic interest rates remains significant in both groups (some examples include Frankel, Schmukler, and Servén 2004; and Edwards 2015).

Figure 5.3. Twelve-Month Cumulative Response of Domestic Policy Rates to US Policy Rates and Other Global Factors

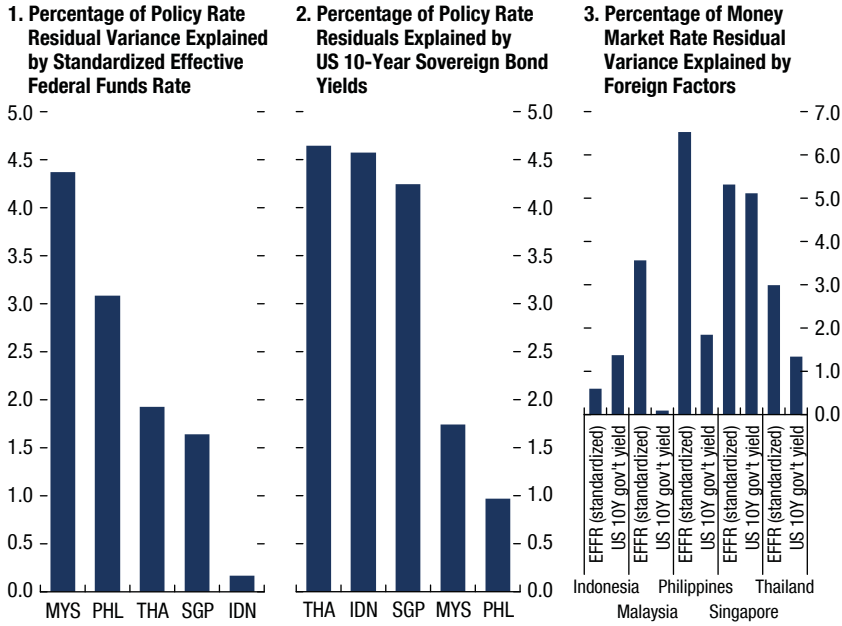


Source: IMF staff estimates.
Note: Labels in the figure use International Organization for Standardization country codes.

innovations or interest rate smoothing (Figure 5.4). However, US interest rates explain a significant share of the variance of policy rates not attributed to domestic factors. In addition, the share of variance of short-term market rates in the ASEAN-5 appears to be more susceptible to and driven by US interest rates, indicating lower de facto monetary autonomy than implied by policy rates in some instances.

Beyond the impact on the policy rates, changes in external conditions significantly affect domestic financial conditions and constrain monetary policy effectiveness. Chapter 4 showed that global financial factors have a significant and pervasive impact on the domestic economies, partly transmitted through capital flows and domestic financial conditions. This investigation follows the approach of IMF 2014 to analyze the role of external factors in driving business cycles in the ASEAN-5, extended to encompass the monetary transmission mechanism as in Chapter 4. The impulse response function of monetary policy shocks in the ASEAN-5 shows significant impacts on real GDP and inflation, but with a significant lag. Policy rates' ability to dampen the volatility of growth is much weaker than that of inflation in the ASEAN-5, which perhaps explains in part the weaker response to output developments in the Taylor rule estimates reported earlier. However, the variance decompositions show that monetary policy and domestic shocks do not explain variations of business cycle fluctuations as much as external factors, which highlights the importance of understanding global spillovers and the effectiveness of policy

Figure 5.4. Variance Decomposition of the Two-Stage Vector Autoregression



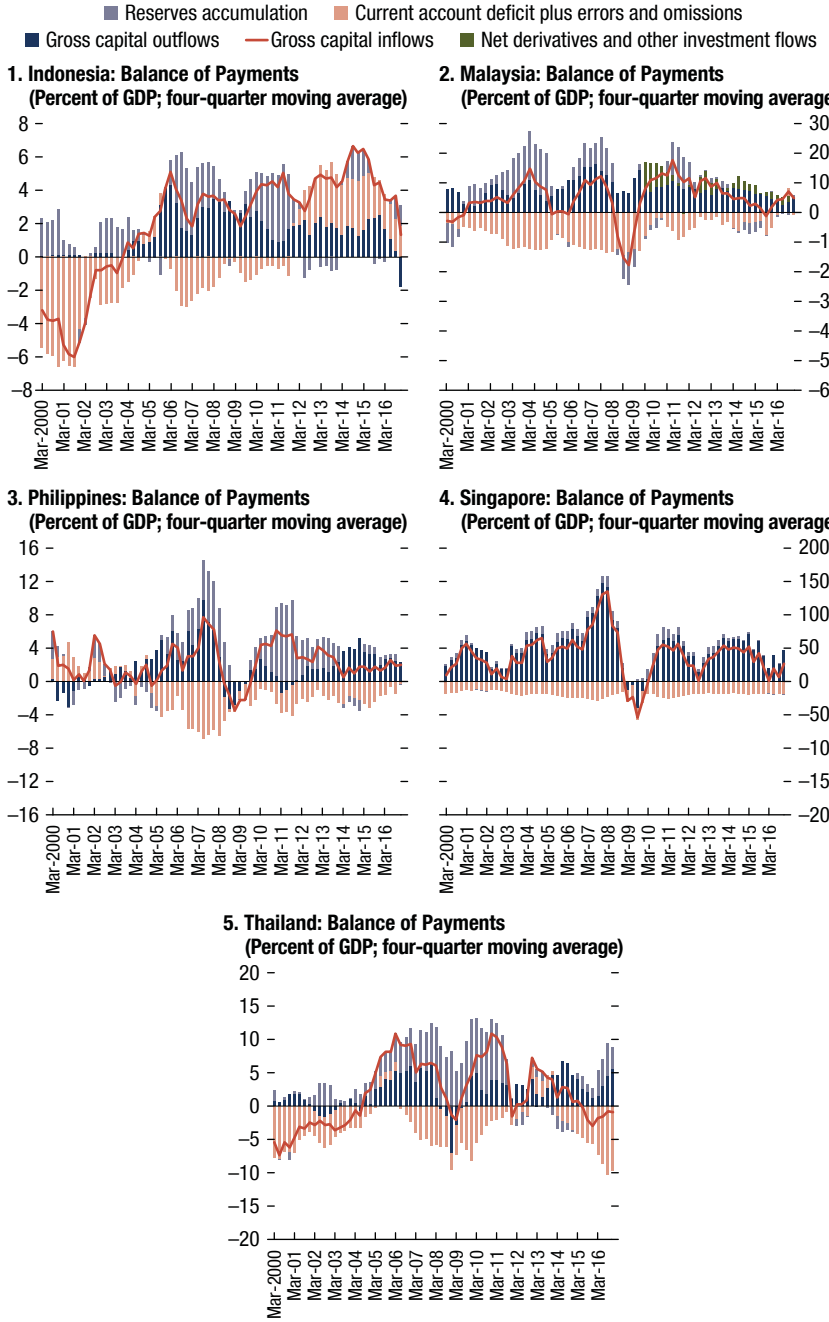
Source: IMF staff estimates.
Note: Labels in the figure use International Organization for Standardization country codes.
EFFR = effective federal funds rate; 10Y = 10-year.

combinations (see IMF, forthcoming). This understanding, in turn, is based on how key macroeconomic aggregates and financial prices (mainly interest rates, exchange rates, and domestic financing conditions) respond to the external factors. Effectiveness is thus intertwined with macroeconomic and other policy transmission channels and any potential interactions between these policies. Global commodity prices, proxied by country-specific terms-of-trade changes, also have a significant impact, particularly on inflation dynamics in the ASEAN-5, further reducing the efficacy of monetary policy in influencing inflation.

EXTERNAL ADJUSTMENT TO CAPITAL FLOWS IN THE ASEAN-5

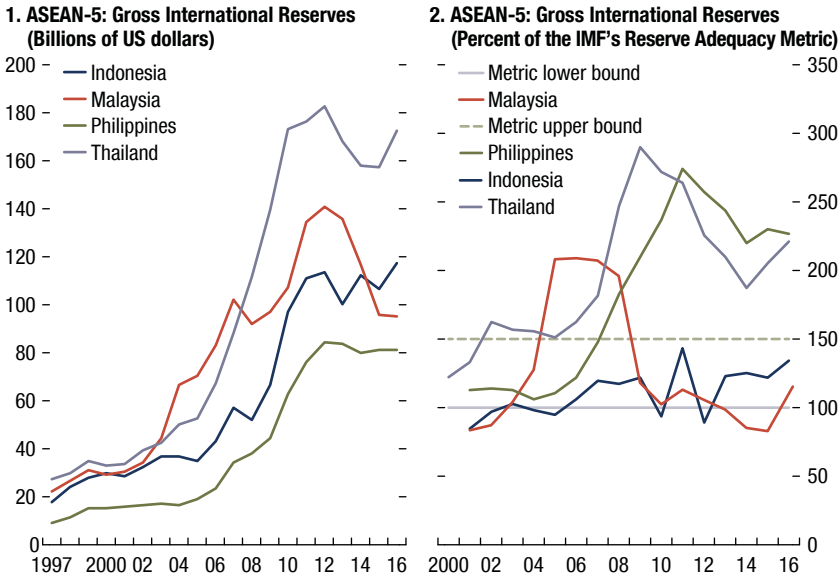
Global financial cycles have also complicated external policymaking in the ASEAN-5 economies. These economies experienced a surge in gross capital inflows in the period of low volatility (as measured by the VIX) before the global financial crisis and in the period of unconventional monetary policies in advanced economies after the crisis (Figure 5.5). As noted in IMF 2013, there are two ways in which countries can adjust to a surge in gross capital inflows: financial adjustment through

Figure 5.5. ASEAN-5: Financial versus Real Adjustment to Gross Capital Inflows



Sources: Country authorities; and IMF staff estimates.

Figure 5.6. ASEAN-5: International Reserves and Adequacy Metric



Sources: Country authorities and IMF staff estimates.

increases in resident capital outflows or reserves accumulation, or real adjustment through an appreciation of the exchange rate and a larger current account deficit. Before the global financial crisis, all ASEAN-5 economies adjusted through the financial channel, with resident capital outflows rising in tandem with foreign capital inflows. But the effect was not sufficient to offset the massive influx of foreign exchange because these economies were also running current account surpluses. Thus, central banks complemented resident capital outflows with reserves accumulation through foreign exchange market intervention to avoid an excessive appreciation of their exchange rates. This policy response was in line with the goal of rebuilding reserve buffers after the Asian financial crisis. Reserve levels were below or at the lower end of the IMF's reserve adequacy metric range early in the first decade of the 2000s, but were brought to comfortable levels by 2007 (Figure 5.6).

The policy trade-off for the ASEAN-5 economies was more severe after the global financial crisis. The surge in foreign capital inflows after the crisis as a result of the unconventional monetary policies in advanced economies was not offset by similar outflows from domestic residents, except in Singapore, a financial center, and to some extent in Malaysia where capital markets were deeper. To avoid a deterioration in current account balances (real adjustment), central banks stepped up reserves accumulation, with mostly one-sided foreign exchange market intervention, particularly in Indonesia, the Philippines, and Thailand, and to some degree in Malaysia. This additional accumulation of reserves was not motivated

purely by precautionary motives, given that reserve buffers were already at comfortable levels. Moreover, Indonesia also experienced a real adjustment, with its current account balance moving from surplus to deficit in 2012. Reserves remained within the adequacy range in Indonesia and Malaysia, and well above this level in the Philippines and Thailand.[6] The large accumulation of reserves and partial sterilization in some instances resulted in a persistent liquidity overhang and low domestic borrowing costs, which fueled credit growth and asset price inflation. Countries were reluctant to tighten monetary policy as they were concerned that doing so could attract even more capital inflows. Instead, they relied on macroprudential policies, but their effectiveness was limited in countries with financial supervisory gaps, in which tighter prudential measures on banks could divert financial intermediation to the less regulated nonbank sector (see Chapter 6).

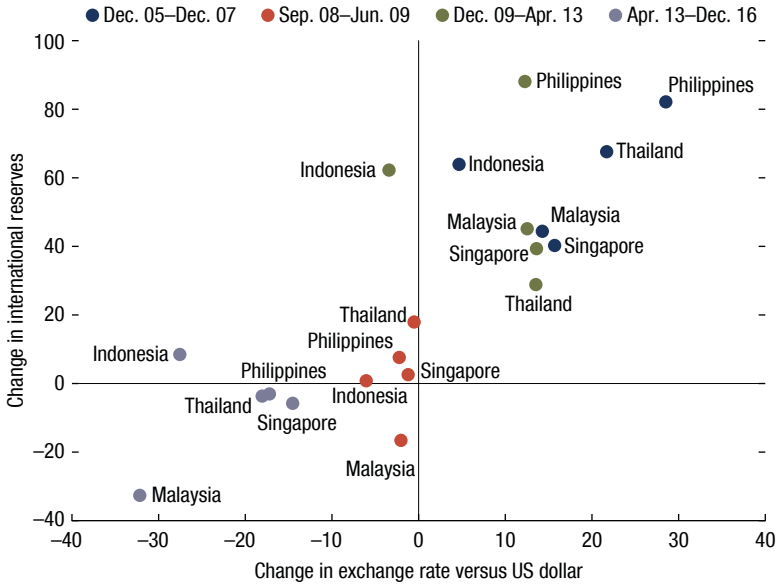
Nonresident capital inflows and reserves accumulation have eased since 2013, with foreign exchange market intervention becoming two sided and more symmetric. The ASEAN-5 economies' foreign reserves have stabilized or fallen following the taper tantrum episode in mid-2013. Nonresident capital inflows have moderated or turned negative as US monetary policy has gradually normalized. All ASEAN-5 economies, except Indonesia, experienced net capital outflows, which sometimes surpassed the current account surplus, leading to more two-sided foreign exchange market interventions. Indonesia's current account balance has remained in deficit, and the country has continued to receive net capital inflows. But these inflows were not always sufficient to cover the current account deficit, thus also leading to two-sided foreign exchange market interventions. During the recent episodes of large capital outflows, the ASEAN-5 economies have relied more on currency depreciation than on reserves drawdown than they had in previous outflow episodes (Figure 5.7). Reserves were drawn down, in some cases below the IMF's reserve adequacy metric range (Indonesia and Malaysia), but have remained above this range in the Philippines and Thailand.

Foreign Exchange Intervention and Costs of Holding Reserves

The experiences of the ASEAN-5 economies in managing capital inflows indicate that the move to a more flexible exchange rate regime was gradual (IMF 2016a). The ASEAN-5 economies accumulated foreign reserves for precautionary reasons between the Asian financial crisis and the global financial crisis and in response to large capital inflows after the global crisis. In both cases foreign exchange market interventions were generally one-sided, although central banks let their currencies partially appreciate while leaning against the wind. Since 2013, these economies have stopped accumulating reserves, and foreign exchange market intervention has become two sided and more symmetric. Exchange rates have fluctuated more freely, serving as effective shock absorbers. Greater exchange rate flexibility may also have mitigated the slowdown in capital inflows, as shown in

[6]Note that Malaysia's exchange rate regime was reclassified to "floating" with effect from September 26, 2016, and the reserve adequacy level adjusted accordingly.

Figure 5.7. Changes in Exchange Rate and Foreign Reserves
(Percent)



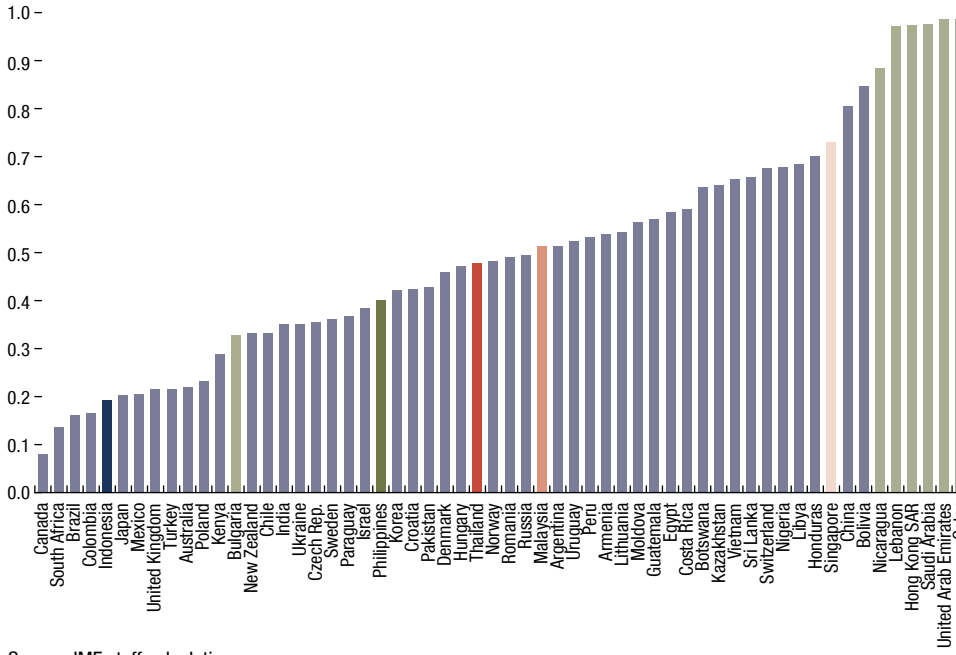
Sources: Bloomberg L.P.; and IMF staff estimates.

IMF 2016b, where more flexible exchange rate regimes lower the share of the total variance in capital inflows explained by common global factors.

Despite the extensive use of foreign exchange market intervention, the ASEAN-5 economies are not among the heaviest interveners, except for Singapore. Adler, Lisack, and Mano (2015) built an indicator of the degree of foreign exchange market intervention for 52 economies using monthly data during 1996–2013 (see Figure 5.8). The indicator is defined as the standard deviation of the central bank's net foreign asset position divided by the sum of that standard deviation and the standard deviation of the nominal exchange rate. A higher value indicates more foreign exchange market intervention. Among the ASEAN-5 economies, Indonesia has the lowest degree of intervention, comparable to that of some advanced economies. The Philippines and Thailand follow, with slightly higher degrees of foreign exchange market intervention. Malaysia is near the median of the sample, while Singapore has a very high degree of intervention, comparable to that of China, consistent with its exchange rate–based monetary policy framework. However, this indicator does not measure whether foreign exchange market intervention has been one or two sided and thus should not be interpreted as a measure of exchange rate flexibility.

Studies have found a significant and persistent effect of foreign exchange market intervention on the exchange rate level, validating the view that the move to exchange rate flexibility in the ASEAN-5 economies has been gradual. Adler,

Figure 5.8. Degree of Exchange Rate Management



Source: IMF staff calculations.
Note: The figure reports a measure $\rho_j = \frac{\sigma_j^{NFA}}{\sigma_j^{NFA} + \sigma_j^{S}}$, in which $\sigma_j^{\Delta NFA}$ and $\sigma_j^{\Delta S}$ denote the standard deviations of changes in net foreign assets and in the nominal exchange rate, respectively. The last six bars correspond to countries with de jure pegs for most of the sample.

Lisack, and Mano (2015) investigate the impact of foreign exchange market intervention on exchange rate levels using an instrumental-variables panel approach for 52 economies based on monthly data during 1996–2013. They find that intervention affects the exchange rate in a persistent manner. A purchase of foreign currency equivalent to 1 percent of GDP causes the nominal exchange rate to depreciate by 1.7 to 2.0 percent, with a half-life cycle of between 12 and 23 months. These findings suggest that the persistent one-sided foreign exchange market intervention by the ASEAN-5 economies before the global financial crisis and during 2010–12 kept their currencies weaker than they would have been otherwise. Since 2013, however, interventions have been two sided and more symmetric, suggesting that although exchange rate fluctuations have been smoothed, the average level of the exchange rate has not necessarily been affected.

The ASEAN-5 central banks have generally sterilized their foreign exchange market interventions to avoid inflation pressure arising from reserve inflows (IMF 2016a). The intensity of sterilization in the ASEAN-5 economies is estimated following the approach of Aizenman and Glick (2008), regressing the central bank's annual change in net domestic assets (*NDA*) on the annual change in net

foreign assets (*NFA*), both scaled according to the level of the reserve money stock 12 months earlier (*RM* (–12)), as follows:

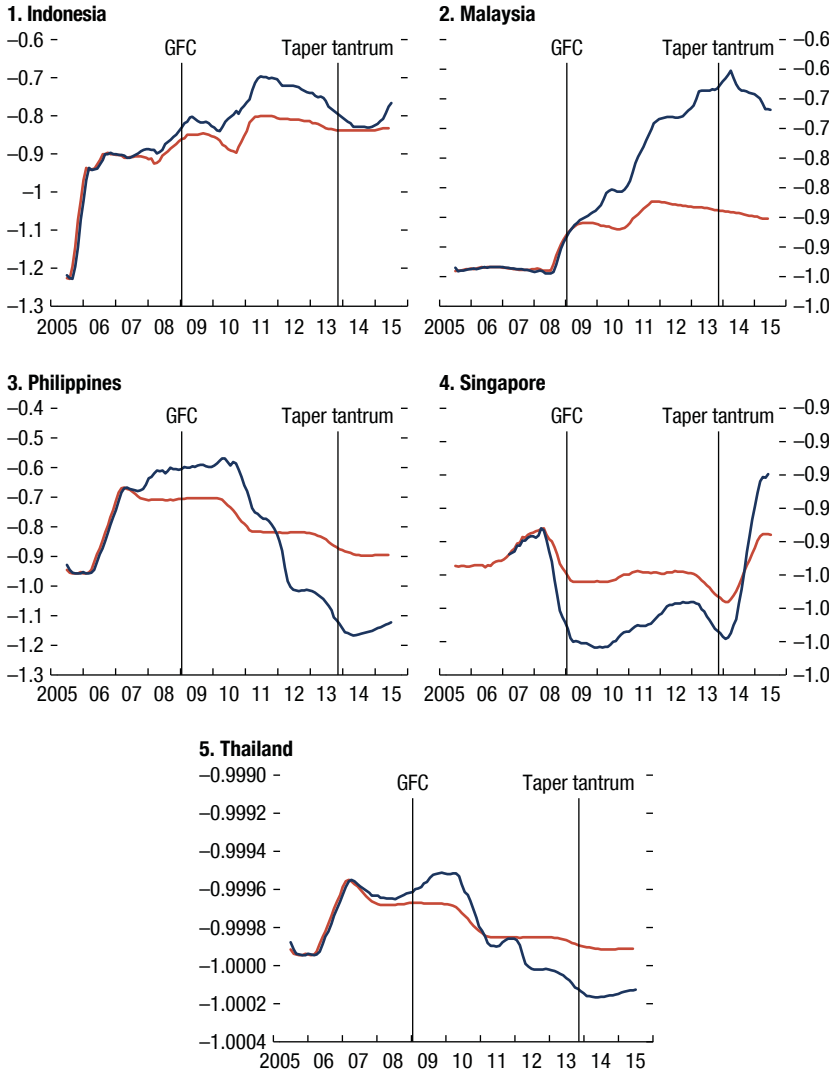
$$\Delta NDA/RM(-12) = \alpha + \beta \Delta NFA/RM(-12) + \varepsilon.$$

The regression is estimated using 1-month extended and 60-month rolling windows. The coefficient β measures the intensity of sterilization, with $\beta = -1$ representing full sterilization of reserve changes, $\beta = 0$ implying no sterilization, and $-1 < \beta < 0$ indicating partial sterilization. Average sterilization coefficients in the ASEAN-5 economies have remained close to $\beta = -1$ in the post–Asian financial crisis period (Figure 5.9; Table 5.2). In general, the ASEAN-5 countries have attempted to fully sterilize their foreign exchange market intervention even during the period of exceptionally easy monetary policy in advanced economies (albeit with temporary periods of partial sterilization in Indonesia, Malaysia, and the Philippines), when the buildup of reserves was especially strong and sterilization may have attracted greater capital inflows.

Foreign exchange market intervention and reserve holdings may be costly, and their benefits need to be weighed against their costs. Adler and Mano (2016) estimate the marginal cost of intervention (per US dollar) and the total cost of rolling over reserve positions, both ex post and ex ante, for 73 economies during 2002–13. Ex post costs consider domestic and external interest rates as well as actual realization of the exchange rate. These costs have been large because of sizable deviations from uncovered interest rate parity and elevated foreign reserve holdings. Although ex post costs measure the actual cost of foreign exchange market intervention and reserve holdings, they are not relevant for policymaking because ex post exchange rate realization is unknown at the time policy decisions are made. Instead, the authors use ex ante costs estimated with survey- and model-based exchange rate expectations. Their estimated ex ante costs are lower than the ex post costs, but they are still sizable, with marginal costs of foreign exchange market intervention ranging between 2 and 5.5 percent per US dollar, and the total cost of holding reserves hovering between 0.2 and 0.7 percent of GDP a year. The average ex ante total cost of holding foreign reserves for Indonesia, the Philippines, Thailand, Malaysia, and Singapore are 0.6, 0.7, 0.9, 1.0, and 1.3 percent of GDP a year, respectively (Figure 5.10). The total cost for the median emerging market economy, in comparison, is 0.5 percent of GDP a year. Thus, the cost of holding foreign exchange reserves in the ASEAN-5 countries is on the high side of the sample, likely because of their large international reserve holdings.

Cost-benefit analysis of reserve holdings requires a richer framework. Some studies have analyzed the benefits and costs of holding reserves and have calculated the optimal level of reserves for emerging market economies. For example, to address this question, Jeanne and Rancière (2011) calibrated a small open economy model in which reserves allow the country to smooth domestic absorption in response to sudden stops in capital flows, but yield a lower return than the interest rate on the country's long-term debt. Plausible calibrations of the model justify reserves of the order of magnitude observed in many economies. However,

Figure 5.9. ASEAN-5 Economies: Sterilization Coefficients



Source: IMF staff estimates.
Note: Red line = 1-month extended window; blue line = 60-month rolling window for Indonesia, Malaysia, the Philippines, and Thailand, and 80-month rolling window for Singapore. Sample period for Indonesia, the Philippines, and Thailand: monthly data for 2001–15; for Malaysia and Singapore: monthly data for 2002–15. GFC = global financial crisis.

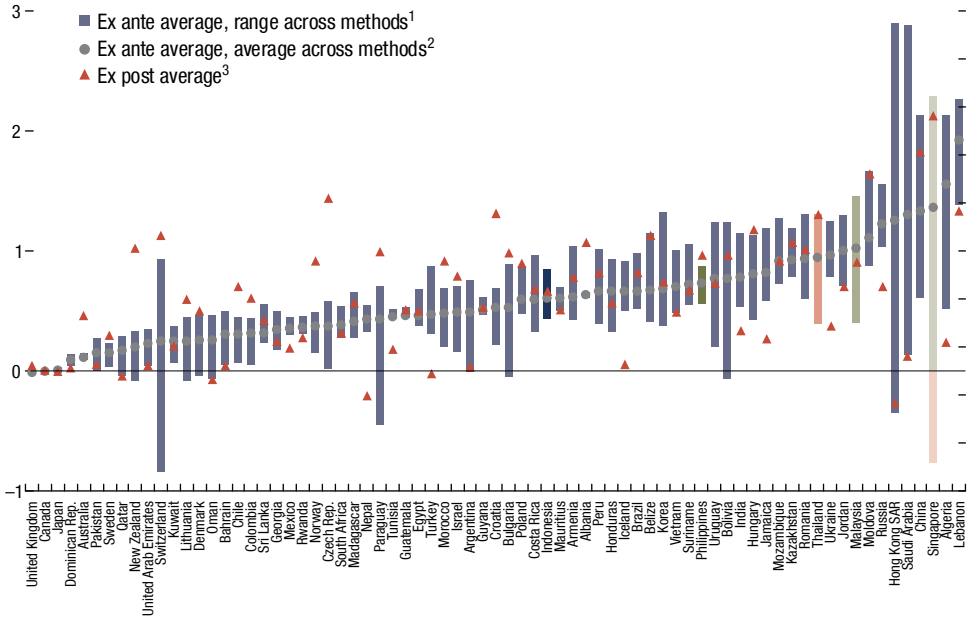
TABLE 5.2.

Sterilization Coefficient				
	Pre-GFC	**GFC**	**Post-GFC**	**Taper Tantrum**
Indonesia	−0.957	−0.901	−0.838	−0.824
Malaysia	−0.933	−0.914	−0.871	−0.839
Philippines	−0.806	−0.709	−0.765	−0.833
Singapore	−0.989	−0.981	−1.000	−1.004
Thailand	−1.000	−1.000	−1.000	−1.000

Source: IMF staff estimates.
Note: Average sterilization coefficient using one-month extended window in the following periods: pre-GFC (starting January 2005 or onward data available up to August 2008), GFC (September 2008 to March 2009), post-GFC (April 2009 to April 2013), taper tantrum (May 2013 to December 2013). GFC = global financial crisis.

reserves in Asia are larger than those implied by a motive to insure against sudden stops in capital flows. Similarly, Calvo, Izquierdo, and Kung (2013) use an empirical model to address this question. The benefits of holding reserve buffers are a lower risk of sudden stops in capital flows, while the cost is the spread of public sector bonds over the interest earned from reserve holdings. The model finds that reserve holdings in Latin America were the closest to the model-based optimal

Figure 5.10. Average Ex Ante Total Cost of Foreign Exchange Market Intervention, 2002–13
(Percent of GDP)



Source: IMF staff estimates.
[1]Range between the minimum and maximum estimated ex ante country average across different methods.
[2]Average (across methods) of ex-ante measures.
[3]Ex post country average.

levels, while reserves in eastern Europe were lower than the optimal levels and those in Asia higher. This outcome is consistent with the findings of Adler and Mano (2016), who find that the costs of rolling over reserve holdings in Asia are larger than for those in other regions—mainly because of the larger size of their reserves holdings—and argue that countries with high credit ratings, such as the ASEAN-5, could therefore lower their foreign exchange reserves and costs of sterilization (Domanski, Kohlscheen, and Moreno 2016).

Two-Target–Two-Instrument Approach Applied to the ASEAN-5

In some circumstances, a two-target–two-instrument monetary policy framework may be consistent with a symmetrical approach to managing the global financial cycle. Under such a framework, foreign exchange market intervention together with movements in the policy interest rate are designed to achieve exchange rate and inflation objectives (Benes and others 2013; Escudé 2013; IMF, forthcoming; Ostry, Ghosh, and Chamon 2012). In particular, when the exchange rate becomes too strong or too weak, competitiveness or balance sheet concerns would lead to foreign exchange market intervention to influence exchange rate movements. Such intervention can be sustained but needs to be two sided, as recently observed in the ASEAN-5 countries. Such a regime is not without risks, especially to the extent that frequent intervention may undermine the clarity and credibility of the monetary policy framework, although good communication and enhanced transparency can help to clarify the objectives. A related issue is the consistency of the overall policy mix and the need to ensure that objectives are congruent and that foreign exchange market intervention does not substitute for other needed policy changes (IMF 2012).

The interaction of a Taylor rule with foreign exchange market intervention is studied in a standard monetary model used by many central banks. To study the effectiveness of intervention in leaning against the wind of the global financial cycle, this section explores the rationale for its use in combination with a standard Taylor rule–type monetary policy function in a modified Forecasting and Policy Analysis System (FPAS) model (Berg, Karam, and Laxton 2006). The IMF's FPAS model involves a core macro structure consisting of a number of behavioral equations, based on conventional links familiar to most macro modelers and policymakers. Following the literature on the effectiveness of foreign exchange market intervention in emerging market economies (for example, Blanchard, Adler, and de Carvalho Filho 2015; Ostry, Ghosh, and Chamon 2012), the standard FPAS model is modified by introducing foreign exchange market intervention as an additional tool for the central bank; through intervention, the central bank can affect the exchange rate, which, in turn, will affect output and inflation gaps. The modified FPAS model is consistent with a stripped-down version of Escudé's (2013) dynamic stochastic general equilibrium model in which the author compares two policy regimes: a pure float in which the central bank follows only its Taylor rule and a combination of interest rate policy based on a

Taylor rule and market intervention, a so-called managed float regime. For simplicity, this chapter assumes that the amount of foreign exchange market intervention, defined as the net purchase of foreign currencies, is a function of the deviation of the real exchange rate from its long-term average and the speed of appreciation or depreciation. In other words, the larger the gap or the faster the rate of appreciation or depreciation of the home currency, the larger the foreign exchange market intervention. To evaluate the impact of intervention on exchange rates, this analysis follows Adler, Lisack, and Mano (2015) by expressing the exchange rate as a function of foreign exchange market intervention and using this function to replace the uncovered interest rate parity equation in the FPAS model, as in Escudé 2013.

A modified FPAS model is a better fit for the data for the Philippines and Thailand and thus illustrates the potential trade-offs associated with using foreign exchange market intervention to manage the global financial cycle in the ASEAN-5 context. The model is estimated using Bayesian techniques based on prior distributions for the parameters from previous studies, including those on the effectiveness of foreign exchange market intervention. Quarterly data from the early 2000s (the starting point varies depending on data availability) are used for the Philippines and Thailand. For foreign exchange market intervention, the exercise follows the literature by using quarterly changes in foreign exchange reserves as a proxy for intervention. The results suggest that the modified FPAS model incorporating foreign exchange market intervention fits the data better for the Philippines and Thailand than the standard FPAS model does (Table 5.3).

The benefits of inflation targeting coupled with intervention are apparent. In the face of a capital outflow shock (due to higher global interest rates or risk premiums), inflation targeting without foreign exchange market intervention implies raising the policy interest rate more than in the case of intervention, similar to Escudé 2013. This forces central banks to tolerate a more depreciated currency (and, conversely, with positive shocks, a more appreciated one), lowering welfare relative to the central bank's objective of keeping the exchange rate close to its fundamental value. Consequently, foreign exchange market intervention can help to manage extreme external pressure, especially if the country has substantial exchange rate pass-through effects or currency mismatches (which would exacerbate balance sheet risks following a currency depreciation). For the Philippines and Thailand, the modified FPAS model shows that foreign exchange market intervention can also help reduce output and inflation gaps when the economy is facing a capital outflow shock given its influence on the exchange rate, in line with the findings of Adler, Lisack, and Mano (2015) and Escudé (2013) (Figure 5.11). These results provide the rationale for the use of foreign exchange market intervention as a tool for macroeconomic management in the ASEAN-5 economies.

The use of foreign exchange market intervention for other types of shocks and interactions with policies other than Taylor rule–type monetary rules requires further research. Whether foreign exchange market intervention is optimal in the

TABLE 5.3.

Estimation Results of the Modified FPAS Model with Foreign Exchange Intervention

Philippines: Root Mean-Squared Errors

	FPAS Model			Modified Model		
	1 Quarter ahead	4 Quarters ahead	8 Quarters ahead	1 Quarter ahead	4 Quarters ahead	8 Quarters ahead
YGAP	0.41	1.07	0.95	0.42	1.01	0.75
PIE	2.24	3.71	3.97	1.93	3.11	3.00
RS	1.75	2.53	3.79	1.70	2.17	2.92
REER	2.67	3.11	2.94	2.46	2.60	3.13

Ratio (Modified/FPAS)

	1 Quarter ahead	4 Quarters ahead	8 Quarters ahead
YGAP	1.02	0.95	0.79
PIE	0.86	0.84	0.75
RS	0.97	0.86	0.77
REER	0.92	0.83	1.07

Thailand: Root Mean-Squared Errors

	FPAS Model			Modified Model		
	1 Quarter ahead	4 Quarters ahead	8 Quarters ahead	1 quarter ahead	4 Quarters ahead	8 Quarters ahead
YGAP	1.87	1.23	1.08	1.83	1.19	1.00
PIE	0.69	1.53	0.89	0.70	1.47	0.88
RS	0.19	0.61	0.86	0.21	0.64	0.84
REER	0.28	2.15	3.26	0.27	2.14	2.77

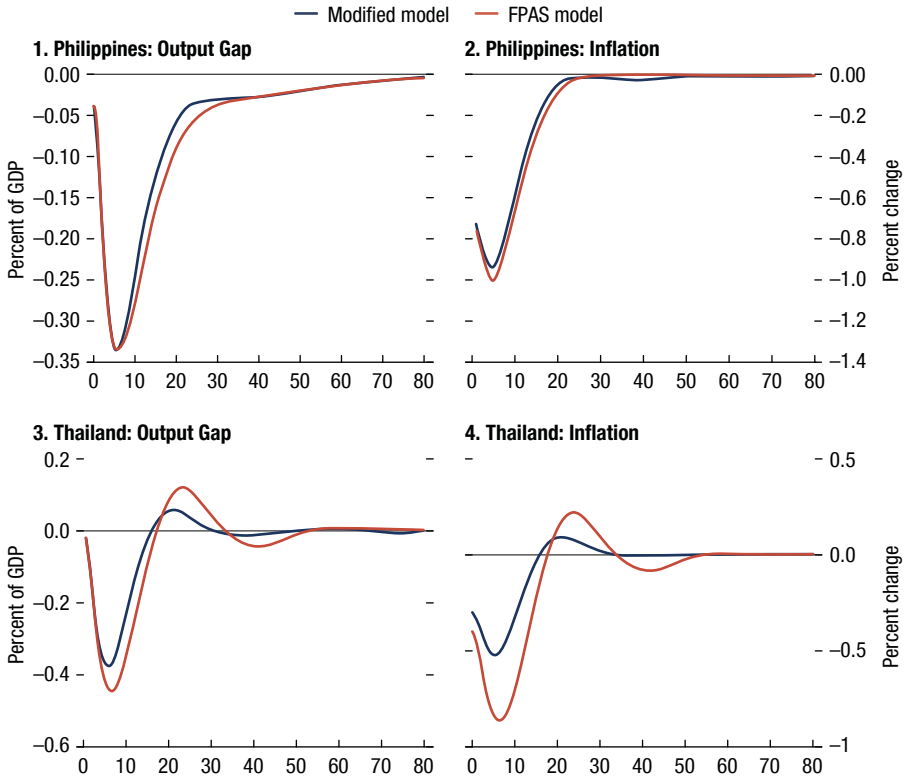
Ratio (Modified/FPAS)

	1 Quarter ahead	4 Quarters ahead	8 Quarters ahead
YGAP	0.98	0.97	0.93
PIE	1.02	0.96	0.99
RS	1.08	1.05	0.97
REER	0.94	0.99	0.85

Source: IMF staff estimates.
Note: FPAS = Forecasting and Policy Analysis System; PIE = quarterly rate of inflation; REER = real effective exchange rate; RS = policy interest rate; YGAP = output gap.

presence of an array of shocks is debatable. Escudé (2013) shows that the degree of smoothing depends critically on the nature of the shock given that intervention has a far greater impact on economic developments in the case of an external financing shock than for a demand shock. Benes and others (2013) also show the importance of balance sheet considerations in assessing the impact and efficacy of foreign exchange market intervention in response to external shocks. Anand, Delloro, and Peiris (2014 and Chai-anant, Pongsaparn, and Tansuwanarat (2008) show the potential benefits of more unconventional monetary policies in the Philippines and Thailand, respectively, that may interact with foreign exchange market intervention. More generally, the more extensive use of macroprudential policies in the ASEAN-5 (see Chapter 6) suggests that foreign exchange market

Figure 5.11. Impact of Foreign Exchange Intervention



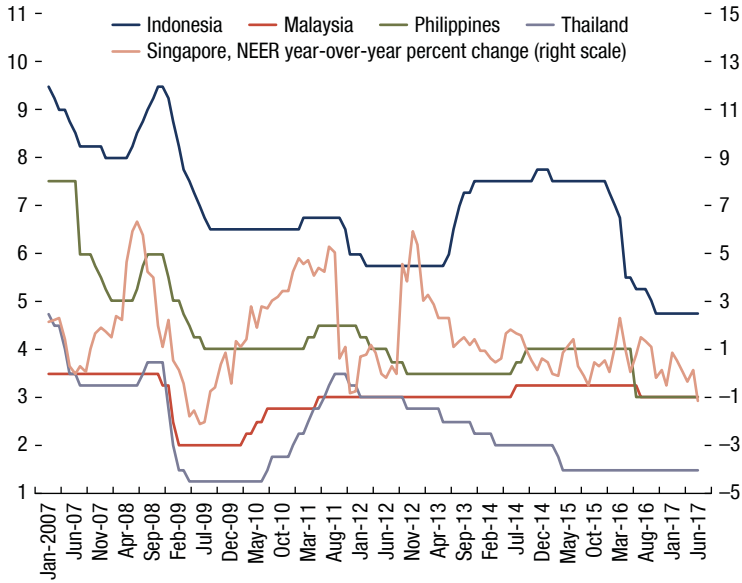
Source: IMF staff calculations.
Note: FPAS = Forecasting and Policy Analysis System.

intervention could be evaluated in richer models with macroprudential policies to get a better sense of their desirability in combination with other macro policies (see Chapter 9; Chen and Laseen, forthcoming; Harmanta and others 2015; Ghilardi and Peiris 2016).

POLICY RESPONSES TO CAPITAL OUTFLOW EPISODES

ASEAN-5 economies used a wide range of policy tools—including fiscal measures, macroprudential policies, capital flow management measures, foreign exchange market intervention, and provision of liquidity to money markets—to supplement monetary policy to address market pressure and its economic impacts (Figure 5.12; Table 5.4). In particular, while all countries raised their policy rates during the Asian financial crisis to support their external positions, they eased their policy rates following the global financial crisis to support growth

Figure 5.12. ASEAN-5: Policy Interest Rates
(Percent)



Sources: Haver Analytics; and IMF staff estimates.
Note: NEER = nominal effective exchange rate.

(Figure 5.12). By comparison, only Indonesia raised its policy rates during the taper tantrum to support its external position; Malaysia and the Philippines tightened modestly in consideration of domestic stability. Singapore and Thailand gradually eased their monetary policy stances during 2011–12, reflecting the weakening economic outlook. During the turbulent summer of 2015, policy rates were left unchanged in all ASEAN-5 economies because policymakers had to weigh concern about capital flow reversals—largely confined to portfolio equity flows—against worries about slowing economic activity. However, Indonesia did not begin easing monetary policy to support domestic demand until January 2016.

Various responses were observed across countries and episodes depending on country circumstances (Table 5.4). During the global financial crisis, Indonesia, Malaysia, and the Philippines lowered banks' reserve requirements and expanded liquidity provision measures to preserve orderly money market conditions. Moreover, all ASEAN-5 economies expanded deposit insurance. Fiscal stimulus packages were also implemented to support growth. In contrast, during the taper tantrum episode, Indonesia—the ASEAN-5 country under the most pressure—had to prioritize stability over supporting economic activity. Reserve requirements and the loan-to-value ratio were tightened to contain credit growth, while the exchange rate and long-term bond yields were allowed to move freely after an initial period of containment. Fiscal policy was also tightened, with an average

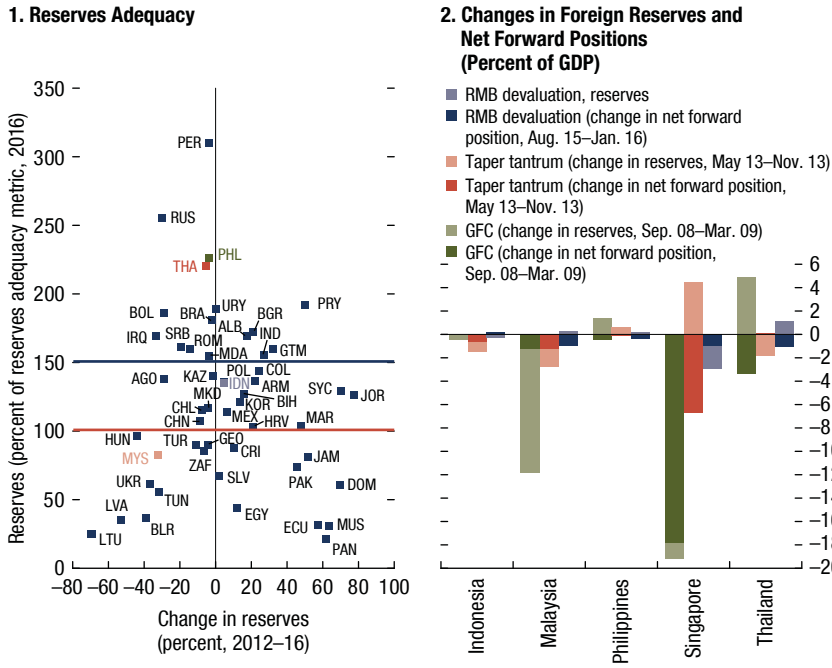
TABLE 5.4.

Policy Tools Used during the Global Financial Crisis and Taper Tantrum

	Indonesia			Malaysia			Philippines			Singapore			Thailand		
	GFC	Taper Tantrum	Summer 2015	GFC	Taper Tantrum	Summer 2015	GFC	Taper Tantrum	Summer 2015	GFC	Taper Tantrum	Summer 2015	GFC	Taper Tantrum	Summer 2015
Policy Rate[1]	Lowered	Raised	Unchanged	Lowered	Unchanged	Unchanged	Lowered	Unchanged	Unchanged				Lowered	Lowered	Unchanged
Exchange Rate Corridor Band[1]										Recentered to validate a weaker currency[1]	Unchanged	Unchanged			
Exchange Rate Depreciation		Yes		Yes	Yes	Yes		Yes					Yes		
Drawdown of Reserves								Yes							
Macroprudential Policy		Tightened LTV for motor vehicles and residential properties			Imposed limit on mortgage term, maximum tenure of financing for personal use						Restricted motor vehicle and public housing loans, measures of property loans; imposed limits on total debt servicing ratio				
Reserve Requirements	Lowered	Raised		Lowered			Lowered								
Capital Flow Measures		Shortened minimum holding period for central bank bills						Imposed limits on banks' NDF exposures							
Foreign Exchange Interventions	Yes	Yes	Yes	Yes		Yes				Yes					Yes
Liquidity Provision Measures	Yes	Yes		Yes			Yes								
Expansion of Deposit Insurance Coverage	Yes			Yes			Yes			Yes			Yes		
Expansion of Eligible Collateral for Short-Term Financing	Yes														
Loan Guarantees													Yes		
Fiscal Policy	Expansive	Reduced fuel subsidies		Expansive			Expansive			Expansive			Expansive		
Other Measures		Swap arrangements with other countries; contingent loans													

Sources: IMF, ASEAN-5 countries' staff reports for their Article IV consultations.
Note: GFC = global financial crisis; LTV = loan-to-value ratio; NDF = nondeliverable forward.
[1]Unlike the other ASEAN-5 countries, Singapore does not use the policy rate as the main monetary policy instrument. Instead, it uses the exchange rates corridor band.

Figure 5.13. Foreign Exchange Responses to Capital Outflow Episodes



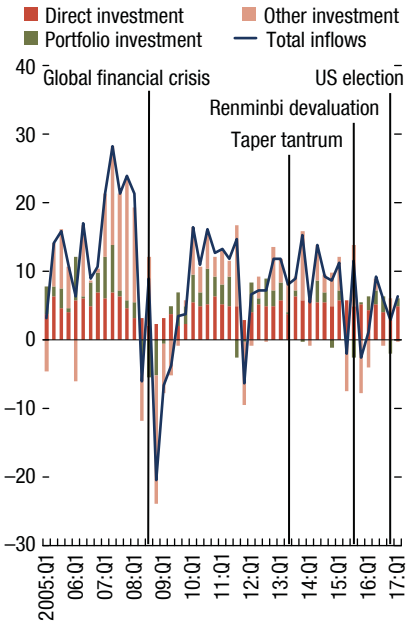
Sources: Haver Analytics; IMF, International Reserves and Foreign Currency Liquidity Database; and IMF staff estimates.
Note: Labels in the figure use International Organization for Standardization country codes. GFC = global financial crisis; RMB = renminbi.

33 percent increase in subsidized fuel prices, to address external and fiscal imbalances. Conversely, the minimum holding period for central bank bills was shortened to increase their liquidity and attract more foreign inflows. During the turbulent summer months of 2015, reserve requirements were left unchanged, but were reduced in December in Indonesia and in February in Malaysia to provide liquidity to the money markets.

Foreign reserves were used as a buffer, coupled with greater exchange rate flexibility, to help cushion the economy and avoid disorderly market conditions. All ASEAN-5 currencies came under severe pressure and depreciated significantly during the global financial crisis, allowing the exchange rate to act as a shock absorber (Figure 5.13). Net capital outflows during the taper tantrum were not as large as during the global financial crisis, but the markets monitored the strength of the countries' macroeconomic fundamentals more closely. Indonesia, in particular, faced severe pressure because of its twin deficits, which prompted more foreign exchange market intervention to avoid disorderly market conditions (Figure 5.14) (IMF 2016a). Moral suasion in the foreign exchange market and reduced purchases of government securities by Bank Indonesia were also used to

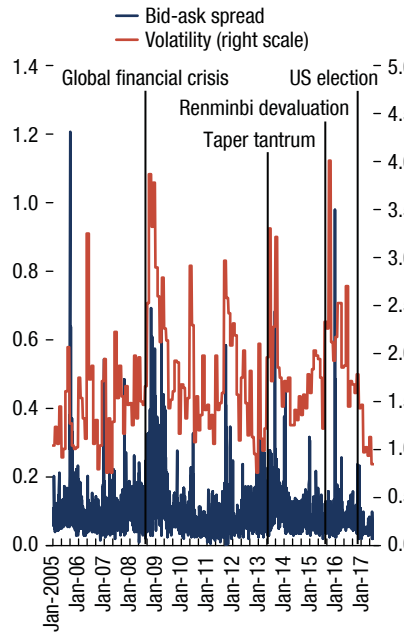
Figure 5.14. Reaction to Disorderly Market Conditions

1. ASEAN-5: Total Net Capital Inflows (Percent of GDP)



Sources: Country authorities; Haver Analytics; IMF, *Balance of Payments Statistics*; and IMF staff calculations.
Note: Malaysia's other investment only covers inflows from the public sector. Where available, financial derivatives are added to other investments.

2. ASEAN-5: Bid-Ask Spreads and Volatility (Percent)



Sources: Bloomberg Finance L.P.; and IMF staff calculations.
Note: Volatility is the annualized standard deviation of daily exchange rate percent changes.

manage price adjustments; transparency of market interventions was increased and communication with market participants enhanced. During the summer 2015 turbulence, all ASEAN-5 economies suffered from financial market volatility, particularly in equity markets. However, the foreign reserves drawdown was most pronounced in Indonesia and Malaysia, the two commodity exporters that were most affected by the commodity price collapse, requiring an external adjustment to smooth the external shock, with reserves falling close to the IMF's reserve adequacy metric. Overall, greater exchange rate flexibility helped smooth "excessive" volatility and preserve orderly market conditions during the turmoil.[7]

[7]Exchange rate volatility or overshooting a level consistent with macroeconomic fundamentals does not constitute disorderly market conditions per se, but only to the extent that adverse shocks are amplified.

CONCLUSIONS

The sensitivity of emerging market asset prices and capital flows to global factors is well recognized, and the pervasive global spillovers to domestic interest rates and credit conditions highlight the susceptibility of the main monetary transmission channel in the ASEAN-5. This calls into question the traditional "trilemma" view of the independence of monetary policy with flexible exchange rates because flexible rates alone cannot fully insulate economies from the global financial cycle when the capital account is highly open. The estimates of monetary policy reaction functions, or Taylor rules, suggest that ASEAN-5 monetary authorities respond predominantly to domestic stability considerations but external considerations also play a role. Policy rates are susceptible to global monetary shocks, controlling for the interdependence of economic cycles, and the degree of monetary policy autonomy varies across the ASEAN-5, with monetary transmission influenced by global financial and commodity price shocks.

In some circumstances, foreign exchange market intervention may be motivated by the desire to mitigate capital flow shocks. ASEAN-5 countries accumulated foreign exchange reserves to strengthen their external positions and build reserve buffers to enhance their resilience, partly based on their experience during the Asian financial crisis and the global financial crisis. However, the degree of reserves accumulation in some ASEAN-5 countries may have exceeded levels deemed necessary for precautionary purposes. It may also have been motivated by the objective of smoothing exchange rate fluctuations or volatility, without targeting a particular exchange rate level (see Chapter 2). Combining foreign exchange market intervention with a standard Taylor rule–type monetary policy function estimated for the ASEAN-5 indicates that it could help reduce business cycle fluctuations in response to capital flow shocks in some circumstances. In particular, during periods of excessive currency volatility, the exchange rate can stop operating as a shock absorber and may become a shock amplifier, operating through balance sheet concerns. However, the benefits of intervention, such as dampening shocks, should also be weighed against sterilization costs and their potential to undermine the credibility of the policy framework, particularly when foreign exchange market intervention becomes too frequent and market conditions are not disorderly.

The susceptibility of ASEAN-5 capital flows to global financial factors heightens the risk of a sudden stop and a reversal in capital flows, which can have large macroeconomic consequences on emerging markets. Foreign exchange market interventions were generally one-sided before the global financial crisis—as these economies were rebuilding reserve buffers for precautionary reasons—and in the wake of the crisis, when they were struggling to mitigate the liquidity impact of large capital inflows triggered by the exceptionally easy monetary policies in advanced economies. However, intervention became two sided and more symmetric, and exchange rates more flexible, after the taper tantrum episode in 2013. Moreover, the ASEAN-5 economies have relied more on currency depreciation than on reserve depletion during recent episodes of

large capital outflows than during previous outflow episodes. A key aspect of the policy responses was the timely use of policy combinations to mitigate disorderly market conditions and severe economic fallout, taking into account macro-financial linkages, which holds lessons for other emerging market economies and future challenges.

Frameworks for the conduct of monetary policy are likely to evolve further under the "new normal" (Bayoumi and others 2014). The normalization of US monetary policy should provide greater scope for monetary policy independence in the ASEAN-5 economies given the limited impact of conventional and unconventional monetary policy in other jurisdictions. Additional intermediate objectives (such as financial and external stability) will play a greater role in the future than they have in the past (Bayoumi and other 2014). When possible, these objectives should be targeted with additional instruments (for example, macroprudential policies and foreign exchange intervention). The use of intervention in the ASEAN-5 economies is a case in point, but new challenges may arise if, for example, reserve buffers fall below critical levels and if nonfinancial shocks dominate in the future.

ANNEX 5.1. METHODOLOGY

Two-Step Regression Approach to Assessing Monetary Autonomy

The first stage of the approach measures the degree to which domestic monetary policy is affected by domestic macroeconomic conditions by estimating the following regression model:

$$int_{i,t} = \alpha_i + \widehat{\beta_{1,i}}\left(gdp_{i,t}\right) + \widehat{\beta_{2,i}}\left(inf_{i,t}\right) + \varepsilon_{i,t}, \tag{A5.1.1}$$

in which $int_{i,t}$ is the domestic interest rate of country i at time t and domestic macroeconomic conditions are represented by $gdp_{i,t}$, and $inf_{i,t}$, which are one-year-ahead expectations of real GDP growth and headline inflation of country i at time t, respectively.

The second stage of the methodology then aims to determine the extent to which the dynamics of foreign monetary policy affect movements in domestic interest rates that are not accounted for by domestic macroeconomic conditions. Building on the regression models estimated in the first stage, the exercise takes the residuals of the regression models for each country, then regresses them against foreign monetary policy rates to measure how much of the movement of domestic policy rates not explained by domestic macroeconomic factors is explained by external factors:

$$\varepsilon_{i,t} = \gamma_i + \delta_i\left(int_t^*\right) + \epsilon_{i,t}, \tag{A5.1.2}$$

in which $\varepsilon_{i,t}$ is the error term at time t from the regression model for country $i_{i,t}$, and int_t^* is the level of the base country indicator at time t. In this study, four base or reserve currency country indicators were tested. To estimate the explicit effect

of policy rates in the United States, the residuals were regressed against the effective federal funds rate. However, because the Federal Reserve implemented unconventional monetary policies and the US policy rate reached its lower bound (thus, there was no longer any movement in the series), alternative regression models using the shadow federal funds rate were used to capture the "theoretical movement" of interest rates. Regression models using US 10-year Treasury bond yields were also estimated because, although policy rates move only at the direction of the monetary authorities, movements in the economy attributable to the effects of the policy rates are said to be mirrored in bond yield data.

Structural Vector Autoregression with Block Exogeneity (SVARX)

To measure the dynamic relationships between domestic macroeconomic factors, a vector autoregression model was also estimated. As in the regression models, the SVARX models are estimated in two stages.

For the first stage, a Taylor-type rule is used that models the dynamic relationship between domestic interest rates and domestic macroeconomic conditions:

$$\begin{bmatrix} gdp \\ inf \\ int \end{bmatrix}_t = \boldsymbol{A}_0 + \sum_{j=1}^{p} \boldsymbol{A}_j \begin{bmatrix} gdp \\ inf \\ int \end{bmatrix}_{t-j} + \begin{bmatrix} e^{gdp} \\ e^{inf} \\ e^{int} \end{bmatrix}_t . \tag{A5.1.3}$$

To eliminate possible contemporaneous correlation between the error terms, the residuals from the domestic interest rate are regressed on the residuals from GDP and inflation expectations:

$$\hat{e}^{int} = \alpha + \beta_1 \hat{e}^{gdp} + \beta_2 \hat{e}^{inf} + u_t^i. \tag{A5.1.4}$$

By following this approach the analysis eliminates the systemic policy response of monetary policy to domestic macroeconomic shocks, and we are able to extract the part of the domestic interest rates that is unexplained by movements in domestic variables. This residual is used for the second stage, wherein we try to quantify the degree to which these residuals are influenced by foreign shocks. Note that in this study, assumptions on the exogeneity of foreign factors were imposed such that domestic factors do not affect foreign factors contemporaneously, but can affect them with a lag. On the other hand, foreign factors are assumed to affect domestic factors contemporaneously.

$$\begin{bmatrix} int^* \\ \hat{u}_t^i \end{bmatrix}_t = \boldsymbol{B}_0 + \sum_{j=1}^{p} \boldsymbol{B}_j \begin{bmatrix} int^* \\ \hat{u}_t^i \end{bmatrix}_{t-j} + \begin{bmatrix} v^{int^*} \\ v^i \end{bmatrix}_t \tag{A5.1.5}$$

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CHAPTER 6

Macroprudential Policies

The use of macroprudential tools to limit systemic financial risk has grown over the past two decades. The Association of Southeast Asian Nations–5 (ASEAN-5) economies have been well ahead of other regions in realizing the value of macroprudential policies for financial stability. However, prudential policy frameworks are still a work in progress, and the ASEAN-5 are striving to develop and build appropriate institutional underpinnings for such policies.

This chapter looks at what macroprudential policies are and why their use has grown in the ASEAN-5. It then analyzes the impact of such policies on maintaining financial stability and whether these tools, if used more preemptively, could have helped prevent the financial excesses during the Asian financial crisis. Chapter 8, in turn, examines macroprudential policy frameworks and the policy agenda ahead to ensure that financial stability is maintained over the medium term.

The increased use of macroprudential policies in the ASEAN-5 since the Asian financial crisis has reduced the incidence of credit boom-bust cycles and their impact on asset prices. Event studies show that macroprudential tools have been an effective policy instrument for moderating credit growth. Since the Asian financial crisis, macroprudential policies have also complemented monetary policy and enhanced the monetary transmission mechanism by altering bank loan profitability. Indeed, the greater use of prudential tools in the ASEAN-5 has been mirrored by more prudent bank balance sheet management.

Although their efficacy has been demonstrated, the argument for using macroprudential policies to mitigate financial vulnerability is further strengthened by the macroeconomic history of the ASEAN-5. Credit and real cycles in these countries have operated at different frequencies, and inflation has not been a reliable indicator of financial excess. The ASEAN-5 have demonstrated since 2000 that dedicated macroprudential policies can help achieve the financial stability objective because policies can be better tailored to financial risks. These countries' experience with macroprudential policies thus hold lessons for other advanced and emerging market economies beginning to explore macro-financial policymaking.

WHY MACROPRUDENTIAL POLICIES?

The increasing use of macroprudential tools for safeguarding financial stability over the past decade stems from a greater understanding of the limits of monetary policy. These limits include the realization that real and financial cycles operate at different frequencies, that supply-side developments have constrained monetary policy, that

This chapter was prepared by Sohrab Rafiq under the guidance of Shanaka J. Peiris.

TABLE 6.1.

Average Length of Credit and Business Cycles in the ASEAN-5 (1960–2016) (*Years*)

	Business Cycle	Credit Cycle
Indonesia	6.9	9.6
Malaysia	3.6	6.4
Philippines	4.1	4.9
Singapore	4.5	5.4
Thailand	5.4	7.8

Source: IMF staff calculations.
Note: The average length of business and credit cycles is calculated using annual data and a Bayesian Markov chain regression. The business cycle is captured using GDP growth rates.

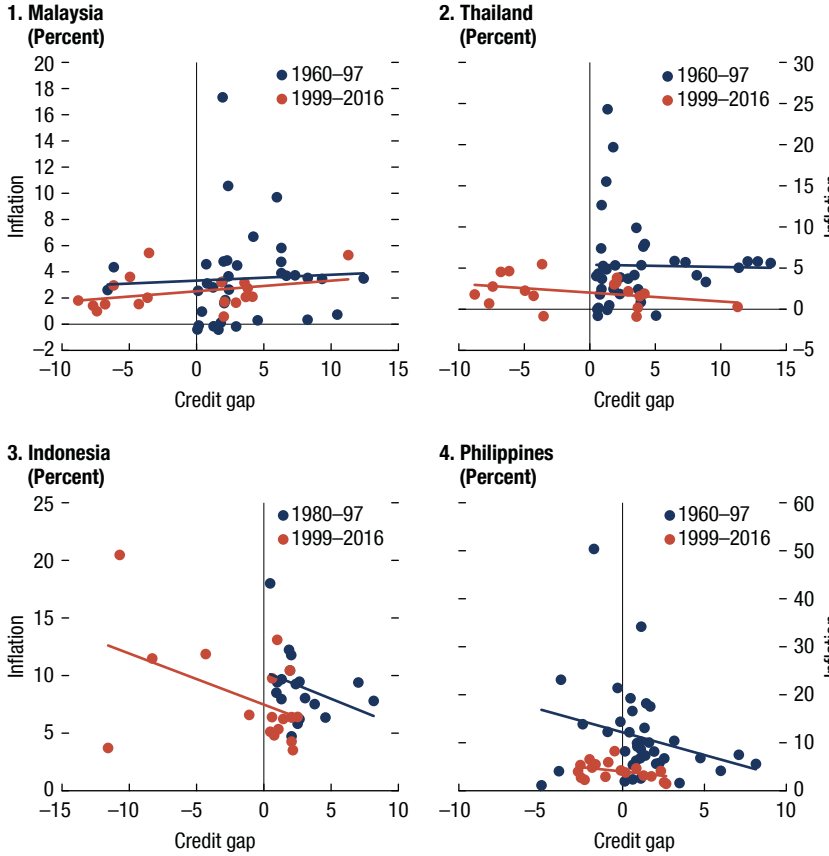
external factors have gained importance for domestic financial conditions, and that monetary policy is too blunt an instrument for dealing with asset price bubbles.

The financial sector is inherently procyclical and can amplify the real cycle. This amplification occurs through price and quantity channels. Bank lending is procyclical because liabilities tend to increase by more than assets during a credit boom, thus raising leverage. Moreover, because financial conditions are positively correlated with overall economic activity, price-based market risk indicators tend to be procyclical. An examination of the risks to financial stability arising from excessive procyclicality highlights several coordination issues among policymakers.

The duration and amplitude of the financial cycle are not the same as those of the real cycle, which in real time could lead monetary policymakers astray (Borio 2012). Drehmann, Borio, and Tsatsaronis (2012) note that the financial cycle operates at a much lower frequency than the traditional business cycle, while Borio and Lowe (2002, 2004) show that widespread financial distress typically arises from the unwinding of financial imbalances that build up while disguised by benign economic conditions characterized by stable and low inflation.

Since 1960, the duration of the average business cycle has been smaller than the average credit cycle in the ASEAN-5 (Table 6.1). It is these patterns that cause coordination difficulties for monetary policy and potentially lure a central bank into a looser monetary policy stance than would otherwise be warranted. This concept can also be illustrated by a simple scatterplot of the credit gap, which is one measure of the financial cycle and is defined as the difference between the credit-to-GDP ratio and its long-term trend, and inflation. If inflation is a reliable indicator of excessive financial leverage, there should be a positive relationship between inflation and the size of the credit gap. However, the data for the ASEAN-5 countries show a weak relationship between the financial cycle and inflation (Figure 6.1), and this relationship has generally weakened since the early 2000s. Taken together, these findings parallel the idea that financial and real cycles operate at different frequencies (Borio 2012). For this reason, monetary policy may not be an efficient tool for calming the credit cycle if it is expected to moderate business and inflation cycles at the same time. Moreover, multiple objectives may overburden monetary policy, creating an expectation gap between what the central bank can achieve and what it can deliver. Therefore, moderating

Figure 6.1. Scatterplot—Inflation and Credit Gap
(Percent)



Sources: Authorities' data; and IMF staff calculations.

real and financial cycles calls for complementary sets of monetary and macroprudential policies. Chapter 9 illustrates the benefits of such complementary policies for addressing both price and financial stability.

Positive supply-side developments in the ASEAN-5 since 2000 have constrained monetary policy flexibility, raising the risk of larger and more prevalent financial booms. These supply-side developments linked to increased global trade and financial integration have contributed to higher growth potential and hence the scope for credit and asset price booms. At the same time, they have put downward pressure on inflation, which, in turn, constrains the room for monetary policy tightening (Juselius and others 2016). As discussed in Chapter 2, most ASEAN-5 countries give preeminence to inflation in guiding monetary policy interest rates. As inflation has declined, monetary policy rates have fallen, which,

in turn, has depressed natural interest rates across the region. The natural rate, a convenient benchmark against which to measure the policy rate, is an unobservable equilibrium concept assumed to be determined by real factors. At the heart of this interpretation are two features: first, the natural rate is defined as the rate that would prevail if actual output equaled potential output. Second, inflation is the key signal that output is not at its potential, sustainable level. This view presumes that over the medium term, monetary policy only passively tracks the natural rate. Thus, the observed decline in real interest rates is purely a function of forces beyond the central bank's control.

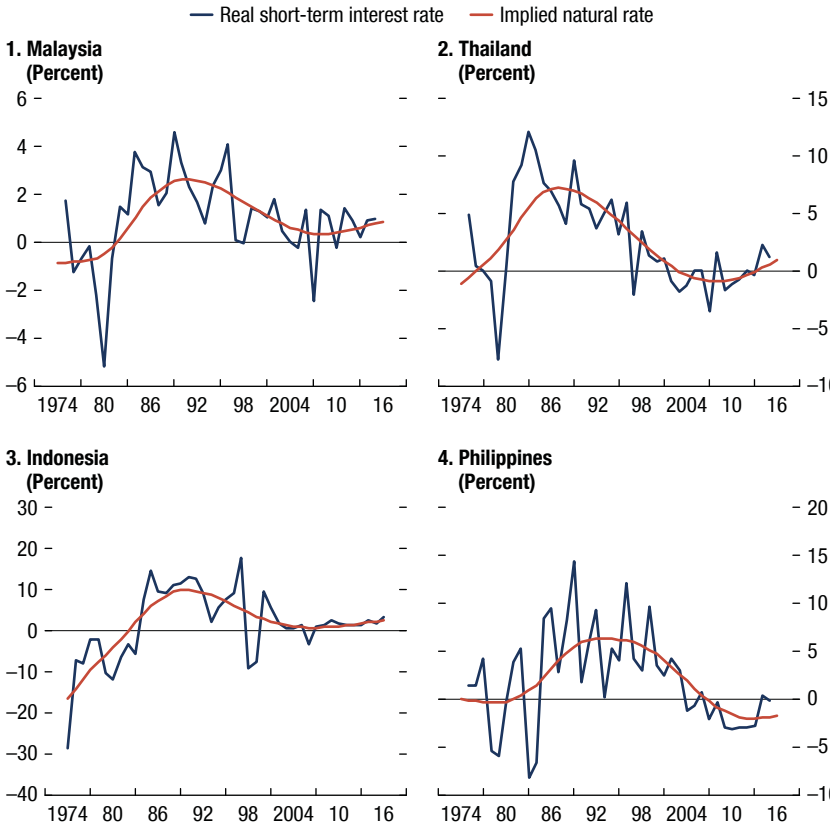
Time-varying estimates show a decline in the natural interest rate since 1990 among ASEAN-5 economies.[1] The natural rate rose in the high-inflation era of the 1980s, but declined persistently during the so-called Great Moderation of the 1990s, when global inflation declined. The natural rate stayed low across the ASEAN-5 during the first decade of the 2000s. Since 2010, the natural rate has hovered around zero. The decline in the natural rate across the ASEAN-5 mirrors global financial trends and reflects, in part, the success of ASEAN central banks in moderating and stabilizing inflation, as documented in Chapters 2 and 7. Since credit booms have not, historically at least, been accompanied by higher inflation in the ASEAN-5 (Figure 6.2)—reflecting positive supply-side developments and improved central bank credibility—a monetary policy focused on price stability has not needed to tighten beyond the natural rate to restrain a buildup in financial imbalances. Therefore, where low policy rates are consistent with low inflation, they may contribute to excessive credit growth and the buildup of asset bubbles and thereby sow the seeds of financial instability (Juselius and others 2016). These factors reinforce the need for prudential policies that mitigate the buildup of financial risk in a low-interest-rate environment.

As a result of increased trade and financial integration, the global financial cycle has come to play a more important role in determining domestic financial conditions in the ASEAN-5 (Chapter 4; Rafiq 2016). This external influence may limit the effectiveness of domestic monetary policy in determining local financial conditions (Chapter 5; Miranda-Agrippino and Rey 2015).

How important are external credit conditions in Asia for domestic credit conditions in the ASEAN-5? The relative importance of the external credit cycle for domestic credit growth in the ASEAN-5 is quantified using a dynamic factor model, following Kose, Otrok, and Whiteman (2003). The framework decomposes observable credit growth $c_{i,t}$, $i = 1, \ldots, n, t = 1, \ldots, T$ into the sum of two unobservable components: one that affects all $c_{i,t}$, that is, the factor f_t, which captures the Asian credit cycle, and one that is idiosyncratic ($\varepsilon_{i,t}$) and specific to each country i:

[1]The natural rate cannot be directly observed, and the rate is model dependent. Estimates in this chapter are drawn using ex post real short-term interest rate data in a local-level model estimated using a Kalman smoother. Chapter 7, in turn, presents alternative estimates using a time-varying vector autoregression framework.

Figure 6.2. Implied Real Natural Interest Rate Estimates
(Percent)



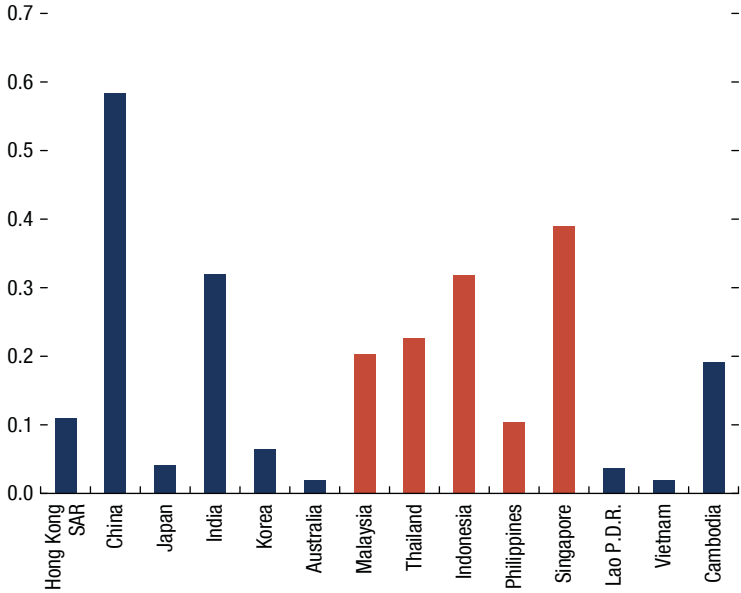
Sources: National authorities' data; and IMF staff calculations.

$$c_{i,t} = a_i + b_i f_t + \varepsilon_{i,t}. \quad (6.1)$$

Estimates suggest that a significant share of credit growth in the ASEAN-5 is linked to credit growth fluctuations in the rest of Asia. Figure 6.3 plots the exposure of domestic credit growth, measured by b_i, to the Asian credit cycle, captured by f_t. The results show that about 20–25 percent of the credit growth in Malaysia and Thailand is linked to credit developments in the rest of the region. The comparable estimate for Indonesia is about 30 percent. Because the external environment in the global banking system is a significant determinant of domestic credit conditions and, therefore, a source of vulnerability of the economy to financial excesses, considerations of financial stability cannot be easily separated from the merits of macroprudential policies.[2] This interdependence is recognized in the

[2]Chapter 10 discusses the benefits and risks of regional financial integration in the ASEAN-5.

Figure 6.3. Variance Decomposition: Asia Credit Factor
(Share of variance explained)



Source: IMF staff calculations.

macroprudential policy framework discussed by the international regulatory community (FSB, IMF, and BIS 2011). Because macroprudential policies are less constrained than monetary policy, they can better deal with financial stability issues as a result of shifts in global liquidity.

Finally, despite better understanding of the limitations of monetary policy, a pre–global financial crisis view that central banks should focus on stabilizing inflation and output has, in some circles, given way to the postcrisis view that policymakers should pay attention and eventually respond to developments in asset markets. However, proposals for monetary policy that leans against the wind in response to financial conditions' perceived deviation from fundamentals rely on the assumption that higher short-term interest rates will be effective in shrinking the size of an emerging financial or asset price bubble. Yet—and despite the popularity of such proposals—the empirical evidence for such a link is far from established (Galí and Gambetti 2015; Rigobon and Sack 2003).

The link between stock prices and monetary policy can be established via a risk-neutral general equilibrium environment, as in Galí 2014. The stock price (Q) is decomposed into fundamental (Q^f) and bubble (Q^b) components, $Q = Q^f + Q^b$. In a risk-free environment, the fundamental component is defined as the present discounted value of future dividends

$$q^f = const + \sum_{j=0}^{\infty} \Theta^j \left[(1 - \Theta) E_t \{ d_{t+k} \} - E_t \{ r_{t+k} \} \right]. \quad (6.2)$$

The response of an asset price to a change in monetary policy can be expressed as

$$\frac{\partial q_{t+k}}{\partial \varepsilon_t^m} = (1 - \gamma_{t-1}) \frac{\partial q_{t+k}^f}{\partial \varepsilon_t^m} + \gamma_{t-1} \frac{\partial q_{t+k}^b}{\partial \varepsilon_t^m}, \tag{6.3}$$

in which $\gamma = Q^b/Q$ measures the relative size of the bubble component in the overall asset price. In response to a monetary impulse, the fundamental stock price can be traced out using

$$\frac{\partial q_{t+k}^f}{\partial \varepsilon_t^m} = \sum_{j=0}^{\infty} \Theta^j (1-\Theta) \frac{\partial d_{t+k+j+1}^f}{\partial \varepsilon_t^m} - \frac{\partial r_{t+k+j}}{\partial \varepsilon_t^m}, \tag{6.4}$$

in which $\Theta = d/r < 1$ and d_t is the gross dividend yield, and r_t is the riskless real rate.

Under the conventional view that monetary policy can be used to prick asset price bubbles,

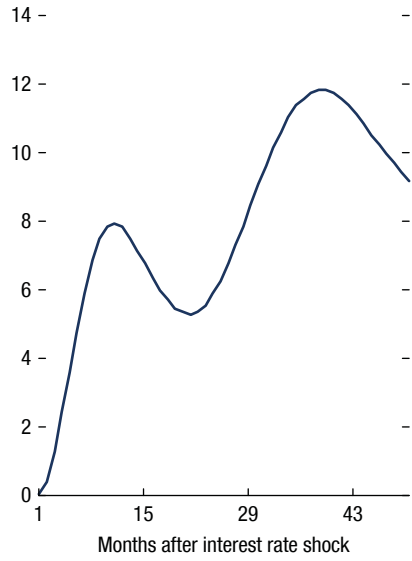
$$\frac{\partial r_{t+k+j}}{\partial \varepsilon_t^m} < 0 \text{ and } \frac{\partial d_{t+k+j+1}^f}{\partial \varepsilon_t^m} \leq 0,$$

which implies that a tightening of monetary policy should cause a decline in the size of the bubble. Hence, the overall effect on the observed asset price should be unambiguously negative, independent of the relative size of the bubble. The response of the bubble component can be backed out via the gap between the empirical stock price and the fundamental stock price responses ($Q^b = \frac{\partial q_{t+k}^f}{\partial \varepsilon_t^m} - \frac{\partial q_{t+k}}{\partial \varepsilon_t^m}$) to a tightening in monetary policy.

This proposition can be tested empirically using a vector autoregression model. The analysis uses monthly Malaysian data for GDP, the GDP deflator, a commodity price index, dividends, the short-term interest rate, and a stock price index from January 2004 to December 2016. The focus is on the dynamic response of stock prices to an exogenous hike in the interest rate. Results show that monetary policy tightening, characterized by a rise in the short-term interest rate, has, on average, been associated with an eventual rise in stock prices and a rise in the bubble component (Q^b) of asset prices (Figure 6.4). This effect is persistent and statistically significant. This simple finding casts doubt on the view that monetary policy that leans against the wind, that is, a rise in interest rates, will help deflate an emerging asset and credit market bubble. Moreover, since monetary policy has a broad impact on the economy and financial markets and gets in all the cracks, attempts to raise interest rates to deflate an asset price bubble are likely to have many unintended side effects, such as increased capital flows. And, to the extent that it is diverted to the task of reducing risks to financial stability, monetary policy is not available to help the central bank attain its near-term objectives of full employment and price stability.

In summary, monetary policy can only do so much, increasing the role of macroprudential policy to prevent financial excesses and build financial resilience. Evidence for the ASEAN-5 implies that financial stability will not necessarily materialize as a natural by-product of a so-called appropriate monetary policy stance. Although the effects of monetary and macroprudential instruments may overlap, they are not perfect substitutes, and achieving the financial stability

Figure 6.4. Malaysia: Response of Bubble Component of Stock Prices to a Rise in Interest Rates
(Share of variance explained)



Source: IMF staff calculations.

objective requires dedicated macroprudential policies, which can be better tailored to financial risks, to address specific problems. Well-tailored macroprudential policies can have fewer unintended consequences on other sectors of the economy and other policy objectives.

WHAT ARE MACROPRUDENTIAL POLICIES?

The primary aim of macroprudential policy is to secure financial stability by leaning against excess financial conditions. FSB, IMF, and BIS (2011) define macroprudential policy as "a policy that uses primarily prudential tools to limit systemic or system-wide financial risk, thereby limiting the incidence of disruptions in the provision of key financial services that can have serious consequences for the real economy. . . ." Rather than managing the level and composition of aggregate demand or the business cycle, as monetary policy aims to do, macroprudential policy tries to strengthen the financial system's defenses in the face of economic and financial shocks.

Financial stability risks can occur in several guises:

- *Aggregate weakness:* This weakness arises when the financial sector becomes overexposed to the same risks. Examples include credit (borrower may default), market (collateral values may decline), or liquidity (assets may be hard to sell or debts refinanced) risks. Such risks are particularly acute when

credit becomes increasingly tied to the value of asset prices. When asset prices collapse, lenders become exposed both to market risk, because the value of assets declines, and to credit risk, because borrowers are less able to repay their loans. In addition, banks that expand credit by borrowing from wholesale markets and that rely less on traditional deposits from customers are at risk if market funding dries up, making it harder to refinance expiring debt.

- *Systemic financial risk:* Failure of an individual institution can give rise to systemic risk and cripple the financial system. These spillovers can occur through several channels: (1) increases in funding costs and runs on other institutions in the wake of the failure of the systemic institution, (2) direct exposure to another financial institution, and (3) fire sales of assets by the stricken institution that cause the value of all similar assets to decline, forcing other institutions to take losses on the assets they hold.

Macroprudential policy makes two active contributions to limit these risks to the wider economy:

- First, it can preempt aggregate weakness by limiting the buildup of risk, thereby reducing the occurrence of crises. By building buffers, macroprudential policy helps maintain the ability of the financial system to provide credit to the economy, even under adverse conditions.
- Second, it can reduce systemic vulnerability by increasing the resilience of the financial system. Macroprudential policies can reduce the procyclical feedback between asset prices and credit and contain unsustainable increases in leverage and volatile funding.

For a macroprudential policy framework to operate it needs to include a system of early warning indicators that signal increased vulnerabilities to financial stability. Excessive asset growth is at the core of increased financial sector vulnerabilities. The challenge is knowing when asset growth is "excessive." Simple rules of thumb such as the ratio of total credit to GDP are often used. The liabilities side of banking sector balance sheets also offers clues to financial vulnerabilities. The ratio of noncore to core liabilities of the banking sector is useful for gauging the stage of the financial cycle. Monetary aggregates and other banking sector liability measures may also be usefully developed to track potential vulnerabilities.

Macroprudential tools can be grouped in many ways. The different prudential tools overlap, and there is no hard-and-fast boundary between monetary and macroprudential measures. One useful way to group the tools is to distinguish between those that prevent financial excess from building up and those that increase financial sector resilience. Several macroprudential policy tools are useful for addressing the buildup of financial vulnerabilities (IMF 2014a; IMF, FSB, and BIS 2016):

- *Bank capital–oriented tools can limit loan growth by altering bank incentives.* Such tools affect all credit exposures of the banking system and aim primarily to increase resilience, but some of them may also have a moderating effect on credit in buoyant times. Such policies include credit growth and sectoral limits and loan-to-value and debt-to-income ratios. Countercyclical capital buffers and dynamic loan loss provisioning requirements can help build buffers to absorb losses. A static leverage ratio limit, such as the one

envisaged in Basel III, can constrain the buildup of excessive leverage in the context of capital inflows.

- *Sectoral tools target specific credit categories to help mitigate systemic risk arising from excessive credit growth.* Sectoral capital requirements (risk weights) on specific loans, such as mortgages, can be raised to induce banks to hold extra capital and protect against unexpected losses that arise when default rates increase because of an economic downturn. Constraints on household lending, such as limits on loan-to-value and debt-service-to-income ratios, increase resilience to asset price and income shocks and reduce demand for housing loans. Loan restrictions and guidance on underwriting standards are often targeted at mortgages but can also be applied to other segments, including commercial property and loans to the corporate sector (IMF 2014b; IMF, FSB, and BIS 2016).
- *Liquidity tools can help contain vulnerabilities related to volatile funding structures.* The Basel III liquidity tools—minimum standards for the liquidity coverage ratio and the net stable funding ratio—can do much to improve resilience to liquidity shocks. Liquid asset requirements (such as the liquidity coverage ratio) make banks hold more liquid assets, hold fewer illiquid assets, or lengthen funding maturities, making it less likely that funding pressure will lead to a fire sale.

To mitigate financial vulnerabilities, macroprudential policy tools should be designed to fit closely with early warning indicators, and it is unlikely that a single prudential tool can address the various sources of systemic risk. Policies must be tailored to specific macroprudential instruments to lessen the vulnerabilities identified by analysis. The macroprudential toolkit should be broad enough to prevent boom-bust credit cycles and should include tools to address the interplay between market and credit risks—such as maximum loan-to-value ratios for home mortgages—and the buildup of liquidity risks as credit surges. Moreover, macroprudential policies could also aim to tackle financial imbalances in individual financial institutions, which could also deal with the aggregate credit cycle. This method may be appropriate because bank-specific actions sometimes internalize spillovers that arise across banks over the credit cycle. Table 6.2 provides a simple schema of macroprudential tools. Table 6.3 provides a more detailed description of these tools.

TABLE 6.2.

Schema of Macroprudential Policies

	Preventing Financial Excess	Building Financial Resilience
Credit Supply	Lending rate ceilings	Capital requirements
	Leverage caps	Dynamic and forward-looking provisioning
	Reserve requirements	Risk weights
	Credit growth limits	Reserve requirements
	Exposure limits	Liquidity requirements
	Levy on noncore liabilities	
	Sectoral limits	
Credit Demand	Loan-to-value ratios	
	Debt-service-to-income ratios	
	Tax policies and incentives	

Source: IMF staff calculations.

TABLE 6.3.

Macroprudential Policies and Aims

		Preventing Financial Excess	Building Financial Resilience
Monetary Measures	**Reserve Requirements**		With reserve requirements, banks are required to hold at least a fraction of their liabilities as liquid reserves. These are normally held either as reserve deposits at the central bank or as vault cash.
	Liquidity Requirements		Liquidity requirements typically take the form of a minimum ratio for highly liquid assets, such as government securities and central bank paper, as a proportion of certain types of liabilities. These prudential regulations ensure that banks can withstand severe cash outflows under stress. However, liquidity requirements act similarly to reserve requirements in that they influence the amount of funds available for lending to the private sector.
	Limits on Credit Growth	When an economy experiences rapid credit growth, the central bank may impose a quantitative ceiling on the rate of credit growth per month or year, or a maximum per-month or per-quarter increase in lending. Such limits to credit growth include actions that specify a quantitative limit on the rate of credit growth and penalties for exceeding this limit.	
Prudential Measures	**Capital Requirements**		The rise in asset values that accompanies a boom results in higher capital buffers in financial institutions, supporting further lending in the context of an unchanging benchmark for capital adequacy. During a bust, the value of this capital can drop precipitously, possibly even necessitating a cut in lending. Current capital requirements can therefore amplify the credit cycle, making a boom and bust more likely. However, capital requirements that lean against the credit or business cycle instead—rise with credit growth and fall when it contracts—can play an important role in promoting financial stability and reducing systemic risk.
	Risk-Weighting Assets		Under Basel I, II, and III, housing loans are subject to risk weights that differ from those applied to corporate or sovereign exposures. Raising the risk weight on housing loans makes it costlier for banks to extend them and, at the same time, banks are induced to build up buffers against potential losses. Often, risk weights are differentiated by the actual LTV ratio for individual loans. For example, the portion of a housing loan's LTV ratio that exceeds a certain threshold (for example, 80 percent) may carry a higher risk weight.

(continued)

TABLE 6.3 (*continued*)

Macroprudential Policies and Aims			
		Preventing Financial Excess	**Building Financial Resilience**
Prudential Measures	**Forward-Looking Provisioning**		Forward-looking provisioning requires the buildup of a loss-absorbing buffer at the time the loan is made, sharing similarities with the countercyclical capital buffer. However, there is a key difference between provisioning and equity in accounting treatment. The forward-looking provision is not counted as bank capital and hence is less likely to influence a bank's business focus—which targets a specific return on equity. To the extent the bank uses its capital as the base for constructing its total balance sheet, the larger the equity base, the larger the balance sheet, and hence the greater its use of debt to finance assets. During a credit boom, the buildup of assets using debt financing will contribute to a buildup of vulnerabilities.
	Limits on Credit Growth	When an economy experiences rapid credit growth, the central bank may impose a quantitative ceiling on the rate of credit growth per month or year, or a maximum per-month or per-quarter increase in lending. Such limits to credit growth include actions that specify a quantitative limit on the rate of credit growth and penalties for exceeding this limit.	
	Leverage Limits	Caps on bank leverage can limit asset growth by tying total assets to bank equity. The rationale rests on the role bank capital plays as a constraint on new lending rather than the Basel approach of using bank capital as a buffer against loss. The main mechanism is the cost of bank equity, regarded by banks as more expensive than short-term debt. By requiring a larger equity base to fund the total size of the balance sheet, a regulator can slow asset growth.	
	Sectoral Limits	Designed to be less blunt than dynamic capital buffers, sectoral limits force institutions to add capital to cover new loans in sectors that are building up excessive risks.	

TABLE 6.3 (*continued*)

Macroprudential Policies and Aims			
		Preventing Financial Excess	**Building Financial Resilience**
Prudential Measures	**Loan-to-Deposit Limits**	For domestic banks, the loan-to-deposit ratio cap has two effects: First, it restrains excessive asset growth by tying loan growth to growth in deposits. Second, it directly affects the growth of noncore liabilities and hence the buildup of vulnerabilities that arise from the liability side of the balance sheet. In this respect, there are similarities between the loan-to-deposit cap and the levy on noncore liabilities.	
	Loan-to-Value and Debt-Service-to-Income Limits	Limits on bank lending, such as caps on LTV and DSTI ratios, may be a useful complement to traditional tools for bank supervision. LTV regulations restrict the amount of a loan to a maximum percentage of the value of collateral. DSTI caps operate by limiting a borrower's debt service costs to some fixed percentage of verified income. The macroprudential rationale for imposing LTV and DSTI caps is to limit bank lending to prevent both the buildup of noncore liabilities in funding these loans as well as to lean against eroding lending standards associated with rapid asset growth.	
	Levy on Noncore Liabilities	Excessive asset growth and greater reliance on noncore liabilities are closely related to systemic risk and interconnectedness between banks. In a boom when credit is growing rapidly, the growth of bank balance sheets outstrips available core funding, and asset growth is mirrored in the greater cross-exposure across banks.	

Source: IMF staff calculations.
Note: DSTI = debt-service-to-income; LTV = loan-to-value.

MACROPRUDENTIAL POLICIES IN THE ASEAN-5

This section explores two key questions: how macroprudential policies have evolved in the ASEAN-5 and whether macroprudential policies have complemented monetary policy. The following section, in turn, analyzes the impact of macroprudential policies on credit and asset price cycles and whether such policies could have dampened some of the adverse fallout from the Asian financial crisis.

How Have Macroprudential Policies Evolved in the ASEAN-5?

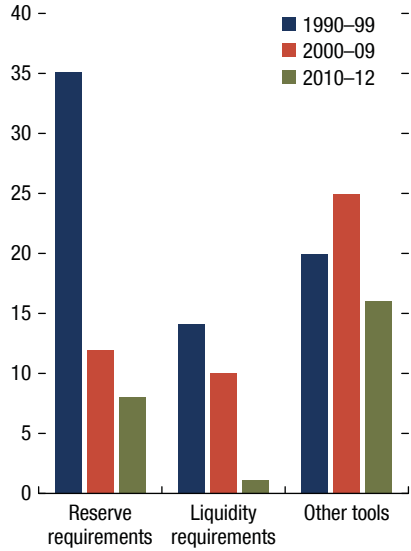
Since the Asian crisis, the ASEAN-5 countries have adjusted their policy frameworks to address financial booms and busts more systematically, embarking on an ambitious and broad-ranging program of economic and financial sector reforms. The ASEAN-5 have been well ahead of the rest of the world in recognizing the value of macroprudential policies for financial stability; they have routinely responded to emerging systemic risks by deploying a variety of instruments, such as loan-to-value ratios, reserve requirements, limits on currency and maturity mismatches, and adjustments in risk weights, to contain excessive financial imbalances. Following the global financial crisis, the ASEAN-5 financial systems were much healthier than those of many advanced economies because policymakers across the ASEAN-5 had routinely responded to emerging systemic risks and preserved financial resilience through a variety of prudential instruments.

The past 30 years have witnessed a shift in the types of macroprudential tools used by the ASEAN-5 to safeguard financial stability. A database of macroprudential policies by the Bank for International Settlements (BIS 2013) shows a move away from monetary macroprudential tools to broader prudential instruments for the ASEAN-5 (Figure 6.5). What might explain the shift from monetary to prudential measures over time? First, reserve requirements lost their importance as monetary policy tools after many ASEAN-5 central banks started to adopt interest rate policy and inflation targeting.[3] Second, there is growing recognition that financial cycles, such as housing credit and house prices, have become longer, larger, and less synchronized with real and inflation cycles (Drehmann, Borio, and Tsatsaronis 2012). In response, policymakers in the ASEAN-5 increasingly resorted to prudential measures to moderate credit and asset price cycles. Third, there was a shift toward explicit macroprudential objectives following the Asian financial crisis (Figure 6.6).

Although monetary prudential tools are deployed less often, they have continued to be used to safeguard financial stability in the face of turbulent economic events. Monetary prudential tools have been employed in a countercyclical fashion since 2003. Mirroring a loosening in monetary policy rates, in 2008 Indonesia, Malaysia, and the Philippines lowered banks' reserve requirements and

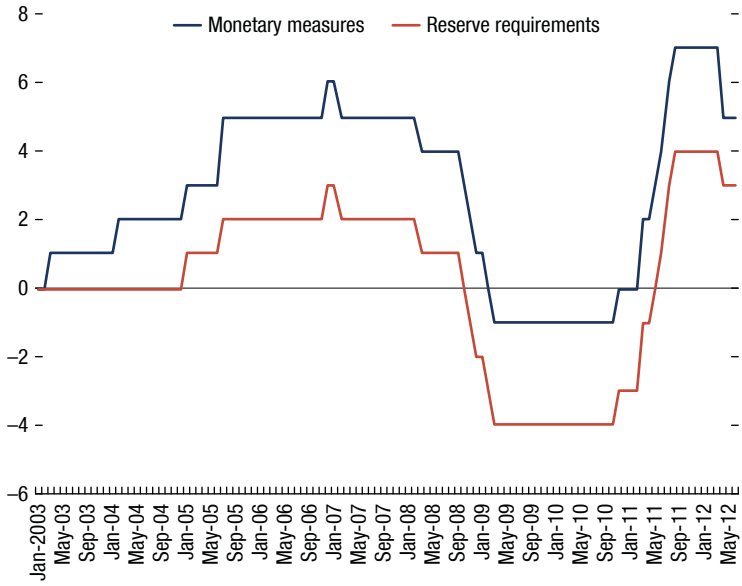
[3]See IMF 2016. All the countries have low inflation as an objective of monetary policy, with some of them (Indonesia, Philippines, Thailand) adopting an inflation-targeting regime.

Figure 6.5. Use of Macroprudential Tools across ASEAN-5
(Number of policy changes)



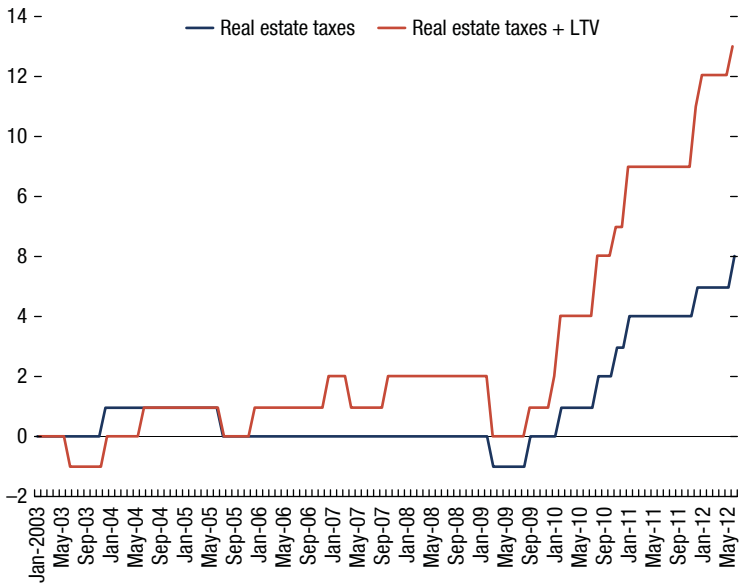
Source: Bank for International Settlements data.
Note: ASEAN-5 = Indonesia, Malaysia, Philippines, Singapore, Thailand.

Figure 6.6. ASEAN-5 Macroprudential Policies: Monetary Measures
(Index)



Source: Bank for International Settlements data.

Figure 6.7. ASEAN-5 Macroprudential Policies–Real Estate
(Index)

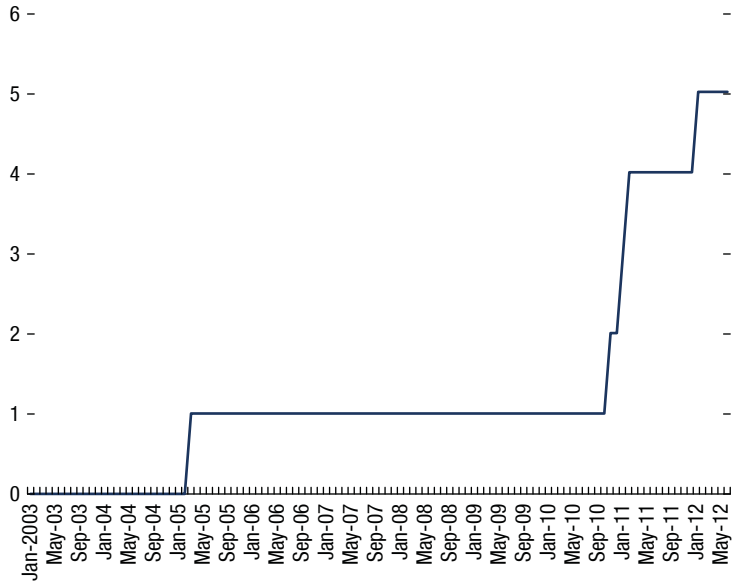


Source: Bank for International Settlements data.
Note: LTV = loan-to-value ratio.

expanded liquidity provision measures to preserve orderly money market conditions. All ASEAN-5 economies expanded depositor insurance guarantees. In 2011, coinciding with a large increase in capital flows, reserve requirements were tightened. During the taper tantrum in 2013 Indonesia gave stability priority over supporting economic activity by tightening reserve requirements and loan-to-value ratios to contain credit growth. During summer 2015, reserve requirements were left unchanged, but they were reduced in December 2015 in Indonesia and in February 2016 in Malaysia.

The broadening of the macroprudential toolkit—with greater focus on the real estate sector and credit-specific domestic prudential tools—was an attempt to address financial stability risks marked by rising household debt and the real estate price cycle. The use of housing-related macroprudential tools across the ASEAN-5 has grown significantly since early 2010 (Figure 6.7). Updated policy indices compiled by Zhang and Zoli (2014) also show increasing use of macroprudential policies, particularly housing-related measures, in the ASEAN-5 economies in the wake of the global financial crisis. Tighter real estate–related macroprudential policies reflected an attempt to control high real estate loan growth attributed to speculative activities in Indonesia, Malaysia, the Philippines, and Singapore, and to tame real estate price inflation in Indonesia and the Philippines. To build financial resilience in the event of a large correction in asset prices, risk weights, particularly for bank

Figure 6.8. ASEAN-5 Macroprudential Policies: Risk Weighting
(Index)



Source: Bank for International Settlements data.
Note: LTV = Loan-to-value ratio.

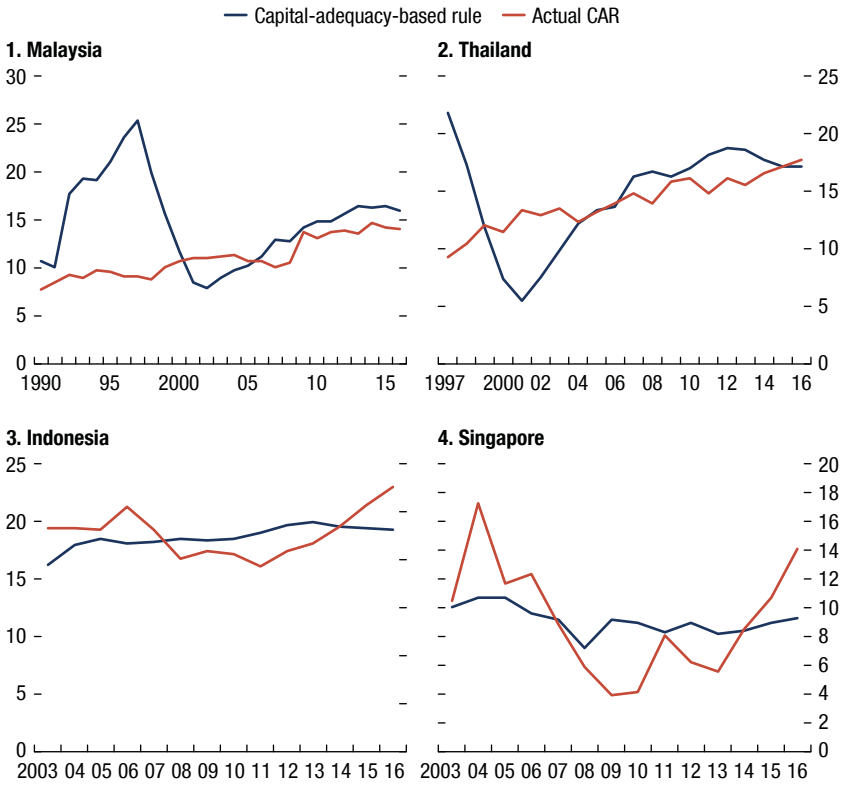
assets linked to real estate, rose in Malaysia and Thailand, and loan-to-value ratios were tightened in Indonesia, Malaysia, and Singapore (Figure 6.8). These policies were complemented by a rise in stamp duties, particularly in Malaysia and Singapore.

The increased use of macroprudential tools has also mirrored shifts in the management of bank capital across the ASEAN-5. Capital requirements are a central part of the macroprudential toolkit, and few issues in the aftermath of the global financial crisis have been more contentious than the level of bank capital. Raising capital requirements serves both goals of macroprudential policy: preemption and resilience. Higher bank capital requirements have several benefits from a financial stability perspective and provide a buffer that absorbs losses—in principal, bank capital plays a preventive role through greater incentives for better risk management (Perotti, Ratnovski, and Vlahu 2011).[4]

Bank capital in the ASEAN-5 has risen progressively since the Asian financial crisis and comfortably exceeds the Basel I minimum requirement of 8 percent in all countries (Figure 6.9). Prudent policy would dictate that when output and credit gaps are large and positive banks should have larger capital buffers. As part of Basel III regulatory reform, banks are required to hold a

[4]Bank capital can limit excesses by increasing shareholders' so-called skin in the game, which prevents excessive risk taking, especially under conditions of asymmetric information.

Figure 6.9. Implied Countercyclical Capital Adequacy Ratios
(Percent)



Sources: World Bank; and authorities' data.
Note: CAR = capital adequacy ratio.

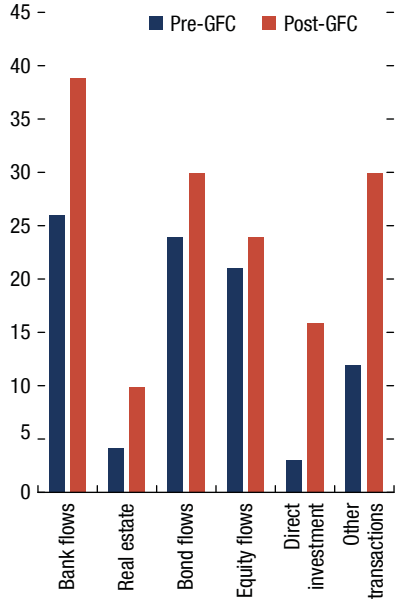
capital conservation buffer.[5] While the countercyclical buffer is a relatively new tool, simulations can be used to illustrate the appropriate level of capital given the stages of financial and real cycles both before and after the Asian and global financial crises.[6]

A countercyclical capital buffer rule would have raised banks' capital in the run-up to the Asian financial crisis (Malaysia and Thailand) and the more recent global financial crisis (Indonesia, Malaysia, Thailand, Singapore) (Figure 6.9). Although this exercise is purely illustrative and the focus is on the actual level of bank capital rather than minimum capital requirements, a countercyclical capital buffer would have lowered bank capital in the aftermath of the Asian financial

[5]This is specified as 2.5 percent of total risk-weighted assets.

[6]An implied countercyclical capital buffer is calculated using the following equation: Capital Adequacy = Banks' Long-Run Capital Adequacy Ratio + 0.5 × Credit Gap + 0.3 × Output Gap.

Figure 6.10. ASEAN-5 Use of Capital Flow Measures
(Number of policy actions)



Source: Bank for International Settlements data.
Note: GFC = global financial crisis.

crisis (Malaysia, Thailand) and following the global crisis (Indonesia, Singapore). Despite the lack of an explicit countercyclical capital buffer policy rule, capital adequacy in Malaysia and Thailand since the Asian financial crisis has closely mirrored the level of capital adequacy implied under such a rule. In other ASEAN-5 countries, the actual capital ratio has not veered substantially from the level of capital implied by a simple countercyclical capital buffer rule. This finding suggests that, whether explicitly realized or not in real time, the management of bank capital has become more macroprudential, adjusting somewhat to excesses in real and financial cycles.[7]

The ASEAN-5 have also taken measures to manage capital inflow and outflow surges (Figure 6.10). These measures have overlapped with macroprudential

[7]It has been argued that higher capital ratios are associated with a higher probability of a crisis. This mechanism suggests that banks raise capital in response to higher-risk lending choices rather than as a buffer against a potential systemic crisis event in the economy. Such a finding is consistent with an empirical reverse causality mechanism reported in the data: the more risks the banking sector takes, the more markets and regulators are going to demand that banks hold higher buffers. See Jordà and others 2017.

policies to address systemic risks at times.[8] Capital flows can give rise to financial stability risks through various channels (IMF 2014a), including increases in short-term wholesale funding of the banking system, growth in foreign currency funding of the financial system, contributions of capital inflows to local credit booms and asset price appreciation, and credit risks from foreign-currency-denominated loans. A database compiled by the Bank for International Settlements suggests that Malaysia, the Philippines, and Thailand took advantage of the loosening in the global financial cycle between 2004 and 2008 to implement measures that liberalized capital inflows and outflows, with an emphasis on bank, bond, and equity flows, and capital inflows grew significantly. The era following the global financial crisis also saw some measures to tighten outflows.

HAVE MONETARY POLICY AND MACROPRUDENTIAL POLICIES BEEN COMPLEMENTARY?

Macroprudential policies work most successfully when monetary policy is pulling in the same direction. Bruno, Shim, and Shin (2015) find that macroprudential policies are not particularly effective when they lean in a direction opposite to monetary policy. Effective monetary and macroprudential policies that complement each other yield better outcomes than monetary—or macroprudential—policy pursued separately. Tightening macroprudential policy tools can dampen real economic activity. However, the authorities can counter these effects by loosening monetary policy at the margin. Moreover, macroprudential policy can give monetary policy more room to pursue its primary objective and can help build buffers that can be relaxed in periods of financial stress, as shown in Chapter 9. Such a policy can help keep monetary policy transmission open, preserving its effectiveness in the event of financial stress.

Monetary and macroprudential policies in the ASEAN-5 have complemented each other since the turn of the century. Table 6.4 shows the degree of complementarity between monetary policy and macroprudential policies for the ASEAN-5, calculated using a pairwise correlation of various policy cycles—specifically, the policy rate cycle and the macroprudential policy cycle as represented by cumulative variables for macroprudential policy tightening or loosening. The correlation between the monetary policy cycle and the macroprudential policy cycle is positive, with a slightly stronger outcome for nonmonetary prudential tools.

A link between macroprudential and monetary policies in the ASEAN-5 should not be surprising given the similarities and complementarities between these types of policies. Both affect credit demand, albeit in different ways. Monetary policy works by intertemporal allocation of spending, bringing forward spending from the future or pushing it into the future. One way to bring spending forward is to lower interest rates so that economic agents can borrow more sooner. In contrast,

[8]The policy frameworks for capital flow management measures and macroprudential policy can overlap (IMF 2012, 2013). Capital flow management measures are designed to limit capital flows by affecting the scale or composition of these flows. Macroprudential measures are designed to limit systemic vulnerabilities, including those associated with capital inflows. To the extent that capital flows are the source of systemic financial risks, the different prudential tools overlap.

TABLE 6.4.

Average Correlation of Monetary and Macroprudential Changes in the ASEAN-5

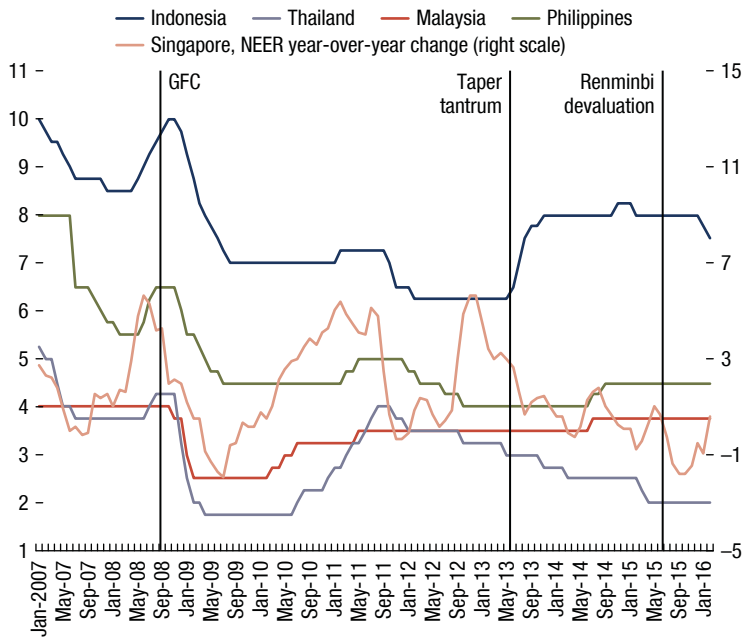
	Policy Rate Change
Policy Rate Change	1
Monetary Prudential Tools	0.21
Nonmonetary Prudential Tools	0.27

Source: IMF staff calculations.

macroprudential policy works by restraining borrowing. Monetary policy and macroprudential tools also affect risk taking by banks: monetary policy works through the so-called risk-taking channel, whereas macroprudential regulation affects financial risk taking by imposing equity constraints. Finally, monetary and prudential policies affect bank funding costs through the net interest margin.

The ASEAN-5 have progressively altered their monetary policy stances to complement existing macroprudential measures. This process can be observed by examining the data during the taper tantrum episode of 2013. All countries raised their policy rates during the Asian financial crisis to support their external positions, but eased these rates in the aftermath of the global financial crisis to support growth (Figure 6.11). Only Indonesia raised policy rates during the taper

Figure 6.11. ASEAN-5: Policy Interest Rates
(Percent)



Sources: Haver Analytics; and IMF staff estimates.
Note: GFC = global financial crisis; NEER = nominal effective exchange rate.

tantrum to support its external position; Malaysia and the Philippines subsequently tightened modestly for domestic stability purposes. Singapore and Thailand gradually eased their monetary policy stances during 2011–12, reflecting the weakening economic outlook. During the summer 2015 turbulence, policy rates were left unchanged in all ASEAN-5 economies because policymakers had to weigh concerns about capital flow reversals that were largely confined to portfolio equity flows against worries about slowing economic activity. However, not until January 2016 did Indonesia start loosening monetary policy to support domestic demand. These episodes demonstrate the increased degree of coordination between monetary and macroprudential policies in the ASEAN-5, which eased the burden on monetary policy to lean against unfavorable financial developments. As a result, the monetary authorities had more flexibility to pursue price and output stability objectives while preserving the established independence and credibility of monetary policy (see IMF 2016).

THE MACROECONOMIC IMPACT OF MACROPRUDENTIAL POLICIES IN THE ASEAN-5

Empirical evidence supports the effectiveness of macroprudential tools for building resilience (IMF, FSB, and BIS 2016). Studies of macroprudential tools' potential to reduce the procyclicality of credit or contain excessive credit growth find sizable economic effects. However, the strength of the effects depends on capital market openness and financial market development (for example, Lim and others 2011; Cerutti, Claessens, and Laeven 2017). Strength also differs across tools: loan restrictions and borrower eligibility tools (such as loan-to-value and debt-service-to-income ratios) affect credit more, based on their historical calibration, than capital or liquidity tools (for example, Akinci and Olmstead-Rumsey 2015). On the other hand, borrower-based tools are generally found to have measurable effects on credit. Tools that impose limits based on borrower income, such as debt-service-to-income ratios, do more to contain increases in credit than limits based on asset prices (such as loan-to-value ratios).

Canonical correlations and model simulations using data for the ASEAN-5 suggest that more active use of macroprudential policies has resulted in less risk taking and a decline in boom-bust cycles. Three methodologies for calculating the credit gap identify credit booms before the Asian financial crisis in all ASEAN-5 economies (see Table 6.5). Except in the case of Singapore, none of the methodologies show that the ASEAN-5 economies experienced credit booms in the run-up to the global financial crisis or thereafter. In addition, for Singapore, the first two approaches should receive more weight given the country's high GDP ratio as a result of its role as a financial center.

Greater use of macroprudential measures since the Asian financial crisis has coincided with lower risk taking by banks and less reliance on noncore funding. The ratio of total credit to broad money is a useful signal of the stage of the financial cycle: an increase implies greater dependence on noncore bank liabilities to finance credit expansion (see Borio and Zhou 2008; Shin and Shin 2011).

TABLE 6.5.

Heat Map on the Evidence of Credit Booms[1–4]

	Pre-AFC (1996–97)			Pre-GFC (2007–08)			Post-GFC/UMP (2009–2012)			Post-Taper Tantrum (2013–15)		
	M&T	D&O	GFSR	M&T	D&O	GFSR	M&T	D&O	GFSR	M&T	D&O	GFSR
Indonesia	0.09	−0.98	−0.53	−0.30	5.22	1.18	−0.29	3.76	0.89	−0.29	3.65	1.06
Malaysia	0.05	16.58	20.87	−0.23	1.38	1.22	−0.19	2.66	2.73	−0.17	2.27	2.59
Philippines	0.10	20.98	8.95	−0.36	2.14	0.58	−0.35	2.96	0.86	−0.24	7.51	2.57
Singapore	−0.02	7.89	6.90	−0.12	11.16	9.25	−0.12	3.98	3.84	−0.04	4.43	5.06
Thailand	0.07	12.27	17.26	−0.25	1.60	1.40	−0.22	4.83	4.74	−0.17	3.49	4.05

Source: IMF (2016).

Note: AFC = Asian financial crisis; D&O = Dell'Ariccia and others 2012; GFC = global financial crisis; GFSR = IMF, *Global Financial Stability Report*, *September 2011*; M&T = Mendoza and Terrones 2008; UMP = unconventional monetary policy.

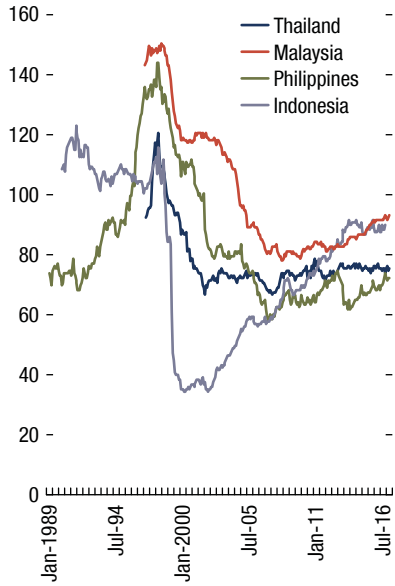
[1]Shades of green indicate lower threshold/early warning of credit boom; shades of red indicate that credit is above upper threshold/evidence of a credit boom.

[2]Figures under M&T refer to the deviations of log real credit per capita from its Hodrick-Prescott trend times 1.75 the trend's standard deviation. The deviations are averaged for the subperiods identified. Positive figures shaded in red indicate evidence of a credit boom.

[3]Figures under D&O refer to the average growth of credit-to-GDP ratio for the subperiods identified. Figures shaded in green and red show ratio above the lower cutoff at 10 percent ratio and upper threshold at 20 percent ratio.

[4]Figures under the IMF's GFSR refer to the annual change in credit-to-GDP ratio in percentage points, averaged for the subperiods identified. Figures shaded in green and red identify change in credit-to-GDP ratio above 3 percentage points and 5 percentage points, respectively.

Figure 6.12. Ratio of Credit to Broad Money

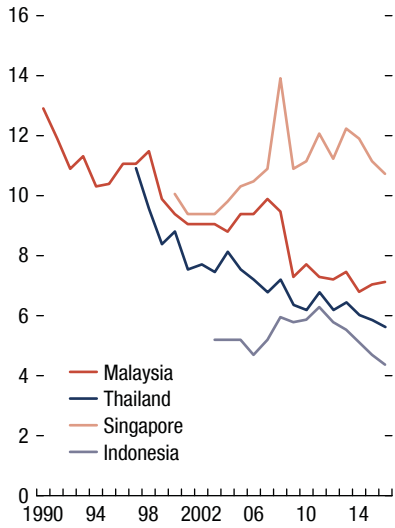


Sources: Authorities' data; and IMF staff calculations.

Broad money signals changes in the size of the banking sector's aggregate balance sheet. It implicitly conveys the degree of risk taking in the economy along with information on the vulnerability of the financial system to a reversal of available funding. The ratio of credit to broad money—exceeding 100 percent—rose sharply in the years preceding the Asian financial crisis (Figure 6.12) for Indonesia, Malaysia, the Philippines, and Thailand, implying that this rapid credit growth was increasingly financed by noncore sources. Following the crisis, as banks shrank their balance sheets, the ratio of credit to broad money declined to less than 100 percent for Indonesia, the Philippines, and Thailand by 2001. The ratio has remained flat for Malaysia, the Philippines, and Thailand since then, despite the global asset price boom and the global financial crisis.

Greater use of prudential tools has also led to more prudent bank balance sheet management and is reflected in acyclical bank leverage. Gourinchas and Obstfeld (2012) report leverage as a consistent and significant predictor of a financial crisis because bank leverage is typically procyclical, with aggregate consequences for the financial system via aggregate volatility and the price of risk (Adrian and Shin 2009). A rise in asset prices strengthens bank balance sheets and—without adjusting asset holdings—leads to a decline in their leverage; banks that hold surplus capital find ways to employ that surplus, leading to a rise in bank leverage.

Figure 6.13. Bank Leverage
(Unit of bank capital)



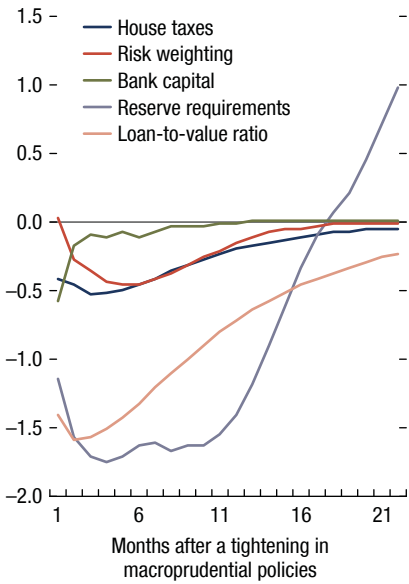
Sources: Authorities' data; and IMF staff calculations.

Figure 6.13 shows that bank leverage for Indonesia, Malaysia, Singapore, and Thailand was not procyclical, but rather appears to have been acyclical for much of the asset price boom period of the 2000s. Data for Malaysia show that in the year before the Asian financial crisis, on average, every unit of capital was associated with an 11 percent increase in credit growth. This rate declined to about 7.5 percent by 2010 and has stayed relatively flat since then despite strong capital inflows. A similar pattern is also observed for Thailand, with bank leverage declining in Indonesia and Singapore since 2010.

These developments in the ASEAN-5 are not only consistent with their greater use of aggregate and sectoral macroprudential policies, but also with their efficacy in moderating credit and asset price cycles since the Asian financial crisis. By means of an event study, Figures 6.14 and 6.15 illustrate dynamic estimates using local projections drawn from a robust panel regression model linking credit growth and various macroprudential policy tools: bank capital, reserve requirements, loan-to-value ratio, property taxes, and risk-weighted assets.[9] These tools operate differently on credit demand and loan supply. The dynamic responses show that, on average across the ASEAN-5, macroprudential measures have had an effective impact on the credit cycle (Figure 6.14). Changes in loan-to-value limits and reserve requirements appear, with a lag, to have the largest impact on

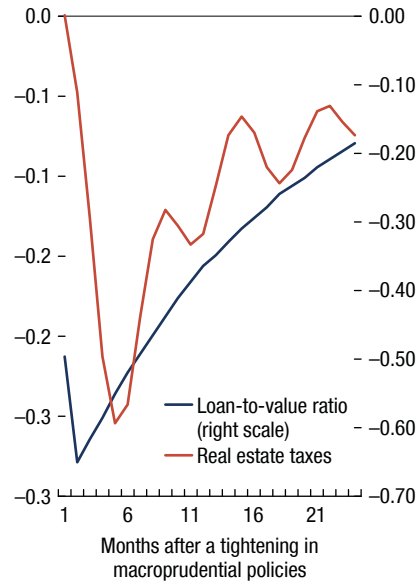
[9]See Jordà 2005 for an explanation of the local projection method.

Figure 6.14. Response of Credit Growth to Macroprudential Measures
(Percent)



Sources: Authorities' data; and IMF staff calculations.

Figure 6.15. Response of Real Estate Prices to Macroprudential Measures
(Percent)



Sources: Authorities' data; and IMF staff calculations.

the credit cycle. This outcome is perhaps not surprising, since loan-to-value limits work directly to limit credit demand. Dynamic estimates also show that real estate–specific measures, such as raising real estate–related taxes or tightening the loan-to-value ratio, help reduce real estate price inflation (Figure 6.15). The lagged effect of some prudential measures on credit and asset prices suggests that macroprudential policies need to be forward looking to preempt financial excesses. Taken at face value, the empirical evidence indicates that, on average, macroprudential measures effectively dampened the procyclicality of credit and asset price growth in the ASEAN-5 since the Asian financial crisis.[10]

[10]The confounding effect of the endogeneity of the policies should be kept in mind when interpreting the results. The introduction of macroprudential policies often reflects the external environment and the perception that surges in bank or bond capital flows may lead to destabilizing capital outflows in any subsequent reversal. To the extent that new macroprudential policies happen only after a period of discussion within the government, central bank, and other public authorities (such as financial regulators), the introduction of such policies often coincides with the late stages of the boom. To the extent that the boom subsides under its own weight, the introduction of the macroprudential policy and the subsequent slowdown of capital flows and credit growth would be a coincidence, not a causal effect. Thus, the results reported herein should be taken with some caution.

Macroprudential policies in the ASEAN-5 have also enhanced the monetary policy transmission mechanism. Macroprudential policy can affect the transmission mechanism because the interest rate margin is a function of the compensation taken by banks for items such as administrative costs, capital costs, risk premiums, and the banks' profit margins. Nondynamic macroprudential instruments, such as increased capital or reserve requirements, affect the net interest margin because they tend to increase banks' costs, which, to a certain extent, are passed on to customers in the form of an increased interest margin. The rule for regulation through the bank lending interest rate equation, which describes the relationship between monetary policy and macroprudential policy, is expressed as follows:

$$i_t^{lending} = i_t + \delta_t(z_t). \tag{6.5}$$

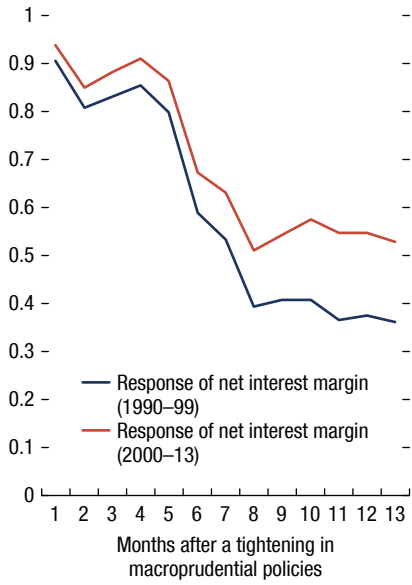
Equation (6.5) expresses banks' lending rate as a function of the policy interest rate and the interest margin (δ_t). The interest margin is influenced by regulation (z_t), which is itself determined by non-time-varying regulations ($\bar{z}$), the credit gap, and the output gap (Ingves, Apel, and Lenntorp 2010; Shin 2011).

Model simulations suggest that the impact of macroprudential policies on the monetary transmission mechanism via the banking system has grown since the 2000s. From estimating equation (6.5), which links macroprudential policies and the net interest margin, dynamic responses are extracted using local projection methods that show that a tightening in macroprudential policies leads to a rise in the net interest margin (Figure 6.16). The impact of tightening macroprudential regulations on banks' net interest margin has grown for the ASEAN-5 since the Asian financial crisis. The influence of macroprudential policies on financial intermediaries in the ASEAN-5 has grown, reflecting their more aggressive use, improved credibility, and increased financial deepening since the Asian crisis, all of which have increased the sensitivity of the financial system to policy changes.

Policy simulations suggest that a modest prudential intervention would have helped curtail the pre–Asian financial crisis credit and asset price booms in Malaysia and Thailand. Given the lessons learned since the crisis, the question is whether macroprudential tools, if deployed more aggressively and preemptively in the years leading up to the crisis, could have done more to preserve financial stability during 1996–99. Given limited data availability for the other countries, a counterfactual experiment is performed for Malaysia and the Philippines by simulating a set of modest macroprudential policy interventions in the years preceding the Asian financial crisis.[11] The responses of credit growth and asset prices are then traced out based on these modest macroprudential policy

[11]It is worth noting that such simulations may suffer from the Lucas critique, which predicts that the coefficients of a macroeconometric model will change when there is a change in policy actions. However, without quarreling with the logic of the Lucas critique, Leeper and Zha (2003) have shown that "modest" policy interventions are unlikely to bias the results, since policy changes tend to be small and do not resemble the once-and-for-all changes in policy rules that underlie the Lucas critique.

Figure 6.16. Median Impact of Macroprudential Policies on ASEAN-5 Net Interest Margin
(Percent)



Sources: Authorities' data; and IMF staff calculations.

simulations to produce a counterfactual series that can be compared with the realized data. On a technical level, following Leeper and Zha (2003) the model is a special case of Kalman smoothing and is estimated using a Bayesian VAR(3) model with Minnesota priors, which in basic terms can be expressed as

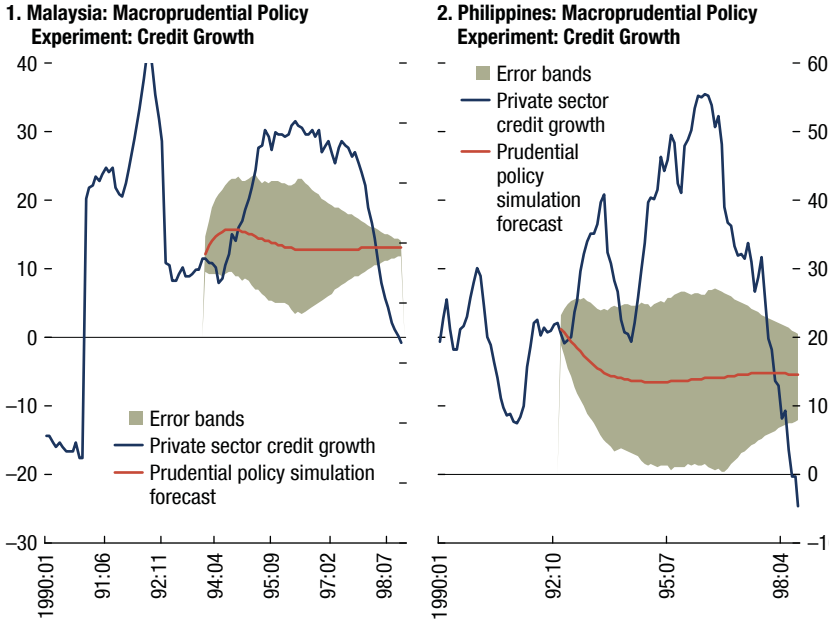
$$Y_t = B(L)\, Y_{t-1} + A_0 \varepsilon_t , \tag{6.6}$$

in which Y_t is a vector containing a set of monthly macroeconomic and policy variables, including credit growth, reserve money, industrial production, and a macroprudential policy index; B is a matrix of reduced-form coefficients; and A_0 captures the contemporaneous relationships between the macro time series and policy variables. To produce forecasts in the years leading up to and during the Asian financial crisis (1993–98), equation (6.7) is iterated over this forecast period h:

$$Y_{t+h} = B^{h+1}(L)\, Y_{t-1} + A_0 \sum_{i=0}^{h} B^i \varepsilon_{t+h-i} . \tag{6.7}$$

The forecast Y_{t+h} in equation (6.7) is essentially a decomposition of two components: an unconditional forecast and a component with structural shocks. Equation (6.7) can be rearranged as

Figure 6.17. Macroprudential Policy Simulations on Credit Growth before and after the Asian Financial Crisis



Source: IMF staff calculations.

$$Y_{t+h} - B^{h+1}(L)\, Y_{t-1} = A_0 \sum_{i=0}^{h} B^i \varepsilon_{t+h-i}. \tag{6.8}$$

Policy simulations show that a more aggressive macroprudential policy stance in the years leading up to the Asian financial crisis would have helped moderate credit and asset price cycles. The simulation assumes that the macroprudential index for Malaysia, constructed from the Bank for International Settlements macroprudential database, would be progressively tightened throughout 1995 until mid-1996. Figure 6.17 reports the actual time series, the out-of-sample forecasts conditional on a tightening in the macroprudential policy index, and 68 percent probability bands for the forecasts. The estimates for Malaysia show that credit growth, allowed to expand at a brisk pace of between 11 and 15 percent from 1995 to early 1997 under the policy scenario, would have grown more slowly than the level realized during this time; actual private sector credit growth averaged about 30 percent between the middle of 1995 and early 1997. In general, these findings illustrate that macroprudential policies would have been useful in containing systemic vulnerabilities.

Although the use of macroprudential policy tools has grown, prudential policy frameworks remain a work in progress, and the ASEAN-5 are striving to develop and build appropriate institutional underpinnings for such policies. Although the

ASEAN-5 remain much more capable of weathering external shocks than when the Asian financial crisis struck, the taper tantrum turmoil exposed several vulnerabilities policymakers had not fully recognized. There is concern about policymakers' ability to provide detailed advice on macroprudential policies—considering information gaps—and there is still only limited experience with the instruments. Moreover, further evolution of monetary policy frameworks is likely in the "new normal" (Bayoumi and others 2014). Part III of the book delves into the challenges ahead for upgrading policy frameworks for price and financial stability in the ASEAN-5.

CONCLUSIONS

The ASEAN-5 economies have been well ahead of other regions in realizing the value of macroprudential policies for supporting financial stability. The more active use of macroprudential policies by the ASEAN-5 since the Asian financial crisis is a sign that policymakers across the region have not been lulled into complacency by apparent macroeconomic stability. They recognize that financial imbalances can materialize during periods of economic tranquility and benign inflation pressure. Structural financial risks have grown as ASEAN-5 credit cycles have become increasingly influenced by external conditions, while a low (natural) interest rate environment over the past decade resulting from persistent low inflation and supply-side improvements has increased the probability of excessive credit growth and the buildup of asset bubbles. Evidence for the ASEAN-5 implies that financial stability will not necessarily materialize as a natural by-product of a so-called appropriate monetary policy stance. With this in mind, macroprudential policies have been effective in stemming the buildup of financial risks. Event studies for the ASEAN-5 show that macroprudential tools have been useful in containing systemic vulnerabilities and procyclical dynamics between asset prices and credit over the past two decades. Macroprudential policies have also complemented monetary policy and enhanced the monetary transmission mechanism via the bank lending channel. The greater use of prudential tools has been mirrored by a lower incidence of credit booms and more prudent bank balance sheet management since 2000.

Macroprudential policies alone cannot prevent financial crises. The findings in the chapter imply that central banks have strong incentives to pursue macroprudential policies to safeguard financial stability. However, effective measures are also needed to ensure that macroprudential policy does not become overburdened. These measures must be complemented by strong macroeconomic policies to build a stable environment conducive to a healthy financial system. Policymakers should be mindful that macroprudential policy is not free of costs and that there may be trade-offs between the stability and the efficiency of financial systems. For instance, when policymakers impose high capital and liquidity requirements on financial institutions, they may enhance the stability of the system, but they also drive up the price of credit. Balancing benefits and costs of macroprudential policies will often require difficult judgments. For

macroprudential policy to contribute to financial stability and social welfare, its objectives need to be defined clearly and in a manner that can form the basis of a strong accountability framework.

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PART III

Challenges Ahead

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CHAPTER 7

Monetary Policy in the New Normal

INTRODUCTION

Monetary policy frameworks in members of the Association of Southeast Nations–5 (ASEAN-5) economies have improved significantly since the Asian financial crisis. As elaborated in Chapter 2, the clarification of price stability objectives, including the adoption of explicit inflation targets in some countries, and the strengthening of central bank operations and transparency have been major milestones in the evolution of monetary policy frameworks. The transition to more consistent forward-looking frameworks allowed ASEAN-5 economies to withstand the global financial crisis well, as well as the commodity price cycle and the low-inflation environment of recent years.

A decade after the global financial crisis, the global macroeconomic and financial landscape continues to be influenced by its legacies. ASEAN-5 countries faced a protracted period during which most advanced economies' expansionary monetary policies were not well aligned with domestic economic conditions in emerging market economies. Moreover, the new normal global landscape is expected to exhibit gradual normalization of monetary policy in advanced economies. However, an inflation surprise could suddenly tighten global financial conditions and prompt capital flow volatility. This global environment will further test ASEAN-5 monetary policy frameworks in the coming years.

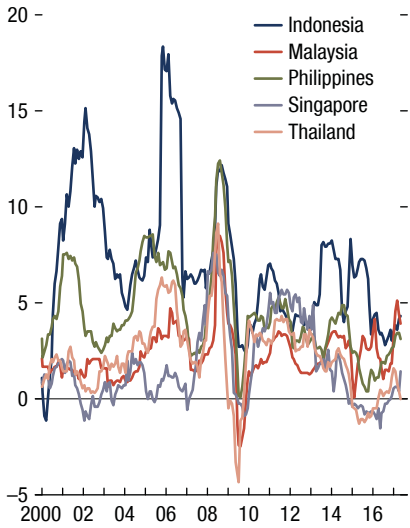
This chapter focuses on the challenges posed by the new normal for ASEAN-5 monetary policy frameworks. The chapter first takes stock of the evolution of inflation dynamics in the region during the past two decades. The analysis provides a basic framework for assessing challenges and areas for improvement in the design and implementation of monetary policy. The chapter then presents the current global debate on the role of monetary policy in the new normal and discusses the implications for ASEAN-5 economies.

DRIVERS OF ASEAN-5 INFLATION DYNAMICS

The gradual improvement in monetary policy frameworks since the Asian financial crisis has resulted in lower average inflation rates in the ASEAN-5, both for

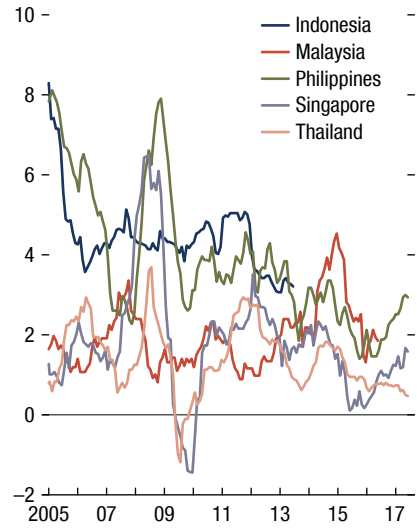
This chapter was prepared by Juan Angel Garcia Morales in collaboration with Geraldine Dany-Knedlik, Aubrey Poon, and Umang Rawat, under the guidance of Ana Corbacho.

Figure 7.1. Headline Inflation in ASEAN-5 Countries
(Percent)



Sources: Haver Analytics; and IMF staff calculations.
Note: ASEAN-5 = Indonesia, Malaysia, Philippines, Singapore, Thailand.

Figure 7.2. Core Inflation in ASEAN-5 Countries
(Percent)



Sources: Haver Analytics; and IMF staff calculations.

headline and for core measures (excluding food and energy; Figures 7.1 and 7.2). The decline in inflation was particularly noticeable after the global financial crisis. Several factors explain the differences in inflation performance among the ASEAN-5 countries, from the degree of development in their monetary policy frameworks and economic structures to the fact that the region comprises both oil producers and heavy oil importers whose inflation is strongly exposed to oil price fluctuations.

One of the legacies of the global financial crisis has been protracted low inflation. Technical innovation in extraction and production has triggered a significant structural change in the oil and gas sector, which, coupled with low demand pressure, may lead to commodity prices that remain below historical averages (Baumeister and Kilian 2016). The persistent below-target inflation in some large advanced economies (euro area, Japan) and the significant slack in the industrial sector in some large economies (IMF 2016) may also attenuate inflation pressure in the coming years.

Assessing potential changes in inflation dynamics is therefore fundamental to the formulation of monetary policy. For example, to what extent can low commodity prices and economic slack explain recent inflation dynamics? Have long-term inflation expectations remained well anchored since the global financial crisis? This section provides some quantitative evidence to answer these questions.

The empirical approach relies on the estimation of a Phillips curve at the country level, building on the hybrid New Keynesian Phillips curve specification in Galí and Gertler 1999, among others. The benchmark specification is as follows:

$$\pi_t = \beta_t^1 \bar{\pi}_t + \left(1 - \beta_t^1\right) \pi_{t-1}^{MA4} + \beta_t^2 \tilde{y}_{t-1} + \beta_t^3 \pi_t^{IM} + \varepsilon_t , \tag{7.1}$$

in which π_t is headline consumer price inflation, $\bar{\pi}_t$ denotes long-term inflation expectations, π_{t-1}^{MA4} is the moving average of inflation over the preceding four quarters, $\tilde{y}_{t-1}$ is economic slack measured by the output gap, π_t^{IM} is inflation—imported goods and services in local currency (that is, including the impact of exchange rates)—and ε_t is the estimation error and is assumed to be a Gaussian white noise process (see Dany-Knedlik and Garcia 2018 for further details).

In terms of economic interpretation, the coefficient β_t^1 determines the extent to which inflation is driven by long-term expectations; that is, its forward-looking component, in contrast to the influence of lagged inflation, captured by $(1 - \beta_t^1)$. The coefficient β_t^2 determines the impact of cyclical economic activity on inflation; that is, the slope of the Phillips curve. The effect of import (and oil) price inflation is captured by β_t^3. To identify changes in inflation dynamics over time—for instance, resulting from the evolution of monetary policy regimes or changes in the global environment, coefficients are allowed to vary over time, along the lines of IMF 2013 and 2016 and Blanchard, Cerutti, and Summers 2015.

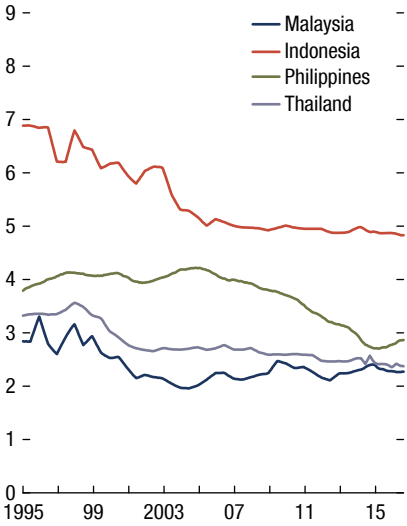
Measures of long-term expectations are a crucial element of the empirical investigation. All central banks, including those of the ASEAN-5, regularly monitor inflation expectations, either through surveys or by extracting expectations from available financial instruments.[1] Survey inflation expectations are a widely used measure of the private sector's (long-term) inflation expectations. They are easy to collect and readily available for many countries. However, since the beginning of the global financial crisis, survey-based measures of inflation expectations have become increasingly disconnected from actual inflation dynamics, particularly in many advanced economies afflicted by significant disinflation pressure. Market-based indicators also have some important shortcomings.[2]

To establish a benchmark measure for long-term inflation, this section uses novel estimates of trend inflation for ASEAN-5 economies (Garcia and Poon, forthcoming; Figure 7.3). The qualitative results on the drivers of inflation dynamics are

[1]Surveys are a traditional source of information on long-term inflation expectations; they have been available several times a year for many countries over several decades. With the issuance of inflation-linked bonds in many advanced economies and in emerging markets, the so-called break-even inflation rate (BEIR)—the yield spread between comparable conventional bonds and inflation-linked bonds—has also become a crucial indicator of inflation expectations.

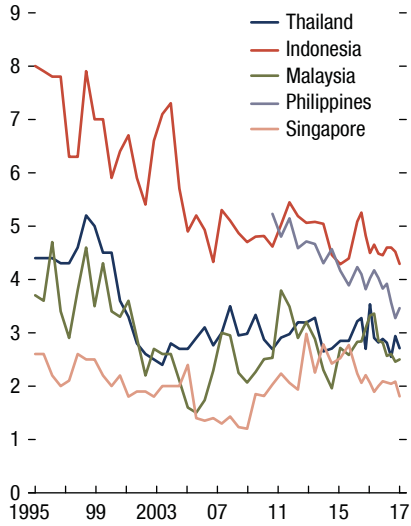
[2]BEIRs often provide more timely information on investors' inflation expectations than survey-based expectations. Yet, in addition to expected inflation, BEIRs may incorporate other factors, notably inflation risk and liquidity risk premiums, and are better interpreted as the overall inflation compensation requested by investors to hold nominal assets than as a pure measure of expected inflation. Among the ASEAN-5 countries, BEIRs are available only for Thailand.

Figure 7.3. Long-Term Inflation Expectations, Trend Estimates
(Percent)



Sources: Garcia and Poon, forthcoming-a; and Consensus Economics forecasts.

Figure 7.4. Consensus Long-Term Inflation Expectations
(Percent)



Sources: Garcia and Poon, forthcoming-a; and Consensus Economics forecasts.

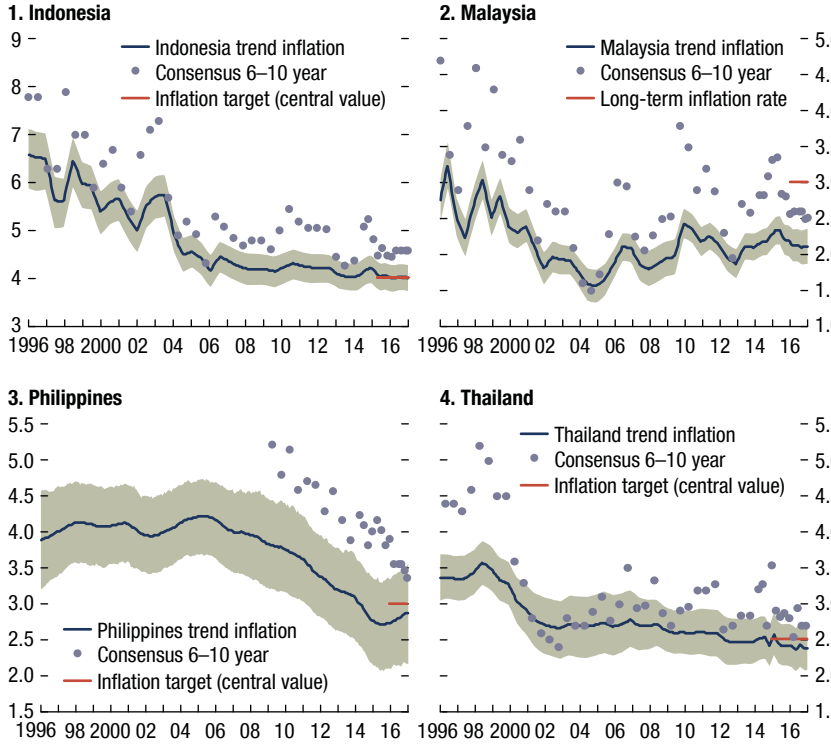
nonetheless similar to those that use Consensus Economics survey expectations (Figure 7.4; see also IMF 2016). Conceptually, trend inflation is the rate of inflation expected to prevail once the effects of temporary shocks in the observed inflation rate dissipate. Trend inflation is therefore a natural measure of future inflation, and the level of inflation expectations in the private sector should hold.

Empirical estimates of trend inflation in the ASEAN-5 countries confirm some important weaknesses in long-term inflation expectations from surveys (Figure 7.5). Compared with trend inflation measures, survey measures of inflation expectations for ASEAN-5 economies do have a quantitatively important *level* bias,[3] in line with recent findings for the United States (Chan, Clark, and Koop 2015) and the euro area (Garcia and Poon, 2018). Recent literature suggests that these biases are the result of informational rigidities (Coibion and Gorodnichenko 2015; Mertens and Nason 2015).[4] Specifically, although they

[3]For a detailed discussion of the relationship between trend inflation and survey measures in ASEAN-5 economies across additional dimensions, see Garcia and Poon, forthcoming-a.

[4]Coibion and Gorodnichenko (2015) provide regression evidence that survey forecasts' departure from full rationality may be related to information rigidities leading to a sluggish adjustment in (US) survey expectations. Such an interpretation is consistent with findings for euro area surveys. Mertens and Nason (2015) model inflation and survey expectations jointly, allowing the strength of the information rigidities to vary over time using an additional latent state and incorporating autoregressive dynamics and trend inflation.

Figure 7.5. Measures of Long-Term Inflation Expectations
(Percent)

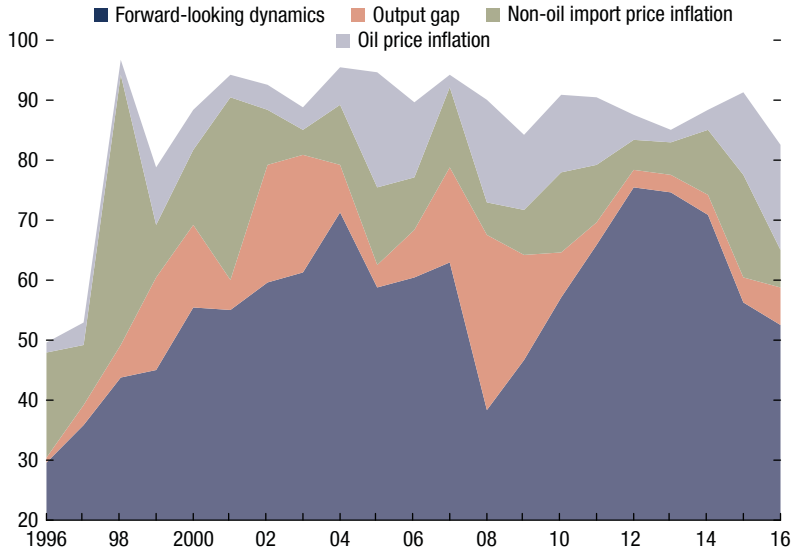


Source: Garcia and Poon, forthcoming-a.
Note: The figure displays the estimates of trend inflation from Garcia and Poon, forthcoming-a, together with standard uncertainty bands, survey measures of long-term inflation expectations, and the inflation targets announced by the corresponding central banks.

exhibit some significant fluctuation over time, survey measures tend to be well above the level implied by long-term trend inflation, even when accounting for standard estimation uncertainty. Furthermore, survey measures also appear to be quite disconnected from official targets in the inflation-targeting ASEAN-5 central banks (Indonesia, Philippines, Thailand).

Since the Asian financial crisis, inflation expectations have gradually become the most important driver of inflation dynamics across ASEAN-5 countries. This evidence is consistent with the conclusions reached in Chapter 2, confirming the forward-looking orientation of ASEAN-5 monetary policy frameworks. To illustrate the contributions of the different inflation drivers across the ASEAN-5, Figure 7.6 shows the median contribution of long-term expectations (that is, forward-looking dynamics), economic slack (measured by the output gap), non-oil import price inflation, and oil price inflation across countries and over

Figure 7.6. Median Contribution of Inflation Drivers in ASEAN-5 Countries
(Percent)



Source: World Bank, Global Financial Development Database.
Note: For additional details see Dany-Knedlik and Garcia, forthcoming. The model is estimated using a standard Kalman filter with Gauss-Newton optimization and the Marquardt step method.

time.[5] By 2016, inflation expectations explained, on average, 60 percent of inflation dynamics in the region, well above economic slack, non-oil import price inflation, and oil price inflation, with each of these drivers explaining only about 10 percent. This result implies a substantial increase in the forward-looking component in inflation dynamics in ASEAN-5 countries since the Asian financial crisis, from about 40 percent between 1996 and 2001 to more than 65 percent thereafter. Close alignment of long-term inflation trends and inflation expectations with the central bank inflation target makes inflation dynamics more forward looking. This is critical to increasing the resilience of actual inflation to temporary shocks; for instance, from subdued commodity oil prices. In recent years, however, the decline in the contribution of inflation expectations during two challenging episodes for monetary policy; that is, the global financial crisis and the recent disinflation period, is also noticeable.

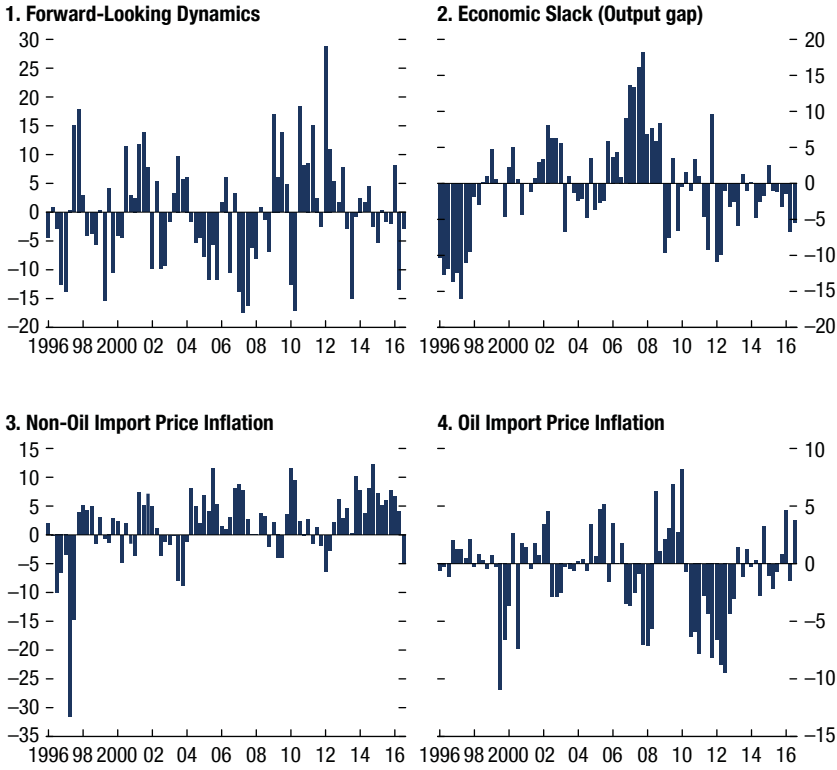
[5]To focus on the contributions of the main drivers in the rest of the section, the estimated impact of inflation persistence in equation (7.1) is replaced by iterating over the other factors (see also IMF 2016). To sharpen the discussion, particularly of the disinflation episode during 2014–16, the contribution of import price inflation is decomposed into non-oil import price inflation and oil price inflation by means of a regression on oil price inflation over a rolling window ordinary least squares estimation.

The quantitative impact of economic slack on inflation dynamics has declined across ASEAN-5 countries since the Asian financial crisis. This outcome suggests a flattening of the Phillips curve, as has been the case in many inflation-targeting and advanced economies over the past two decades (IMF 2016). Although the contribution of the output gap has been steadily declining and has remained relatively limited overall, its role strengthened around times of economic crisis, particularly around the time of the global financial crisis. Considering that the ASEAN-5 countries weathered the global crisis somewhat better than many advanced economies, the impact of the output gap around crisis periods points to potential specific effects, and maybe nonlinearities, that may not have been fully captured by the time-varying coefficients used. The results, however, match empirical findings of a muted impact of economic activity on inflation dynamics in advanced economies during the global crisis (Watson 2014, among others). This may have important implications for monetary policy in ASEAN-5 economies. For example, countries such as Singapore and Thailand—particularly affected by disinflation pressure triggered by low oil prices since 2014 and still facing below-target inflation—may be experiencing a recovery in inflation during the ongoing improvement in economic activity that is weaker than in the past. The euro area and Japan also provide examples of unusually weak responses of inflation to an acceleration in economic growth.

The quantitative importance of oil and non-oil import price inflation has also declined during the past two decades. Over the entire sample, these two components explained almost 20 percent of average inflation across the ASEAN-5 region. Their contributions have, however, fluctuated significantly. Both oil and non-oil import price inflation were major drivers of inflation during the Asian financial crisis, but their relevance has diminished substantially since then. Moreover, in the first part of the sample, 1996 to 2006, their contributions were highly correlated. In the second part of the sample, in contrast, they exhibited little correlation. These differences seem to reflect the higher degree of exchange rate flexibility now prevailing in the region compared with the late 1990s and early 2000s, leading to a lower impact from exchange rate adjustments in import inflation and a larger effect of global market prices.

The evolution of ASEAN-5 inflation dynamics reflects important structural changes since the Asian financial crisis. Differences between inflation dynamics with and without time variation in parameters help gauge the quantitative importance of those structural changes. Figure 7.7 reports the percentage contribution of the main inflation drivers discussed above that would have been unaccounted for using a constant-parameter model. The most important change to account for is the contribution of forward-looking dynamics, particularly during the 2000s, until the start of the global financial crisis, and during the most recent disinflation episode since 2014. Both episodes illustrate that capturing improvements in the ASEAN-5 monetary policy frameworks leads to larger contributions from inflation expectations to overall inflation dynamics, which, in the latter period, have provided substantially greater stability to inflation. Time variation in the slope parameter of the Phillips curve was most relevant during the Asian crisis, but was

Figure 7.7. Contributions from Time-Varying Parameters
(Percent)



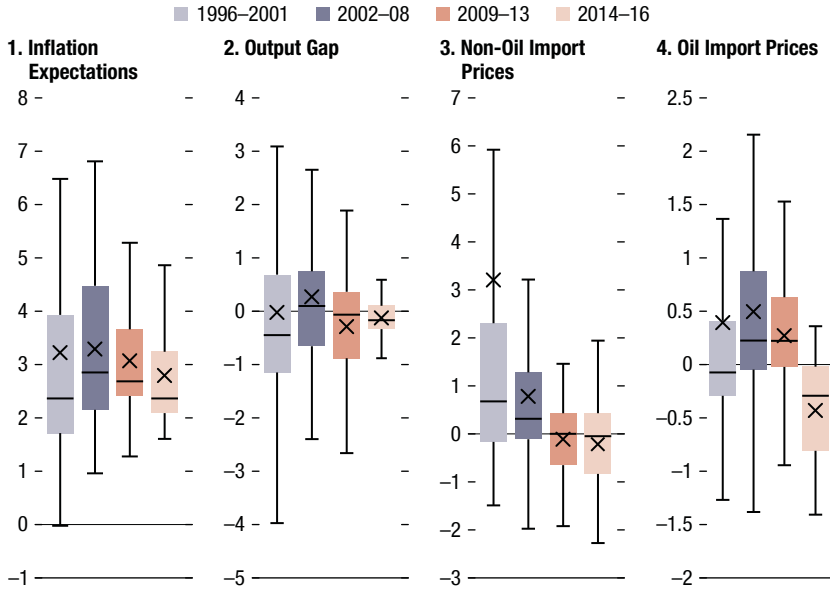
Source: Authors' estimates.
Note: Inflation dynamics show some differences across the ASEAN-5 countries, but they share some broad patterns. Box plots (Figure 7.8) over different subsamples show a relatively high degree of commonality in the country-specific contributions of the inflation drivers, but also suggest heterogeneous experiences across ASEAN-5 countries and over time (Figure 7.9).

also influential during the expansion ahead of the global crisis. This evidence corroborates the importance of output gap contributions when actual economic activity deviates significantly from potential, in any direction. In addition, whenever time parameter variation is ignored, external influences arising from non-oil and oil import price contributions may tend to be underestimated.

The main insights are as follows:

- The rise in forward-looking inflation dynamics between the Asian and global financial crises was broadly shared among the ASEAN-5. However, interquartile and quartile ranges suggest some heterogeneity, likely capturing the different speeds of improvement in monetary frameworks. Since the global crisis there has been a slight decrease in both the median and the dispersion across countries,

Figure 7.8. Contributions of Different Inflation Drivers to Inflation in ASEAN-5 Countries



Source: Authors' estimates.
Note: Box plots depict the median and the interquartile range (25–75 percent). Outliers (coefficient estimates that are 1.5 times the interquartile range) are represented by ×.

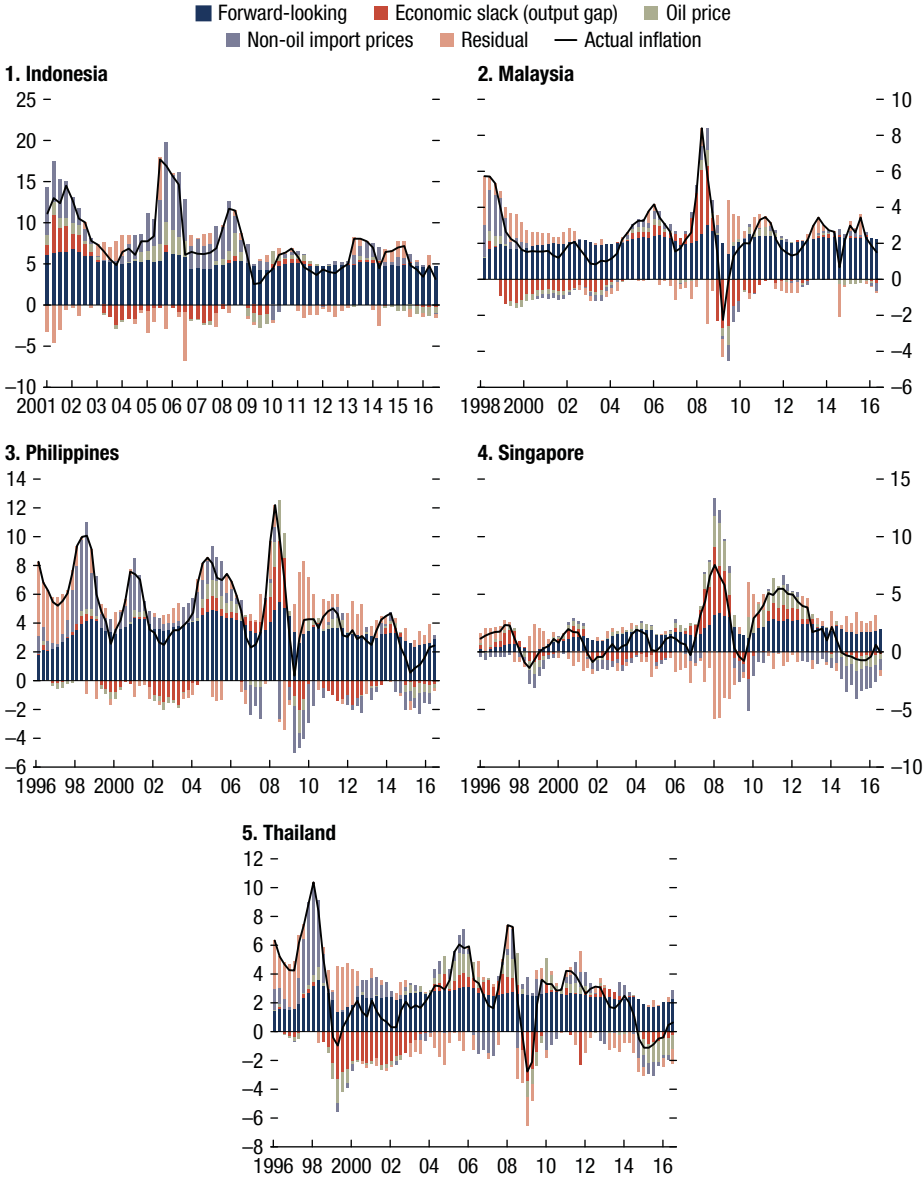
suggesting more similar challenges for monetary policy. (There is still a negative skew that reflects mainly Thailand's position at the low end of the distribution.)

- The impact of economic slack on inflation dynamics has been much more stable (although still low) over time and across countries, with narrow interquartile ranges. The large number of extreme values reflects simply the higher impact when the output gap is large, which, in turn, confirms that business cycles are relatively synchronized across ASEAN-5 countries.
- Country dispersion in the contributions of non-oil and oil import price inflation is more significant and reflects both differences in the evolution of the underlying variables and the quantitative differences of estimated parameters across countries. The decline in non-oil contributions over time seems to be strongly shared across countries. For oil price contributions, the decline is quite natural given that the ASEAN-5 country group includes both heavy oil importers (Thailand) and oil producers (Indonesia, Malaysia).

CHALLENGES AHEAD

Monetary policy frameworks across the globe are likely to continue evolving in coming years. Significant uncertainty surrounds the key characteristics of future

Figure 7.9. Contributions to Inflation Dynamics
(Percent)



Source: Authors' estimates.
Note: The figure displays the estimated contributions of key inflation drivers to headline inflation from equation (7.1).

monetary policy regimes, but some general aspects have already become the focus of significant attention in recent years. For example, the new normal global environment is likely to exhibit low natural interest rates that may constrain monetary policy space and pose a significant challenge for monetary policy to deliver healthy inflation levels. There also seems to be ample consensus that central banks are likely to communicate more actively than they did before the global financial crisis (Blinder and others 2016)[6] and that strongly anchored long-term inflation expectations may be even more important in such an environment. Yet there is still no consensus on the usefulness of some of the unconventional monetary policies introduced during the global financial crisis in the regular conduct of monetary policy or their application to emerging markets.

In addition, central banks may also be tasked with broader mandates, such as financial stability, and may need to use macroprudential tools more extensively. The formal interaction between standard objectives (price and output stability) and financial stability considerations in the implementation of monetary policy, however, remains an area of important debate in both academic and policy circles.

Current conditions and the outlook facing the ASEAN-5 economies matter for the challenges they face and the implications for monetary policy frameworks. On the one hand, countries such as Singapore and Thailand seem to have been more severely affected by the declines in oil and commodity prices since 2014 and experienced a protracted period of very low (or even negative inflation) (Figure 7.10). On the other hand, although inflation has also experienced some volatility in Indonesia, Malaysia, and the Philippines since 2014, it has remained well in positive territory, and in most cases fairly close to central bank inflation targets. The rest of this section discusses issues that may become more relevant for the ASEAN-5 countries in the near future.

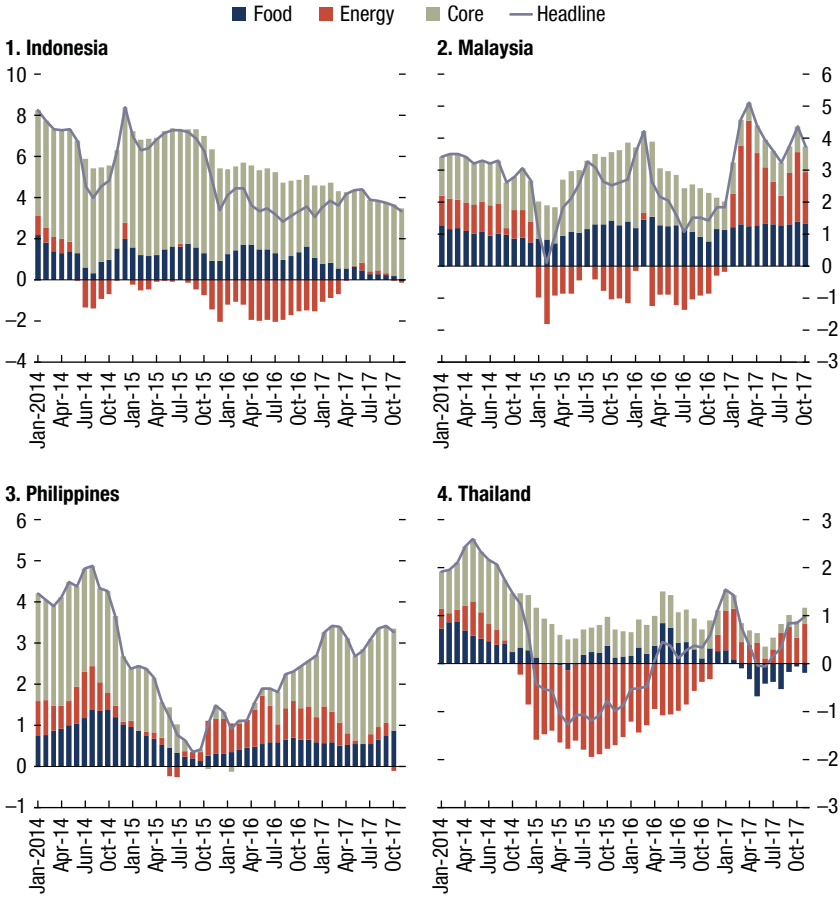
Adjusting to the New Normal Global Environment

Monetary policymaking in the ASEAN-5 will likely continue to be influenced by the global macroeconomic and financial environment that emerged from the global financial crisis in many advanced economies. This section elaborates on three aspects of that new normal global landscape: (1) the normalization of monetary policy in the advanced economies, (2) the factors behind an inflationless economic recovery from the global crisis, and (3) low natural rates of interest.

As the recovery from the global crisis gains a firmer footing, some advanced economy central banks—most notably the US Federal Reserve—have started normalization following the extraordinary monetary stimulus. As shown in Chapter 4, US monetary policy and the global financial cycle have had important

[6]Blinder and others (2016) collected the views of central bank governors and academics by means of two independent surveys conducted between February and May 2016. Their results were based on 55 replies from central banks from 16 advanced economies, 32 Bank for International Settlements members, 20 inflation-targeting countries, and 12 countries hit by the financial crisis. The second survey yielded 159 replies from academic economists from the relevant research programs of the National Bureau of Economic Research and the Centre for Economic Policy Research.

Figure 7.10. Contributions to Headline Inflation
(Percent)



Sources: Authorities' data; and authors' calculations.
Note: The figure displays the contributions of food, energy, and core goods (excluding energy and food) to headline inflation.

spillovers on financial conditions in ASEAN-5 countries. In the current circumstances, however, the impact of higher US interest rates on global financial markets may be more uncertain. First, the normalization of US monetary policy interest rates implies decoupling of the US monetary policy stance from that of advanced economies that may need to remain accommodative longer. Moreover, although there is broad consensus that normalization of US policy rates is in general good news for the global economy, the pace of implementation is more controversial. Given the uncertainty surrounding the economic outlook, the pace of normalization of US monetary policy will also be subject to uncertainty. With

the gradual move to flexible exchange rates and the buildup of buffers, the ASEAN-5 countries are well prepared to face global financial volatility if there is a bumpy exit from unconventional monetary policies in advanced economies.

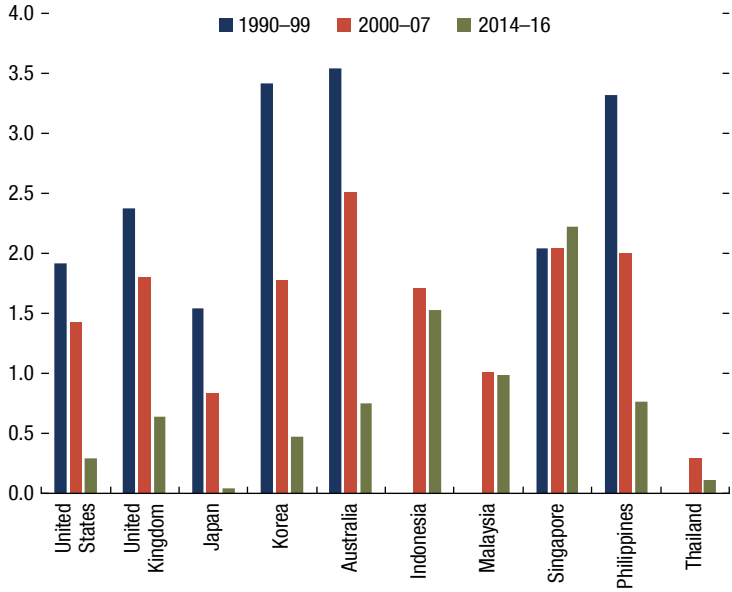
Considering the inflationless recovery in most countries in recent years, the shape of the Phillips curve, a benchmark framework for the analysis of inflation dynamics in most central banks, has been the subject of much debate. Although recent empirical evidence suggests a flattening of the Phillips curve (for example, Blanchard, Cerutti, and Summers 2015; Ball and Mazumder 2011; Kiley 2015), the focus of those analyses was mainly the surprisingly high inflation observed during the early stages of the global financial crisis in many advanced economies. This high inflation was often justified by the strong anchoring of inflation expectations and the presence of "shadow economic slack" (an unusual divergence between unemployment and overall labor market slack). Yet the low inflation in advanced economies during the ongoing economic recovery in recent years has further supported the presence of a weaker link between growth and inflation, at least temporarily.

For ASEAN-5 economies, the evidence presented in the section "Drivers of Asean-5 Inflation Dynamics" is also broadly consistent with the main findings for advanced economies. The strong role of long-term inflation expectations and their anchoring and the relatively low quantitative impact of economic slack on inflation dynamics, except during major recessions, are two key pieces of evidence with which to assess the region's outlook for inflation. For example, ASEAN-5 countries particularly afflicted by low inflation (Singapore, Thailand) have also experienced relatively weak inflation dynamics in recent years despite an improvement in growth, in line with the experience of many advanced economies.

There is increasing evidence of a decline in natural real rates worldwide (from about 4 percent in the late 1990s to close to zero in recent years). Against this backdrop the surge in research on the level of interest rates is not surprising because the natural real rate has important implications for monetary policy (for example, Yellen 2015). The natural real interest rate is usually defined as a real interest rate consistent with an economy's achievement of both potential output and price stability. In other words, it is the interest rate at which real GDP equals potential GDP and the inflation rate equals the inflation target. Recent estimates corroborate a dramatic decline in natural interest rates in Europe, the United Kingdom, and the United States since the start of the global financial crisis.[7] In Asia, natural rates have also fallen in advanced economies (Australia, Japan, Korea), while in ASEAN-5 countries and other emerging markets they have remained relatively stable (Figure 7.11).

[7]See, among others, Laubach and Williams 2003, 2016; and Lubik and Matthes 2015. Results are generally model based, using either semistructural time series and filtering methods or formal (dynamic stochastic general equilibrium) macroeconomic models to examine the relationship between the equilibrium real interest rate and its possible determinants. Regardless of the specific methodology used, a common finding in these studies is that the equilibrium real interest rate has declined in recent years to a level not seen in decades.

Figure 7.11. Selected Economies: Real Natural Interest Rates
(Percentage points)



Source: IMF staff calculations using the methodology in Lubik and Matthes 2015.

Further research is needed to understand the reasons behind the lower natural rates. Global supply and demand for funds, shifting demographics, slower trend productivity and economic growth, emerging markets' search for large reserves of safe assets, and a more general global savings glut have been proposed as possible causes (Council of Economic Advisers 2015; Rachel and Smith 2015; Caballero, Farhi, and Gourinchas 2016). Most of these causes bear little relationship to monetary policy, at least in the short term. Nevertheless, they reflect global trends that seem likely to be part of the new normal, particularly in advanced economies. And in a widely integrated economic and financial world, they are likely to affect monetary policymaking in other countries as well.

Evidence on the evolution of natural real rates in ASEAN-5 countries is mixed. Natural real rates in Indonesia, Malaysia, and Singapore have remained relatively stable. In contrast, the Philippines has experienced a significant decline in natural rates during the past two decades. In all those cases, the estimated level of the natural real rates remains somewhat higher than those for most advanced economies in recent years. Thailand seems to be in a different position, with a persistently lower natural rate than the other ASEAN-5 countries and, with the exception of Japan, than even most advanced economies.

A lower natural rate of interest has important implications for optimal implementation of monetary policy. A decline in natural real rates that turns out to be

permanent, or at least highly persistent, as evidence suggests, would affect the appropriate stance of monetary policy. A central bank that fails to acknowledge a lower natural rate may set nominal policy rates too high, risking inflation rates that run below the inflation objective over time. Moreover, measurement of the natural rate of interest, similar to potential output, remains subject to significant uncertainty. Against this backdrop simple monetary policy rules—for example, those in which the first difference of the policy rate is a function of the deviation of inflation from its objective and the first difference of the output gap—can serve as broad guidance and perform well (Orphanides and Williams 2002).

Central banks in ASEAN-5 economies have not been constrained by the zero lower bound on their policy rates. However, in economies with very low natural real interest rates and low inflation, the possibility of a zero lower bound has become more likely, even from small shocks to economic activity. A numerical example based on a stylized monetary policy framework comprising a standard Taylor rule and a Phillips curve (as equation (7.1)) can illustrate this point. In Indonesia, given current inflation expectations and the natural real rate, real GDP growth would have to deteriorate to –0.15 percent for the nominal policy rate to hit the zero lower bound. In Thailand, facing lower inflation expectations and natural real rates, it would take a much smaller growth shock. Real GDP growth could fall to just 2 percent for the nominal policy rate to hit the zero lower bound. Such a difference of more than 2 full percentage points of real GDP growth gives significantly greater room for conventional monetary policy to operate and mitigate output losses. Moreover, any decline in inflation expectations would further increase the probability of the zero lower bound and the associated costs to economic activity. Kiley and Roberts (2017) study the frequency and potential costs of effective zero bound episodes in economic models. They advocate raising inflation targets and pursuing a very accommodative monetary policy stance to steer inflation above target whenever possible and gain additional space for monetary policy in the future.

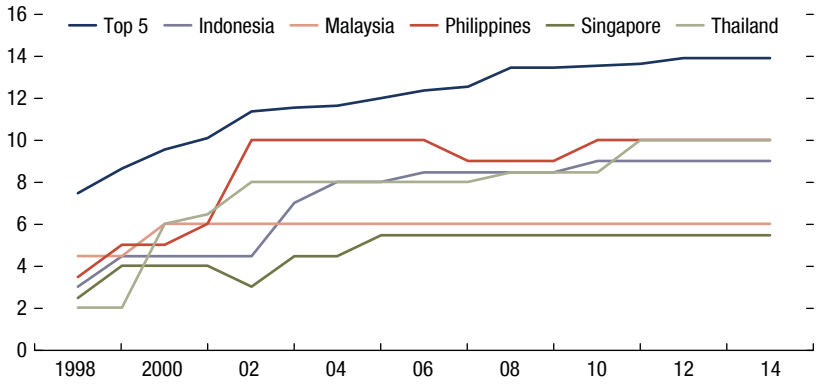
Upgrading Monetary Policy Frameworks

In the new normal global environment, monetary policy frameworks in ASEAN-5 countries will likely need to continue adapting to uncertain and volatile economic and financial conditions. This section elaborates on three crucial challenges for ASEAN-5 monetary policy frameworks for the period ahead: (1) enhancing communication and transparency, (2) strengthening the monitoring of long-term inflation expectations, and (3) in countries that may face recurrent episodes of low (and below-target) inflation, considering unconventional monetary policies, higher inflation targets, and synergies with other policies.

Enhancing communication and transparency

Effective central bank communication is essential for managing inflation expectations and their impact on inflation dynamics. As economic structures and the monetary policy regime evolve over time, effective communication about the central bank's objectives and strategy and the rationale for its decisions, along with the

Figure 7.12. ASEAN-5 Central Banks: Dincer-Eichengreen Central Bank Transparency Index



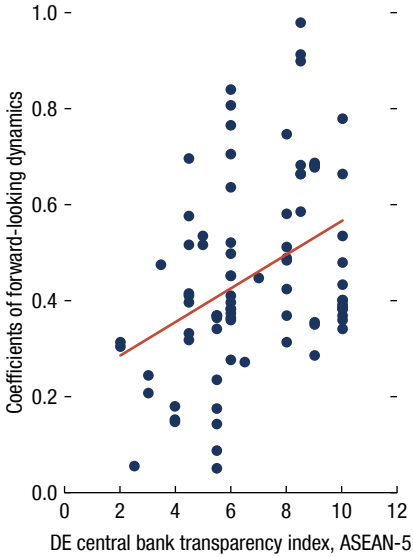
Source: Dincer and Eichengreen 2014.
Note: Top 5 = the top 5 central banks in the ranking: central banks of the Czech Republic, Hungary, Israel, New Zealand, and Sweden.
Maximum score of 15 is based on central bank transparency across the following five dimensions:
Political (3): policy objectives (explicit objectives, quantification, instrument independence)
Economic (3): information used for monetary policy decisions (data, model, central bank forecast)
Procedural (3): decision making (policy strategy, prompt account of deliberations, voting info)
Policy (3): disclosure of decisions (prompt announcement, explanations, forward guidance)
Operational (3): implementation (evaluation with respect to targets, shocks impairing the achievement of goals, explanation of decisions' contribution to goals).

macroeconomic outlook, become critical for guiding private sector expectations and enhancing monetary policy effectiveness (for example, Blinder and others 2008).

ASEAN-5 central banks' transparency has increased significantly over the past two decades, but there is scope for improvement. To strengthen monetary policy independence after the Asian financial crisis, all ASEAN-5 countries increased their exchange rate flexibility and made significant improvements in their operating frameworks, definition of policy objectives, and communication. Establishing price stability as a primary objective and explaining monetary policy decisions in publicly available reports are currently regular features across ASEAN-5 central banks. Indonesia, the Philippines, and Thailand—the flexible inflation-targeting countries among the ASEAN-5—also established explicit medium-term inflation targets. Indeed, an index of central bank transparency shows that from low scores of between 2 and 4 points in 1998, the transparency of ASEAN-5 central banks improved substantially (Indonesia, Philippines, and Thailand up to 9–10 points and Malaysia and Singapore 5–6 points in 2014; Dincer and Eichengreen 2014; Figure 7.12).[8] However, those improvements coincided with a global trend

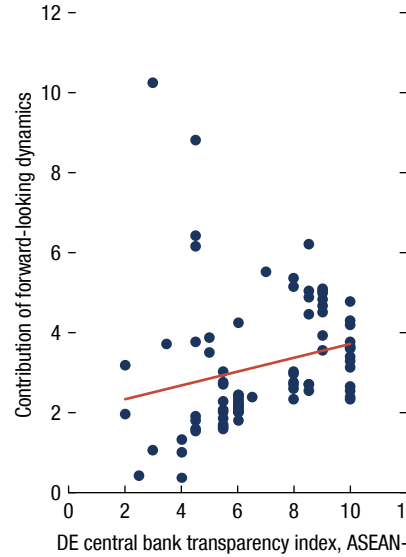
[8]It is important to note that Malaysia and Singapore are somewhat penalized in the index for not having an official figure for their inflation target even though their central bank mandates stress price stability.

Figure 7.13. Coefficients of Forward-Looking Dynamics and Central Bank Transparency



Sources: Dincer and Eichengreen 2014; and Dany-Knedlik and Garcia, forthcoming.
Note: DE = Dincer-Eichengreen.

Figure 7.14. Contribution of Forward-Looking Dynamics and Central Bank Transparency



Sources: Dincer and Eichengreen 2014; and Dany-Knedlik and Garcia, forthcoming.
Note: DE = Dincer-Eichengreen.

among central banks, and compared with the top five central banks in the ranking, there is generally still room for improvement in transparency.

Central bank transparency scores and the degree of forward-looking inflation dynamics are strongly linked in ASEAN-5 countries. From a theoretical point of view, effective communication and transparency by the central bank should successfully align public long-term expectations with the inflation target and ensure a substantial degree of forward-looking behavior in price setting and inflation dynamics. The empirical results discussed in the previous section provide strong support for these theoretical considerations: both the time-varying estimates of the forward-looking coefficient, β_t^1, and the overall time-varying contribution of long-term inflation expectations, $\beta_t^1 \bar{\pi}_t$, have been positively related to the evolution of the Dincer-Eichengreen transparency score for each country (see Figures 7.13 and 7.14).

Looking ahead, the challenge for effective communication by ASEAN-5 central banks lies in the quality of information. Transparency about the responses to a rapidly evolving macroeconomic environment and the uncertainty surrounding the economic outlook, both at the domestic and the global level, as well as the necessary adjustments in monetary policy frameworks to cope with them, are likely to be fundamental parts of effective central bank communication.

Strengthening the monitoring of long-term inflation expectations

Improving the monitoring of long-term inflation expectations should be a top priority in the research agenda of ASEAN-5 central banks. The presence of a systematic discrepancy between survey expectations and inflation targets suggests that there is scope for strengthening the anchoring of inflation expectations in the region. Adding trend inflation estimates, such as those shown earlier in this chapter, to the regular tools that central banks use can inform monetary policymaking decisions, provide reliable information about long-term inflation trends, and help cross-check survey expectations. Trend inflation estimates have been more aligned with the inflation targets announced by the ASEAN-5 central banks, particularly in Indonesia. In the Philippines, trend inflation has been below target since 2014, but it is now on a gradual return path to the 3 percent target level. In contrast, in Thailand, trend inflation has been on a slow downward path since 2014, which may pose a more serious challenge for monetary policy. The analysis of trend inflation should help better assess the stance of monetary policy in these economies.

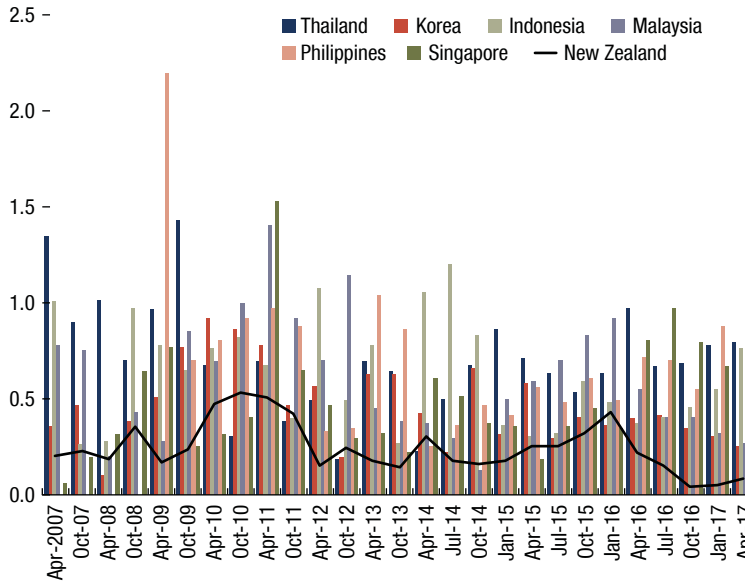
The evolution of trend inflation and the uncertainty surrounding the estimates also provide some important insights about the anchoring of inflation and the challenges for central bank communication. For example, trend inflation in Malaysia since 2005 has been significantly more variable than in Thailand and Indonesia. This difference may have occurred because Thailand and Indonesia adopted explicit targets for inflation, helping reduce uncertainty about long-term inflation trends. The evidence in the earlier part of this chapter, however, shows that Bank Negara Malaysia has nonetheless conducted its monetary policy effectively since 2005. Hence, trend inflation estimates may provide insights helpful to monetary policy regardless of the specific regime in place.

There is also scope for using the information from survey measures of inflation expectations more systematically. The level of long-term inflation expectations is just one dimension of their anchoring. For example, the degree of *disagreement* (the standard deviation of the point forecast among the survey participants) also provides information: if inflation expectations are well anchored around a given level—the central bank's midpoint target—all survey panelists' expectations should be very close to that value, and the discrepancy among panelists should be relatively limited. For ASEAN-5 economies, evidence from Consensus Forecasts suggests substantial disagreement among survey panelists—for example, on average, well above that for other successful inflation-targeting countries in the Asia and Pacific region, such as New Zealand (Figure 7.15).

Policy responses against protracted periods of low inflation

The global financial crisis triggered significant changes in the practice of monetary policy. Many advanced economies faced serious disinflation pressure, cut policy rates to the zero lower bound or negative territory, and adopted unconventional monetary policies. Most of the policies adopted in advanced economies were introduced to improve financial and economic conditions rather than as a

Figure 7.15. Disagreement about Long-Term Inflation Expectations



Source: Consensus Forecasts.

planned modification to existing monetary policy frameworks. As a reference, Table 7.1 provides a taxonomy of unconventional monetary policies. Whether the changes in the practice of monetary policy, motivated primarily by the financial crisis, will be temporary or permanent is uncertain at this point (Blinder and others 2016).

The unconventional monetary policies adopted by various central banks were understandably chosen to take into account the characteristics of each country's monetary policy transmission channels. In addition, the effectiveness of monetary policy in general, but of unconventional monetary policies in particular, depends strongly on the characteristics of the financial market and the financial sector structure through which they operate. For example, the impact of credit-easing policies depends on the conditions under which economic agents obtain financing (that is, the proportion of loan- versus market-based financing, degree of securitization, and so on). These considerations are important to bear in mind when assessing the potential application of unconventional monetary policies in other countries. Reliable quantitative evidence to assess the potential usefulness of unconventional monetary policies remains scarce; therefore, there is no consensus on their usefulness for the regular conduct of monetary policy.

Most available evidence on the usefulness of unconventional monetary policies focuses on situations in which the zero lower bound became a binding constraint for monetary policy. The introduction of unconventional monetary policies in

TABLE 7.1.

Overview of Unconventional Policy Measures Adopted since the Global Financial Crisis

Type of Measure	Formulation
A. Interest rate policy	Setting policy rates and signaling future path to influence market expectations
Negative Interest Rates	Policy/deposit rates below zero
Forward Guidance on Interest Rates	Central bank communicates on future policy rates
Expansion of Liquidity-Providing Facilities	Fixed-tender auctions, expansion of eligible collateral, etc.
B. Balance sheet policies	Adjusting the size and/or composition of the central bank's balance sheet through purchases of financial assets
Quantitative Easing and Forward Guidance on the Central Bank Balance Sheet	Purchases of government debt and communication
Credit Easing	Modifying the discount window facility Expansion of collateral/counterparties in liquidity operations Purchases of commercial paper, asset-backed securities, and corporate bonds
Bank Reserves Policy	Money market operations to enlarge monetary base
C. Exchange rate policies	Introducing an exchange rate floor Interventions in the foreign exchange market

Source: IMF staff estimates.

many advanced economies followed the full use of space for conventional monetary policy. Hence, this evidence offers only indirect guidance for assessing whether unconventional policies should be used even when there is still room for conventional monetary policy. Recent research (for example, Quint and Rabanal 2017) finds that the benefits of unconventional monetary policies depend critically on the types of economic shocks hitting the economy. There are generally significant benefits in the presence of severe financial shocks, but only negligible benefits in the face of more traditional business cycle (supply and demand) shocks. Moreover, some recent research points to significant risks from unconventional monetary policies in emerging markets: in an analysis of a large panel of emerging market and developing economies, Jácome, Saadi Sedik, and Ziegenbein (forthcoming) show that credit easing may lead to large currency appreciation and substantially lower growth.

A higher inflation target could be a potential preemptive measure to raise inflation expectations and regain monetary policy space. Since average nominal interest rates would reflect the sum of real rates and expected inflation, raising the inflation target may help compensate for the lower (natural) real rate and raise inflation expectations. This approach could provide enough space to offset deflationary shocks and close output gaps (for example, Blanchard, Dell'Ariccia, and Mauro 2010). For the new target to be credible, however, its revision should be implemented through a comprehensive review process with clear and transparent communication to the public. Such a revision should be based on expected future real interest rates, the amplitude and nature of the shocks that are likely to hit the economy, and the necessary policy space to reduce the risk of recurrent low-inflation and deflation episodes. In those circumstances, setting a higher inflation target would not

threaten the central bank's credibility but reinforce it. Indeed, when supported by strong policy action to achieve the new (higher) target and clear communication of the central bank's resolve, raising the inflation target can strengthen the monetary policy transmission mechanism through the expectations channel (see "Drivers of ASEAN-5 Inflation Dynamics" earlier in this chapter).

When space for countercyclical monetary policy is limited, backstopping monetary policy with other expansionary policies can also help avoid entrenched low inflation. Where appropriate, a broader strategy that entails the mutually supportive use of monetary, fiscal, and structural policies would be optimal (Gaspar, Obstfeld, and Sahay 2016). Nonmonetary macroeconomic stimulus, of course, would need to be credible and sustainable. Otherwise, it can also undermine monetary policy.

Fiscal stimulus amid low inflation and low interest rates can be particularly powerful. In such an environment, fiscal multipliers (that is, the impact of fiscal stimulus on growth) are likely larger compared with an environment in which monetary policy may need to counteract the fiscal push to avoid inflation pressure.[9] To be effective, fiscal stimulus must be embedded in a framework that credibly ensures long-term sustainability and adequately manages fiscal risk. Moreover, a credible commitment to and an enduring practice of inflation targeting would allow monetary policy to reinforce fiscal policy. Box 7.1 presents a simulation for Thailand of the improved macroeconomic outcomes achieved by reinforcing fiscal and monetary stimulus to counteract low-inflation risks.

To the extent that the decline in natural real interest rates can be traced back to a decline in potential growth, structural reforms that strengthen economic potential can also be instrumental to rebuild monetary policy space. Structural reforms could have contractionary effects in the short term, while sectoral adjustments take place gradually. Yet, supported by measured monetary policy accommodation, they can increase potential output and growth. Appropriate demand-management measures can offset the negative short-term effects of structural reforms on the economy, thereby reducing the costs of productive structural reforms as well as social opposition from segments of the population that may be adversely affected.

Synergies between Monetary and Financial Stability Policies

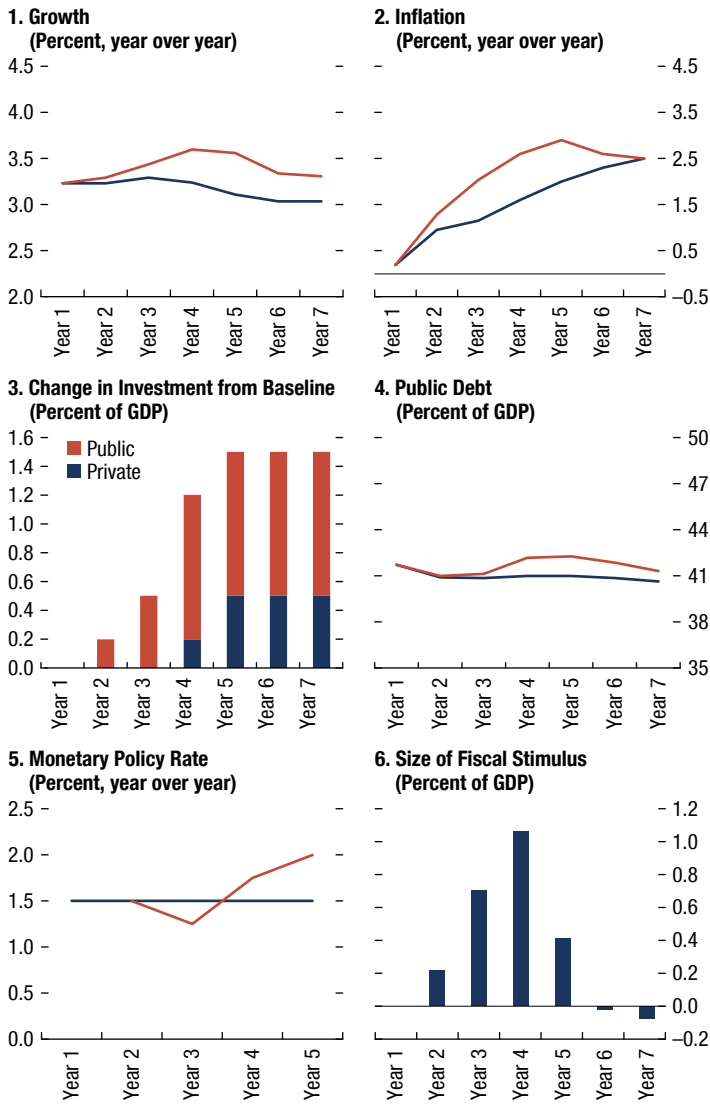
The global financial crisis triggered a debate over whether monetary policy should focus primarily on price stability or also target financial stability. Before the global financial crisis, the prevailing view was that monetary policy should have one main (in many cases overriding) objective, price stability, and one instrument,

[9]When the economy is near full employment or overheating, the central bank would normally have to raise its policy interest rate in response to a fiscal expansion in defense of its inflation objective, crowding out private spending and dampening the multiplier effect (Auerbach and Gorodnichenko 2012).

Box 7.1. Combining Monetary and Fiscal Stimulus in a Low-Inflation Environment

Macroeconomic simulations offer some quantitative evidence of the potential impact of joint fiscal and monetary stimulus within a stylized New Keynesian model calibrated for the Thai economy (see Clinton and others 2015 for details on the model). In Figure 7.1.1, a baseline scenario (blue lines) assumes a constant monetary policy rate and a cumulative fiscal stimulus of 1 percent of GDP over three years. The alternative scenario (red lines) incorporates

Figure 7.1.1. Potential Impact of Joint Monetary and Fiscal Stimulus: Thailand



Source: IMF staff calculations.

Box 7.1. Combining Monetary and Fiscal Stimulus in a Low-Inflation Environment (*continued*)

(1) monetary easing, (2) additional public investment of a cumulative 1 percent of GDP sustained over the medium term, and (3) a phased increase in the value-added tax rate to 8.5 percent once the output gap closes. The alternative scenario, with joint monetary-fiscal stimulus, helps inflation reach the midpoint inflation target (2.5 percent) with a substantial improvement in the balance of risks; private investment crowds in, and the value-added tax hike stabilizes public debt.

usually a short-term policy interest rate.[10] That paradigm had been widely successful over the previous three decades in most advanced and emerging market economies. Yet severe financial and economic crises have forced reconsideration of the role of financial market imbalances and asset price developments in the design and implementation of monetary policy.

The case for a stronger role for financial stability considerations in monetary policy has intensified in recent years. In an extreme version of the precrisis view, monetary policy should react to asset-price movements only to the extent that they affect inflation (and output) and only if it can effectively clean up the mess after a bubble bursts. The global financial crisis, however, showed that severe financial imbalances could grow under relatively stable inflation and output gaps. Moreover, the Great Recession that followed the global crisis showed that those financial imbalances entail significant macrorelevant costs, which argues for monetary policy that proactively mitigates the risk of a crisis rather than simply cleaning up afterward, a lean versus clean view.

Whether monetary policy should be used for financial stability purposes remains highly controversial. Although there is agreement that policy should aim to avert financial (and economic) crises—not simply deal with the implications once a crisis occurs—whether and to what extent monetary policy should be altered to contain financial stability risks, let alone whether financial stability should be an explicit mandate for the central bank, is far less clear. Indeed, even among central bank policymakers and senior officials there have been voices strongly advocating for explicit financial stability mandates (for example, Olsen 2015) and against (for example, Svensson 2014, 2016). Others represent a more balanced view (for example, Yellen 2014). Detailed discussions on the policy trade-offs can be found in Smets 2014 and Stein 2014, among others.

[10]The theoretical foundation for that policy framework is deeply rooted in New Keynesian models whose mainstream setting is a closed economy with nominal rigidities as the main, or only, friction and often without a financial sector. In this kind of model, the so-called divine coincidence (Blanchard and Galí 2007) through which stable inflation also kept output around its efficient level holds. In the presence of financial and other friction, however, a trade-off can emerge between stabilizing output around its efficient level and stabilizing inflation (Woodford 2003).

The benefits of financial stability considerations influencing monetary policy decisions should be carefully evaluated against potential costs. A leaning-against-the-wind policy, for example, to tame rapid credit growth and mitigate financial risks can imply tighter monetary policy (a higher interest rate) than justified by standard flexible inflation targeting. That policy would therefore entail costs from lower output and inflation in the short to medium term. Benefits would materialize mainly in the medium term, as financial risks are mitigated, the probability of a crisis is reduced, and the losses associated with a crisis, should one occur, are attenuated. Two questions are of fundamental interest in the debate: first, is there a case for leaning against the wind in the presence of financial imbalances? Second, should leaning against the wind invoke a quantitatively important deviation of policy rates from those implied by standard inflation targeting? Answering those questions requires the use of a dynamic quantitative macroeconomic model and counterfactual scenarios.

Available evidence suggests that even if the benefits of leaning-against-the-wind policies could outweigh the costs, the optimal deviation of policy rates from those implied by more standard (inflation–output gap) decision rules would be quantitatively small. On the one hand, Gambacorta and Signoretti (2014) and Filardo and Rungcharoenkitkul (2016) have argued that the benefits of leaning-against-the-wind policies outweigh any costs. Overall results from (mainly closed economy) New Keynesian models with financial frictions support the view that, absent other tools, monetary policy should adopt financial stability as a new intermediate target (Curdia and Woodford 2009; Woodford 2012; Ajello and others 2016). On the other hand, other research finds that the costs generally outweigh the benefits (for example, Svensson 2016). In addition, severe difficulties with identifying bubbles and the potential dangers and costs of influencing asset prices ex ante are often mentioned. Specific results are, to a large extent, driven by the features of the model, and further work is needed before more robust conclusions can be reached.

As discussed in Chapter 2, most ASEAN-5 countries have given preeminence to inflation in guiding monetary policy. As inflation has declined, both globally and in ASEAN-5 countries, monetary policy rates have also fallen, and in some cases even to historical lows. Low rates can contribute to excessive credit growth and the buildup of asset bubbles and thereby sow the seeds of financial instability, but prudential policies can mitigate the buildup of financial risks in a low-interest-rate environment (see also Chapter 6).

The case for leaning against the wind may be even weaker in small open economies. In such economies, financial stability concerns are more likely to arise from capital flows reflecting external financial conditions and the global financial cycle. For example, strong capital flows may exacerbate search-for-yield behavior, put upward pressure on domestic asset prices, and compress financial spreads (Sahay and others 2014). In those circumstances, financial stability considerations that would put pressure on the central bank to raise policy interest rates (or keep them at a level that is higher than warranted based solely on price stability considerations) may turn out to be counterproductive and exacerbate instability

by attracting further capital inflows. Menna and Tobal (2017) provide quantitative evidence in support of this mechanism by extending the framework of Ajello and others (2016) to an open economy setting.

Tensions between price and financial stability mandates may also weaken the credibility of the central bank and the effectiveness of monetary policy. Monetary policy credibility and effectiveness in targeting inflation largely stem from transparency, predictability, and observable success, which are key underpinnings of the standard monetary policy framework. Interest rate decisions guided by financial stability concerns, in contrast, would have to be justified in reference to potential future events that are difficult to forecast, or even to define precisely. Thus, the possible trade-offs with respect to central bank transparency and predictability should be considered, and effective communication could become more challenging. Moreover, if, because of financial stability concerns, monetary policy is calibrated to allow inflation to remain below target for longer than otherwise desirable, there could be risks of destabilizing inflation expectations, leading to higher real rates and thereby penalizing growth and investment.

Macroprudential policy tools can help alleviate tensions between monetary and financial stability objectives.[11] Discrepancies between monetary and financial stability mandates stem from attempts to achieve two different objectives with a single policy instrument, the policy rate. Using macroprudential tools to curb systemic risks may, however, ease those tensions. Indeed, in theory, targeted macroprudential measures to address specific sectors and risks can be more efficient and have fewer undesirable effects than economy-wide measures like the interest rate. As discussed in Chapter 6, ASEAN-5 economies have increasingly used macroprudential tools, especially housing-related and sectoral measures, to address financial stability concerns.

Moreover, Chapters 8 and 9 further elaborate on the future agenda necessary to strengthen macroprudential frameworks and exploit synergies between monetary and macroprudential policies to achieve price and financial stability objectives. The analysis in Chapter 9 shows that the combination of macroprudential tools and monetary policy can produce better results in terms of growth, inflation, and financial stability than simply leaning against the wind through the use of monetary policy to temper credit growth.

[11]Macroprudential policy has been defined as the use of primarily prudential tools to limit systemic risk—that is, the risk of disruption to the provision of financial services as a result of impairment of all or parts of the financial system—and can cause serious negative consequences for the real economy (for further details see, for example, IMF 2015). It includes a range of instruments, such as measures to address sector-specific risks (for example, loan-to-value and debt-to-income ratios), countercyclical capital requirements, dynamic provisions, reserve requirements, liquidity tools, and measures to effect foreign-currency-based or residency-based financial transactions.

CONCLUSION

Monetary policy frameworks in ASEAN-5 economies have improved significantly since the Asian financial crisis and have worked well over the past decade and during the global crisis. Yet they are likely to be tested further by the global environment in coming years. There is still substantial uncertainty about the potential changes in monetary policy frameworks worldwide, and consensus on a new paradigm has yet to be reached.

Potential further refinements in monetary policy frameworks may well not be symmetric across ASEAN-5 countries. Differences in inflation performance vis-à-vis central bank targets over recent years and financial sector vulnerabilities may call for different responses to the global challenges brought about by the new normal. Yet all ASEAN-5 economies are in a position to continue to adapt their monetary policy frameworks, particularly through enhanced communication and better monitoring of inflation expectations.

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CHAPTER 8

Systemic Risks and Financial Stability Frameworks

INTRODUCTION

Association of Southeast Asian Nations–5 (ASEAN-5) financial systems were resilient during the global financial crisis. Although capital outflows and the slowdown in economic activity were comparable to what occurred during the Asian financial crisis, domestic financial stability was preserved. The Asian financial crisis triggered important upgrades in regulatory and supervisory frameworks (discussed in Chapter 3) that helped the ASEAN-5 weather the crisis.

However, some financial vulnerabilities have been rising since the global financial crisis. Although credit growth was moderate between the Asian and global financial crises, it accelerated significantly following the global crisis, after which corporate debt also increased steadily. And in some countries, household debt is substantial. Moreover, the high degree of interconnectivity within the financial sector and between the financial sector and the real sector, while unavoidable in a financial deepening process, could be an emerging vulnerability. Finally, the fast pace of new financial technologies coming on board could bring benefits but also risks to ASEAN-5 financial systems.

This chapter analyzes those vulnerabilities and future challenges and discusses a policy agenda for strengthening financial stability frameworks in the ASEAN-5. The first part of the chapter analyzes systemic risks in ASEAN-5 domestic financial systems along both time and structural dimensions.[1] The chapter first zooms in on recent credit trends to determine whether there were credit booms, given that booms are usually associated with financial instability. Then, it examines interconnectivity within the financial system and between the financial system and the real sector. The focus next turns to the corporate sector, since corporate vulnerabilities were at the root of the Asian financial crisis and since leverage has risen since the global crisis. The final major part of the chapter discusses the challenges and policy agenda ahead for strengthening

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[1]Chapter 10 examines financial integration from a cross-border perspective.

financial stability frameworks in the region, spanning the three core pillars of microprudential regulation, macroprudential policy, and crisis management and resolution.

CREDIT TRENDS

A key dimension of systemic risk is related to the evolution and dynamics of credit growth over time. Periods during which credit to the private sector rises fast are often linked to systemic risks and financial instability. During a credit boom the expansion of lending can be so abrupt that the quality of the investment projects financed becomes compromised. This process may ultimately damage lenders' balance sheets and trigger a financial crisis.

Ample empirical evidence indicates that credit overexpansion and banking crises are related. Demirgüç-Kunt and Detragiache (1997), for example, show that private credit is a significant determinant of banking crises. Mendoza and Terrones (2008) develop a method for identifying credit boom episodes in a sample of 48 industrial and emerging market economies during 1960–2006. They find that credit booms are usually a key component of financial crisis episodes. However, not all credit booms end up in financial crises.

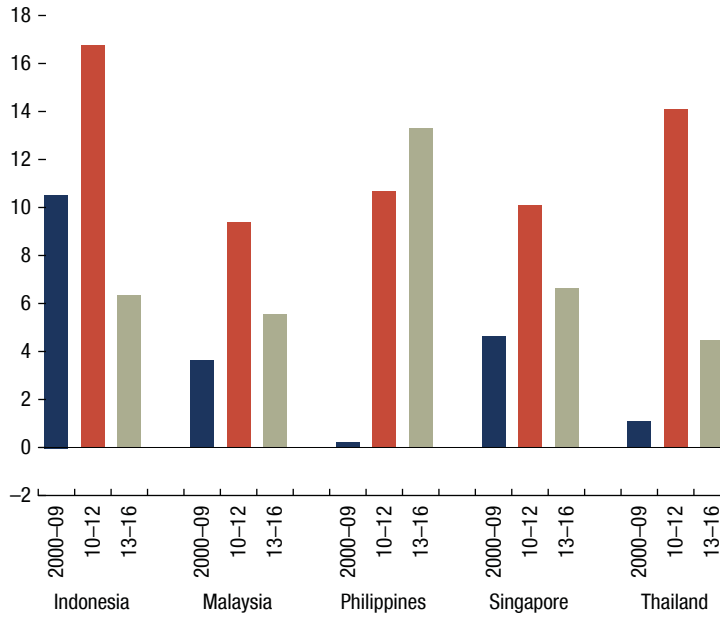
Credit to the private sector in the ASEAN-5 economies grew rapidly in the aftermath of the global financial crisis in a context of exceptionally accommodative monetary policy worldwide. The growth rate of real credit to the private sector rose by more than 5 percentage points, on average, between 2000–09 and 2010–12, but has fallen in most economies since 2013 as global financial conditions tightened after the taper tantrum episode (Figure 8.1). This recent episode of fast credit growth in ASEAN-5 economies resembles, to some extent, the episode that was observed in the early 1990s, when growth of credit to the private sector picked up sharply amid expansionary monetary policies globally.

A comparison of the two episodes is presented below through the lens of the literature on credit booms. The objective is to investigate whether there is evidence of credit booms in the ASEAN-5 economies following the global financial crisis. There is no single criterion with which to identify credit booms in the literature, so four different approaches from previous studies are used.

The first approach is based on Mendoza and Terrones (2008) and looks at deviations of real credit per capita from its Hodrick-Prescott trend, identifying credit booms when that deviation is larger than 1.75 times its standard deviation. The analysis uses data for credit to the private sector, inflation, and population during 1980–2016, complemented with IMF projections for 2017−18. Using this approach, credit booms are identified in the period preceding the Asian financial crisis in all ASEAN-5 economies except Singapore (Figure 8.2). However, no credit booms are picked up after the global financial crisis in any of the ASEAN-5 economies—most of the acceleration in credit growth is attributed to trend growth rather than to deviations from trend.

The second approach is that of Dell'Ariccia and others (2012), which looks at deviations of the credit-to-GDP ratio from a rolling backward-looking cubic

Figure 8.1. Growth in Real Credit to the Private Sector

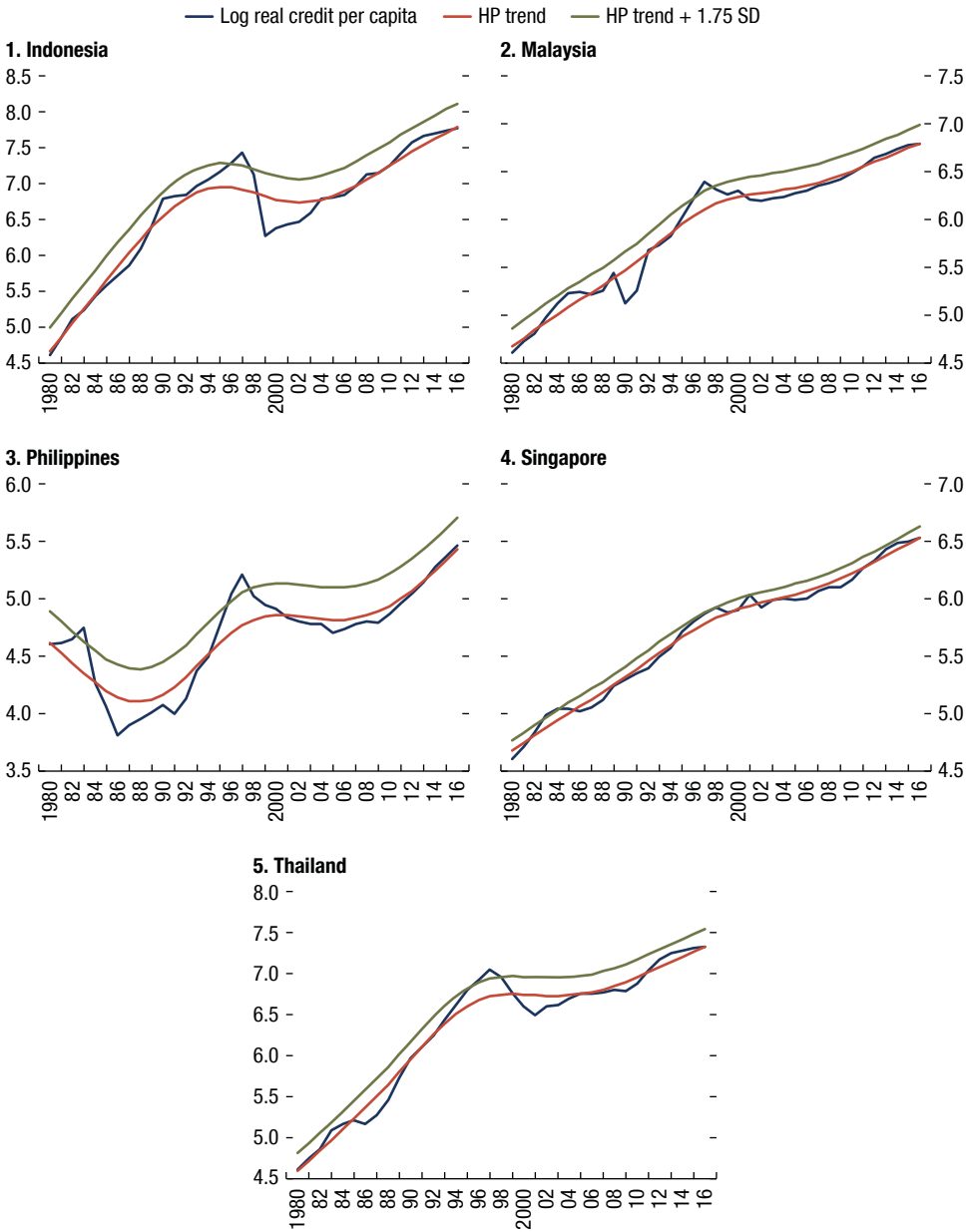


Sources: Country authorities; and IMF staff estimates.

trend. A credit boom is identified when either of the following two conditions is satisfied: (1) the deviation from trend is greater than 1.5 times its standard deviation and the annual growth rate of the credit-to-GDP ratio exceeds 10 percent, or (2) the annual growth rate of the credit-to-GDP ratio exceeds 20 percent. Under this approach, evidence of credit booms is detected in the period before the Asian financial crisis in all ASEAN-5 economies (Figure 8.3). However, there are no credit booms after the global financial crisis in any of the ASEAN-5 economies: the credit-to-GDP ratio remained close to trend, and the growth differential between credit and GDP stayed below the 20 percent threshold, although above the 10 percent cutoff in some cases.

The third approach is that of Chapter 3 of the IMF's *Global Financial Stability Report* of September 2011, which finds that increases in the credit-to-GDP ratio of more than 3 percentage points, year over year, could serve as an early warning of credit booms, with increases of more than 5 percentage points indicating more severe credit booms. This approach indicates severe credit booms in all ASEAN-5 economies in the period before the Asian financial crisis, with changes in the credit-to-GDP ratio exceeding the 5 percent threshold by a wide margin (Figure 8.4). After the global crisis, there are no severe credit booms in Indonesia and the Philippines, but there are in the other economies. Malaysia's credit-to-GDP ratio rose by more than 5 percent in 2011–13, Thailand's in 2011 and 2013, and Singapore's in 2011–13 and 2016.

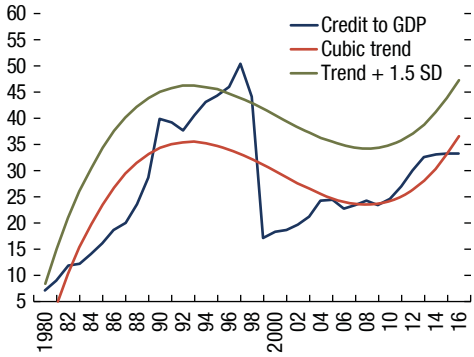
Figure 8.2. Deviation from Trend in Real Credit to the Private Sector per Capita



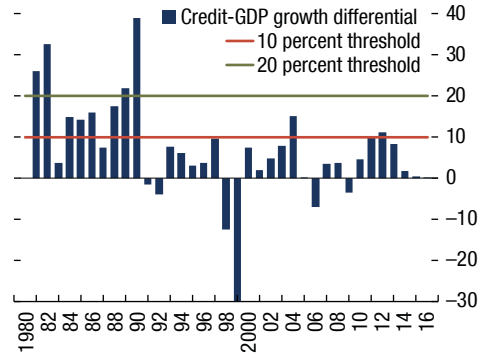
Source: IMF staff estimates using the methodology of Mendoza and Terrones (2008).
Note: HP = Hodrick-Prescott; SD = standard deviation.

Figure 8.3. Deviation from Trend and Growth of Credit to GDP

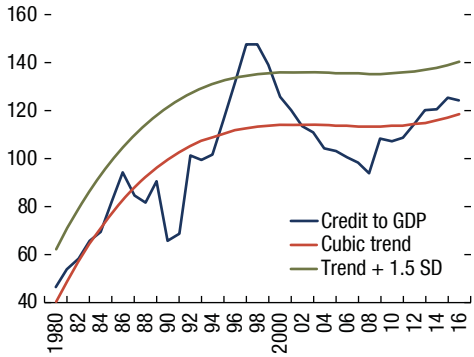
1. Indonesia: Deviation of Credit to GDP from Trend



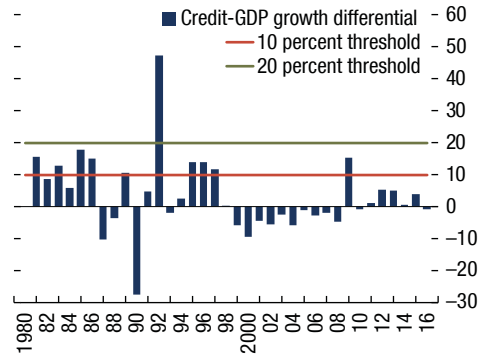
2. Indonesia: Growth Rate of Credit Net of Growth Rate of GDP



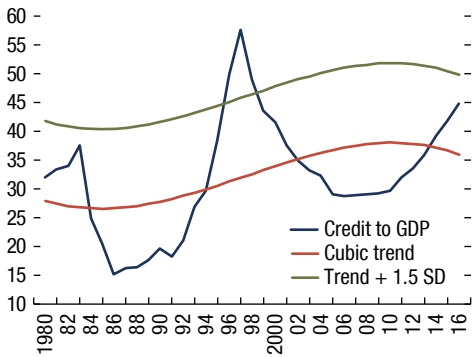
3. Malaysia: Deviation of Credit to GDP from Trend



4. Malaysia: Growth Rate of Credit Net of Growth Rate of GDP



5. Philippines: Deviation of Credit to GDP from Trend



6. Philippines: Growth Rate of Credit Net of Growth Rate of GDP

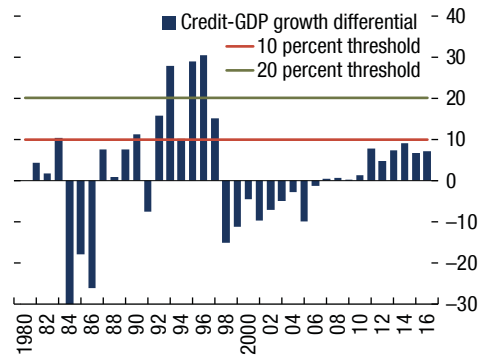
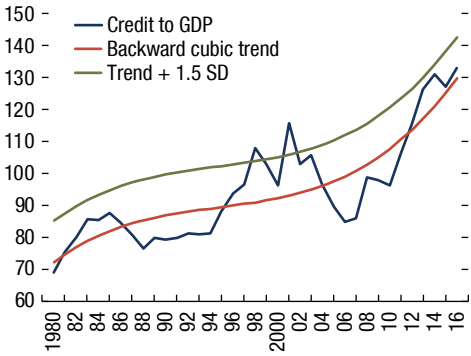
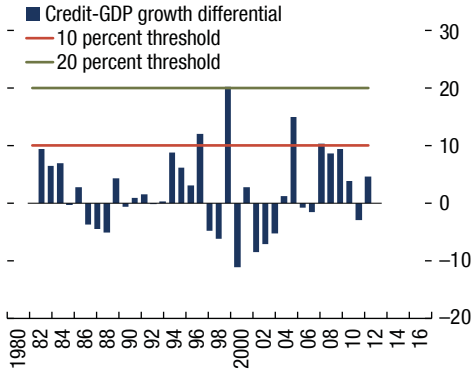


Figure 8.3 (continued)

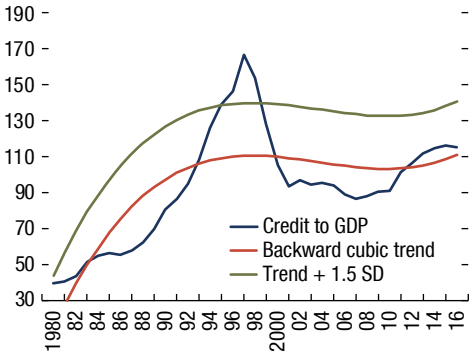
7. Singapore: Deviation of Credit to GDP from Trend



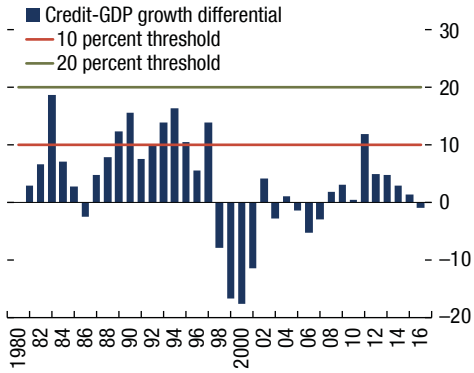
8. Singapore: Growth Rate of Credit Net of Growth Rate of GDP



9. Thailand: Deviation of Credit to GDP from Trend



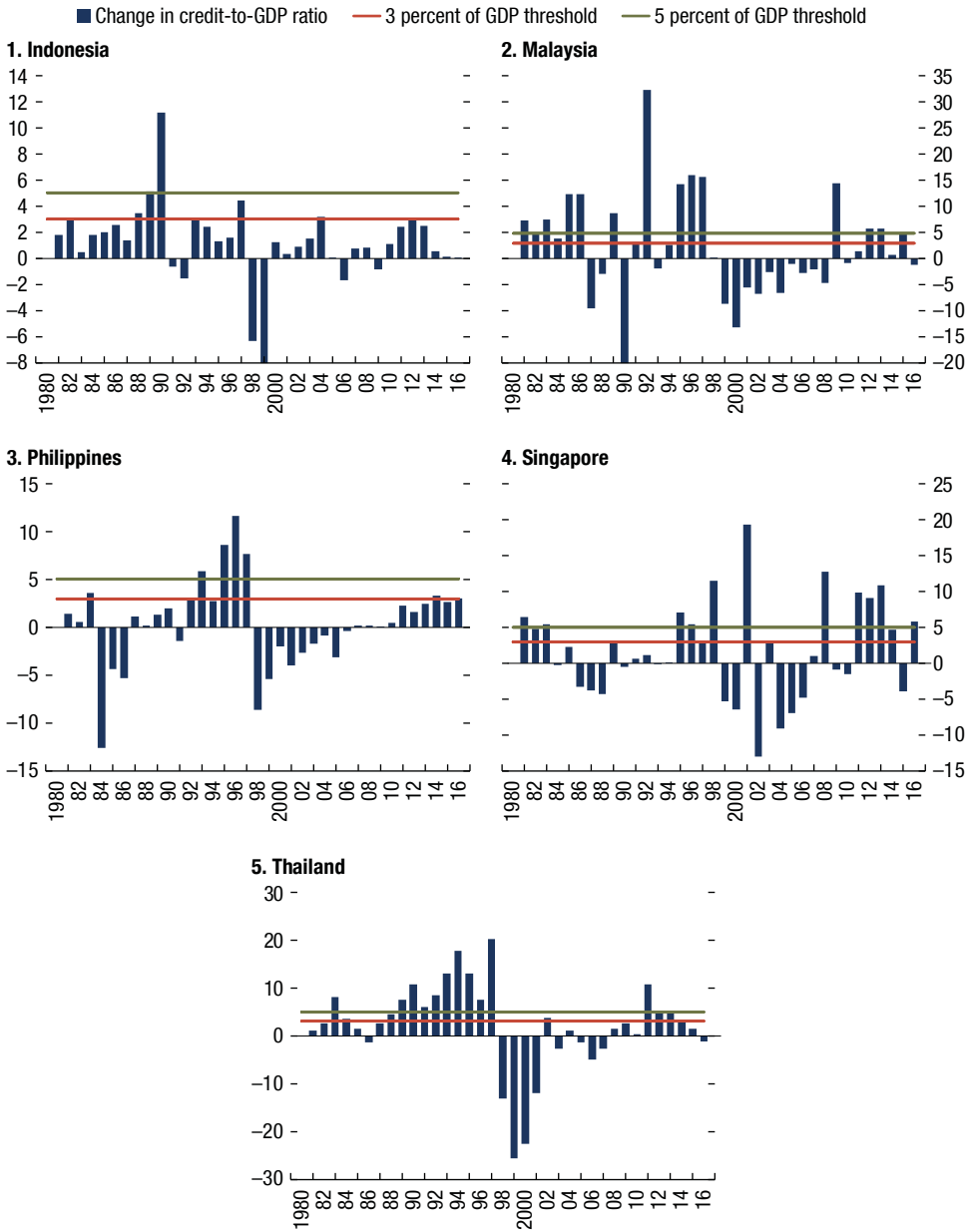
10. Thailand: Growth Rate of Credit Net of Growth Rate of GDP



Source: IMF staff estimates using the methodology of Dell'Ariccia and others (2012).
Note: SD = standard deviation.

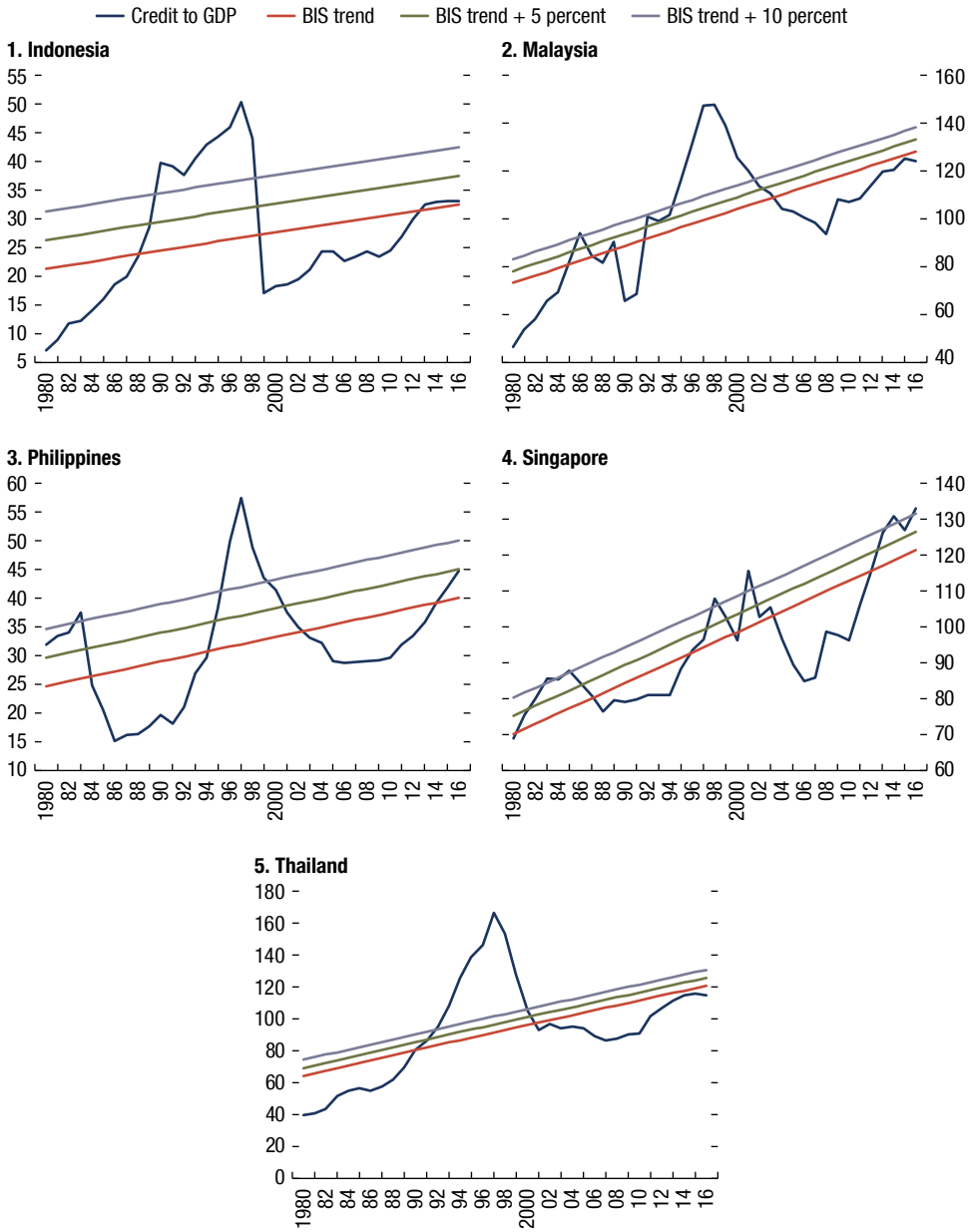
The last approach builds on Bank for International Settlements methodology. Drehmann, Borio, and Tsatsaronis (2012) argue that financial cycles last longer than economic cycles, and thus propose to examine the credit gap, defined as the deviation of the credit-to-GDP ratio from a Hodrick-Prescott trend with a very high smoothing parameter (an almost linear trend). A credit boom is identified when the deviation from trend exceeds 10 percentage points. Applying this methodology to credit to the private sector shows large credit gaps (above the 10 percent threshold) in all ASEAN-5 economies in the years before the Asian financial crisis (Figure 8.5). However, there is no evidence of credit booms in the period following the global crisis, except in Singapore, where the deviation of the credit-to-GDP ratio from trend exceeded the 10 percent cutoff in 2014 and 2016.

Figure 8.4. Changes in the Credit-to-GDP Ratio



Source: IMF staff estimates.

Figure 8.5. Deviation from Trend in the Ratio of Credit to the Private Sector to GDP



Source: IMF staff estimates using Bank for International Settlements (BIS) methodology.

Overall, the evidence suggests that systemic risks on the time dimension have been contained in the ASEAN-5 since the global financial crisis. Using four different approaches, there is evidence of credit booms in the period before the Asian financial crisis in all ASEAN-5 economies, but little evidence of credit booms after the global crisis. All approaches suggest that Indonesia and the Philippines did not experience credit booms after the global financial crisis. However, the *Global Financial Stability Report* approach based on the change in the credit-to-GDP ratio suggests that Malaysia, Singapore, and Thailand may have experienced credit booms at some point during 2011–13, while the Bank for International Settlements approach finds evidence of credit booms in Singapore in 2014 and 2016. There is no evidence of credit booms in any of these three countries after the global financial crisis using the remaining two approaches. More weight should be given to the approaches that use deviations from trend analysis because the credit-to-GDP ratios of Malaysia, Singapore, and Thailand are much larger than those of Indonesia and the Philippines, which makes it more likely that the changes in credit-to-GDP ratios exceed the thresholds.

FINANCIAL INTERCONNECTIVITY

Interconnectivity refers to relationships among economic agents that arise as a result of financial transactions and legal arrangements. In a highly interconnected financial system, distress in one entity can be transmitted to other entities in the network, and bank stresses or failures are more likely to occur at the same time.

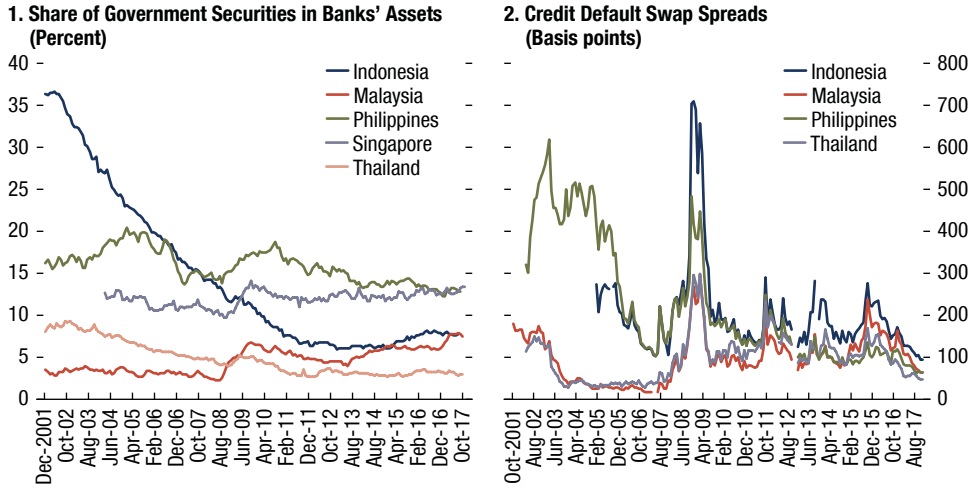
Understanding the nature of these relationships is essential for tracking the buildup of systemic risk along a structural dimension, identifying the fault lines along which financial shocks may propagate, and enhancing macroprudential surveillance and risk management. Leitner (2005), Gai and Kapadia (2010), Caballero and Simsek (2013), and Minoiu and Reyes (2011) argue that highly complex networks can increase the likelihood of contagion risk when there is financial friction. Peltonen, Rancan, and Sarlin (2015) show that early-warning models augmented with interconnectivity measures outperform traditional models for out-of-sample predictions of recent banking crises in Europe.

Financial interconnectivity has increased significantly in the ASEAN-5 in recent years. A continued search for higher returns (given low global interest rates) has changed the mix of assets and liabilities, which, in turn, has changed the nature and intensity of interconnection among financial institutions and economic agents. The remainder of this section examines links between banks on one side and sovereign, nonbank financial institutions and households on the other in ASEAN-5 countries. In turn, the section "Vulnerabilities in the Nonfinancial Corporate Sector" focuses on the links between banks and nonfinancial corporations.

Interconnectivity between Banks and the Sovereign

Banks are exposed to sovereign risk via holdings of government securities and loans extended to public sector bodies. Sovereign risk can be transferred to banks through two main channels: (1) on the asset side, via valuation losses on bank

Figure 8.6. Risks from the Sovereign to the Banks



Sources: Country authorities; Haver Analytics; and IMF staff calculations.

Source: Bloomberg Finance L.P.

holdings of sovereign securities (direct sovereign risk) and (2) on the liability side, through an increase in bank funding costs caused by repricing of risk and credit rating downgrades (indirect sovereign risk). In Indonesia, the share of government securities in banks' assets has declined from 35 percent in 2001 to less than 10 percent since 2011 (Figure 8.6, panel 1). In the other ASEAN-5 countries it remained broadly constant and lower than 15 percent. So the exposure of banks to governments is contained. Banks are also exposed to the sovereign on the liability side because many governments (or government-related agencies) have bank deposits that they could potentially withdraw in a fiscal crisis. Such withdrawal could have a significant effect on banks' liquidity.

Public debt levels in ASEAN-5 countries are moderate, and so are the associated risks (Table 8.1). Overall, banks' holdings of sovereign debt in the ASEAN-5 has either declined or remained low in recent years, and sovereign credit default swap spreads (which measure the risk of a sovereign default) have been compressed (Figure 8.6, panel 2). Singapore's high level of public debt is a consequence of efforts to develop bond markets, with gross debt fully covered by financial assets. Malaysia is the only country in which public debt is higher than the average for emerging market and developing economies. However, sovereign yields are relatively low, and the public debt ratio is projected to be on a declining path. Holdings of public debt by domestic banks are generally higher than those of the average emerging market and developing economy, but a limited fraction of total public debt. Although its overall debt is manageable, the Philippines has the largest stock of foreign-currency-denominated debt, and therefore has a higher exposure to foreign exchange risk.

TABLE 8.1.

Selected indicators of Sovereign Risk

	Indonesia	Malaysia	Philippines	Singapore	Thailand	Median EM
Credit by Banks to the Sovereign, 2015 (percent of GDP)[1]	6	16	15	27	15	9
Public Debt, 2016 (percent of GDP)	28	56	34	112	42	44
Ten-Year Sovereign Yield, End-June 2017 (percent)	6.8	3.9	5.1	2.1	2.5	5.3
Share of Foreign Currency Public Debt, 2016 (percent)	38	. . .	38	. . .	5	35
Share of Public Debt Held by Nonresidents, 2016 (percent)	59	35	30	. . .	12	35
Primary Balance Gap, 2017 (percent of GDP)[2]	−0.1	−0.6	−2.2	−3.4	0.0	0.1

Sources: Bloomberg Finance L. P.; World Bank, Global Financial Development Database; and IMF, *Fiscal Monitor,* April 2017.
Note: EM = emerging market.
[1]Includes credit to state-owned enterprises.
[2]Change in the primary balance to stabilize the debt-to-GDP ratio at the 2016 level.

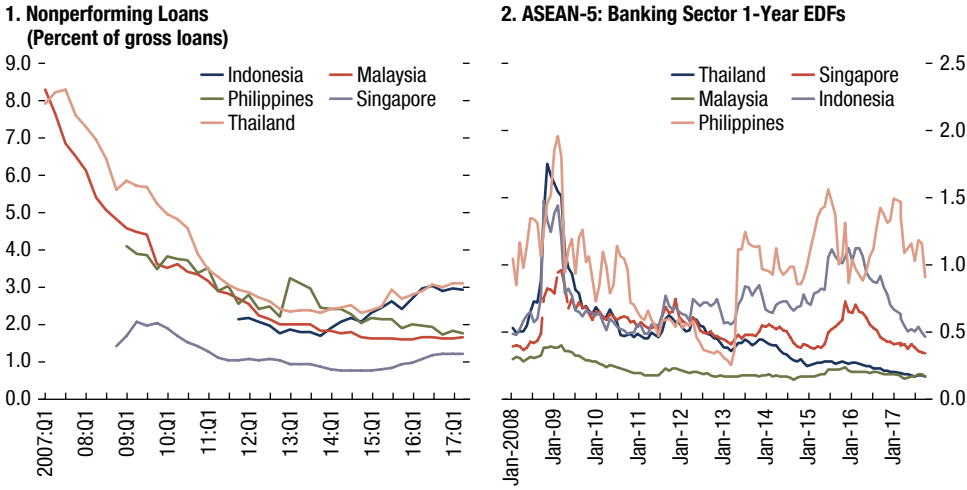
Similarly, sovereigns are exposed to risk from banks' instability. Poor bank performance may require public assistance or funding, thus further increasing the debt burden of the sovereign. As discussed in Chapter 3, banks' balance sheets in the ASEAN-5 remain strong, and nonperforming loan ratios are contained (Figure 8.7, panel 1), suggesting lower exposure of governments to banks. Moody's Analytics market-based expected default frequency data for ASEAN-5 banking systems, which measure the probability that banks will default over the next year, also show relatively modest risks (Figure 8.7, panel 2). Financial stability risks are further mitigated by the presence of developed microprudential frameworks (aimed at securing the orderly functioning of banks and preventing banking crises), macroprudential frameworks (aimed at containing systemic risk), and bank resolution regimes (which facilitate early intervention and limit the liability of governments during banking crises).

Interconnectivity among Banks

Banks can be interconnected directly via bilateral transactions, financial service links, or financial infrastructure links. The greater the degree of interconnectivity between banks, the greater the likelihood that financial stress in one bank could trigger spillovers of financial stress to other banks, thereby increasing systemic risks. Interconnectedness can also be indirect: for example, fire sales by a distressed bank may lead to a fall in asset prices and associated mark-to-market losses for other banks.

There are several ways to measure bank interconnectivity. One measure is the share of interbank loans as a proportion of total bank assets (Figure 8.8, panel 1). Interbank assets and liabilities in Singapore are predominantly limited to nonresident banks, reducing the potential for contagion within the network of the three local banks. In Malaysia, where bank penetration is high, the interbank connections are deep among the conventional banks, while interbank borrowing and lending between the Islamic banks is very thin. In Indonesia, the interbank market is thin and segmented, with banks relying largely on household deposits for

Figure 8.7. Risks from the Banks to the Sovereign



Sources: Country authorities; Haver Analytics; and IMF staff calculations.

Source: Moody's.
Note: EDF = expected default frequency.

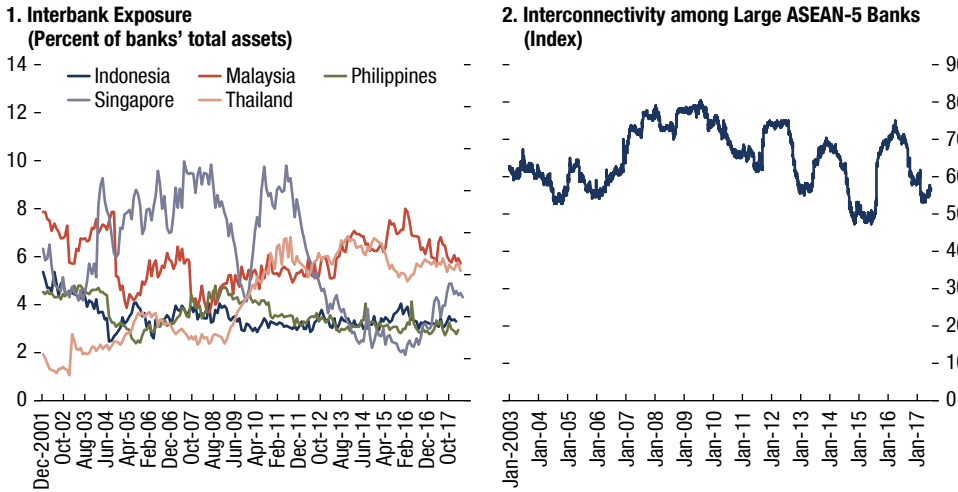
funding. In addition, smaller banks do not generally access the interbank market, limiting their direct interconnectedness with the rest of the sector. The situation is largely similar in the Philippines, where the interbank market is very shallow and direct bank exposures to other banks are small. In Thailand the share of interbank loans has almost tripled since 2001 (Figure 8.8).

Market-based measures of bank interconnectivity indicate rising risks during times of market stress. Connectivity among large banks within countries and across the ASEAN-5 can be assessed by techniques developed by Diebold and Yilmaz (2014) using bank-level equity prices. The connectivity index quantifies the contribution of shocks from one bank's asset returns and volatilities to another's at different times based on dynamic variance decompositions from vector autoregressions. The time-varying interconnectivity index for the largest banks in the ASEAN-5 shows rising susceptibility to propagation of distress from one bank in the region to another, particularly during times of market stress (Figure 8.8, panel 2). The more frequent spikes in the interconnectivity index among ASEAN-5 banks since the global financial crisis could indicate greater systemic risks in the region, requiring a greater focus on monitoring risks stemming from financial institution interconnectivity.

Interconnectivity between Banks and Nonbank Financial Institutions

Interconnectivity between banks and nonbank financial institutions can take various forms. They often have common ownership links (by belonging to a financial conglomerate or owning stakes in each other) and maintain significant

Figure 8.8. Risks between Banks



Sources: Country authorities; Haver Analytics; and IMF staff calculations.

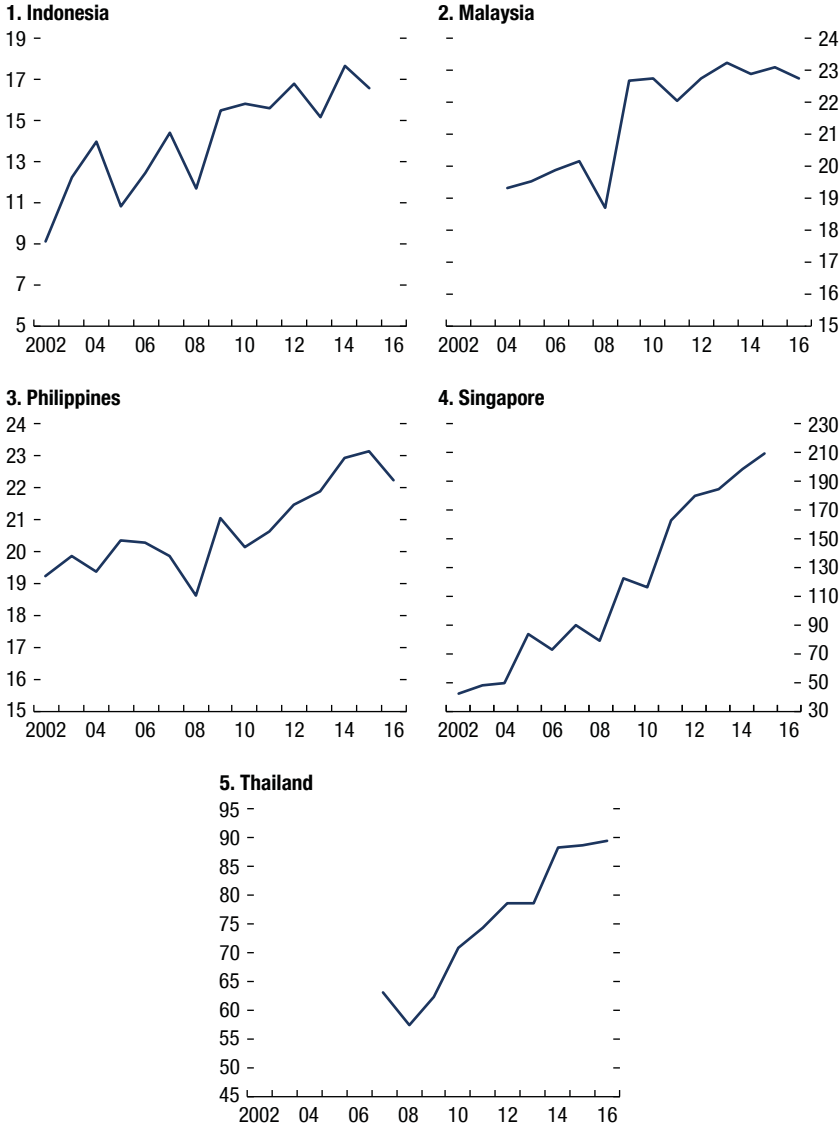
financial links in the form of deposits and common market exposures. Moreover, some nonbank financial institutions play a critical role in the funding strategies of banks, while banks have provided explicit and implicit guarantees of their affiliated banks' net asset values. Over time, the distinction between banks and some nonbanks has become blurred, but there is one key difference: nonbank financial institutions are typically subject to lighter prudential, regulatory, and reporting standards than banks. While the rapid development of nonbank financial institutions could reflect progress toward a more diversified financial system, it could also go hand in hand with financial stability risks.

Nonbank financial institutions in the ASEAN-5 have grown, albeit at different rates (Figure 8.9). Singapore's nonbank sector is nearly half the size of the banking system, and most nonbank players (except wealth management institutions) have limited links with local banks and are unlikely to pose a systemic risk. Strong performance of global and regional equities in recent years provided the wealth management sector—the largest nonbank player in Singapore—a boost, spurring higher sales of unit trusts and other investment products. Local banks have been a key factor behind the wealth management sector's growth and have been its main beneficiary. The size of nonbank financial institutions in other ASEAN-5 countries is modest, suggesting that, all else equal, there is less risk of lower stability as a result of interconnection with banks.

Interconnectivity between Banks and Households

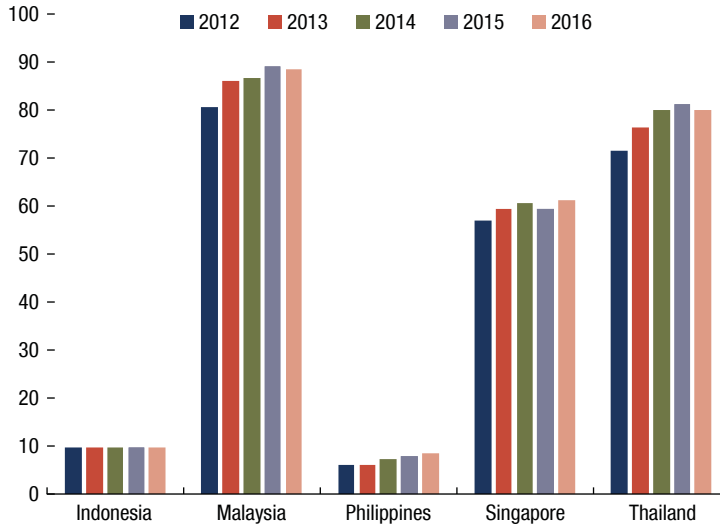
Banks are connected with households through both the asset and liability sides of their balance sheets. On the asset side, the exposure takes the form of various

Figure 8.9. Assets of Nonbank Financial Institutions
(Percent of GDP)



Sources: National authorities; Financial Stability Board database; and IMF staff calculations.

Figure 8.10. Household Debt
(Percent of GDP)



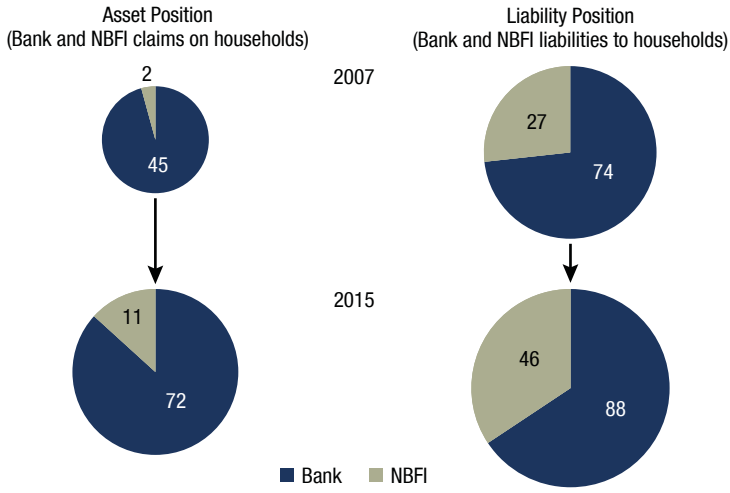
Source: CEIC Data.

types of loans extended by banks to households. On the liability side, households' claims on banks can take the form of deposits and equity. Although the aggregate net exposure of banks to the household sector provides useful guidance for the riskiness of the link between banks and households, the disparities in income and debt-servicing capacity between household groups, as well as maturity mismatches between assets and liabilities, requires a more granular view and prudent macroprudential oversight.

Among the ASEAN-5, household-debt-to-GDP ratios are high in Malaysia, Singapore, and Thailand, but significantly lower in Indonesia and the Philippines (Figure 8.10).

- Having stabilized recently, the household debt level in Singapore is about 60 percent of GDP. Recent macroprudential measures have slowed the growth of household debt and helped build households' financial buffers and reduce the risk for banks and nonbank lenders (see Chapter 6 and IMF 2017d).
- Household indebtedness in Malaysia is higher (at nearly 90 percent of GDP). However, risks are mitigated by high levels of financial assets, exceeding 180 percent of GDP as of the end of 2015 (IMF 2017c).
- Household debt in Thailand peaked at about 80 percent of GDP in 2015. On a net basis, both banks and nonbanks are borrowers from households (Figure 8.11 and Table 8.2). However, in recent years, banks' net liabilities to households have declined, a result of a massive increase in banks' gross

Figure 8.11. Thailand: Bank and Nonbank Financial Institution Exposure to Households
(Percent of GDP)



Sources: Country authorities; and IMF staff calculations.
Note: Size of 2017 and 2015 circles reflects relative size as a percentage of GDP. NBFI = nonbank financial institution.

TABLE 8.2.

Thailand: Balance Sheet Analysis Matrix—Intersectoral Net Positions
(Percent of GDP)

	Government[1]	Central Bank	Banks[2]	NBFIs[3]	NFCs	HHs	ROW
				2007			
Government[1]		−6.7	−4.4	4.9	0.3	4.1	1.2
Central Bank	6.7		9.8	4.1	1.2	1.5	−32.5
Banks[2]	4.4	−9.8		2.0	−21.4	29.3	1.5
NBFIs[3]	−4.9	−4.1	−2.0		−17.8	25.2	−2.4
NFCs[4]	−0.3	−1.2	21.4	17.8			20.7
HHs	−4.1	−1.5	−29.3	−25.2			0.0
ROW	−1.2	32.5	−1.5	2.4	−20.7	0.0	
				2015			
Government[1]		−5.1	−0.8	7.9	0.3	1.7	4.7
Central Bank	5.1		19.9	5.2	0.7	0.1	−42.1
Banks[2]	0.8	−19.9		5.8	−14.1	16.9	9.8
NBFIs[3]	−7.9	−5.2	−5.8		−18.6	35.5	−2.5
NFCs[4]	−0.3	−0.7	14.1	18.6			16.9
HHs	−1.7	−0.1	−16.9	−35.5			0.0
ROW	−4.7	42.1	−9.8	2.5	−16.9	0.0	

Sources: Bank of Thailand; and IMF staff calculations.
Note: HHs = households; NBFIs = nonbank financial institutions; NFCs = nonfinancial corporations; ROW = rest of world.
[1]Includes central government and local governments.
[2]Includes all depository corporations excluding the Bank of Thailand.
[3]Includes all other financial corporations.
[4]NFCs Includes state-owned enterprises.

claims on households, while nonbanks' net liabilities have increased, shifting much of the risk associated with high household debt to banks' balance sheets. The higher household debt with nonbank financial institutions could represent an increase in systemic liquidity risk because the shorter maturity of nonbank products results in maturity mismatches (IMF 2017e).

- In Indonesia, banks are also net borrowers from households, which reduces the potential loan losses on that segment of banks' portfolios.
- Household debt is still less than 15 percent of GDP in the Philippines, taking into account housing-related mortgages from government financial institutions not covered in the financial system surveys. However, bank credit to households has been expanding rapidly since 2010, and close monitoring of credit standards is warranted, particularly given shadow banking by real estate developers and informal financial institutions in the Philippines that may mask the true level of household leverage (IMF 2015).

VULNERABILITIES IN THE NONFINANCIAL CORPORATE SECTOR

Recent Trends in Corporate Debt

Corporate debt in the ASEAN-5 has increased faster than GDP since the global financial crisis.[2] It rose from 77 percent of GDP in 2010 to 102 percent in 2016 in Malaysia, from 155 to 166 percent in Singapore, from 24 to 31 percent in Indonesia, from 25 to 30 percent in the Philippines, and from 64 to 68 percent in Thailand (Figure 8.12, panel 1).[3] The increase in debt was on account of rapid growth in both bond issuance and bank loans. In particular, corporate bond issuance nearly tripled during this period, driven by an increase in domestic and foreign currency bonds.

Higher debt led to rising leverage in the corporate sector, although leverage ratios are still low compared with what they were during the Asian financial crisis (Figure 8.12, panel 2). At the same time, corporate profitability had weakened amid moderation in regional economic growth in recent years (Figure 8.12, panel 3). As a result, average debt-servicing capacity appears to be weakening despite remaining resilient (Figure 8.12, panel 4). Although most bonds have matured, some countries have a relatively large number that are maturing in the next two years (Figure 8.12, panel 5).

The ability to refinance short-term debt and the adequacy of internal cash buffers to meet these debt obligations along with operational costs are important. For most countries, cash buffers are adequate. However, median ratios of cash and cash equivalents to short-term debt seem relatively low in Indonesia and Thailand (Figure 8.12, panel 6). It is worth noting that low cash levels may reflect better reinvestment opportunities in some of these countries. However, cyclical global

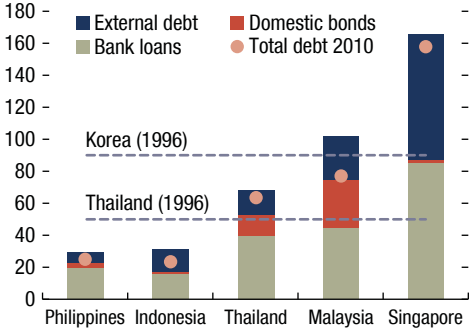
[2]See Chapter 3 for corporate restructuring and deleveraging since the Asian financial crisis.

[3]Bloomberg Finance L.P.'s coverage of nonfinancial corporations comprises publicly listed entities with published balance sheet information.

Figure 8.12. The Corporate Sector

Corporate debt has increased in recent years ...

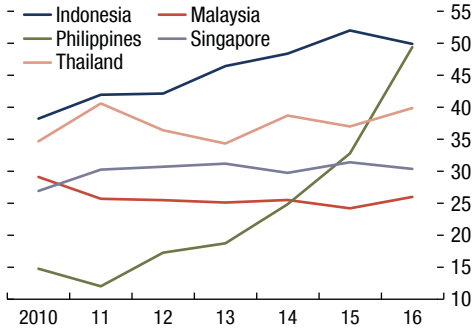
1. Total Nonfinancial Corporate Debt in 2016 (Percent of GDP)



Source: Bloomberg Finance L.P., Financial Soundness Indicators, Quarterly External Debt Statistics.

... prompting leverage ratios to rise.

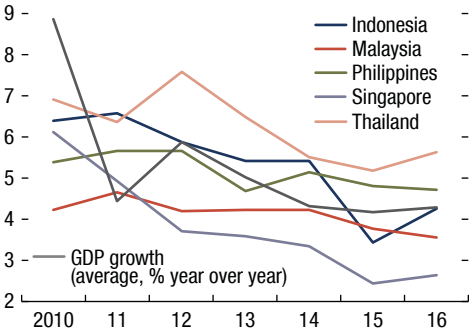
2. Total-Debt-to-Total-Equity Ratio (Percent)



Source: IMF Corporate Vulnerability Utility (CVU).

Profitability has weakened with growth moderation ...

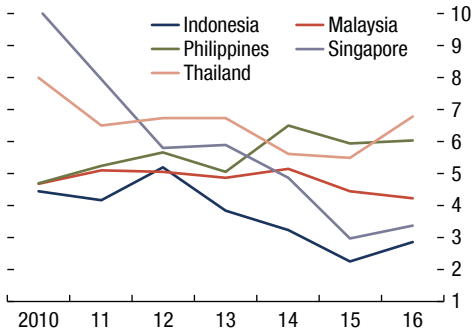
3. Return on Assets and GDP Growth (Percent, median)



Sources: IMF CVU; and IMF, *World Economic Outlook* database.

... leading to weaker debt-servicing capacity.

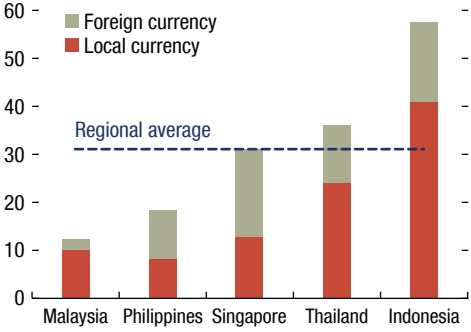
4. Interest Coverage Ratio (Earnings in multiples of interest expense, median)



Source: IMF CVU.

Near-term bond maturities are high for some countries ...

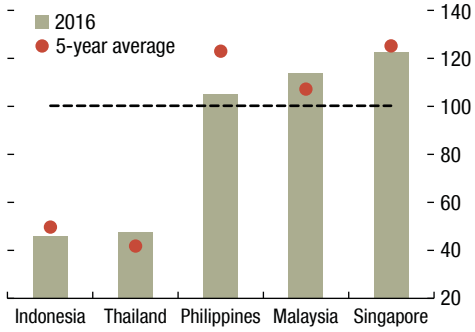
5. Maturity Profile of Nonfinancial Corporate Bonds (Percent, 2017 country total)



Source: Bloomberg Finance L.P.

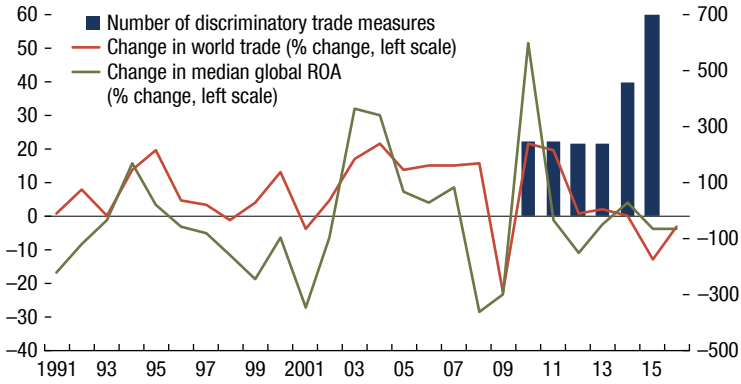
... while their cash buffers appear low.

6. Ratio of Cash and Cash Equivalents to Short-Term Debt (Percent)



Source: Bloomberg Finance L.P.

Figure 8.13. World Trade, Global Corporate Return on Assets, and Discriminatory Trade Measures



Sources: Global Trade Alert; IMF, Corporate Vulnerability Utility; and World Trade Organization.
Note: ROA = return on assets.

headwinds, especially during periods of dislocation in global capital markets, can amplify rollover risks and affect firms' short-term refinancing needs. Moreover, higher risk premiums lead to higher borrowing costs and lower earnings.

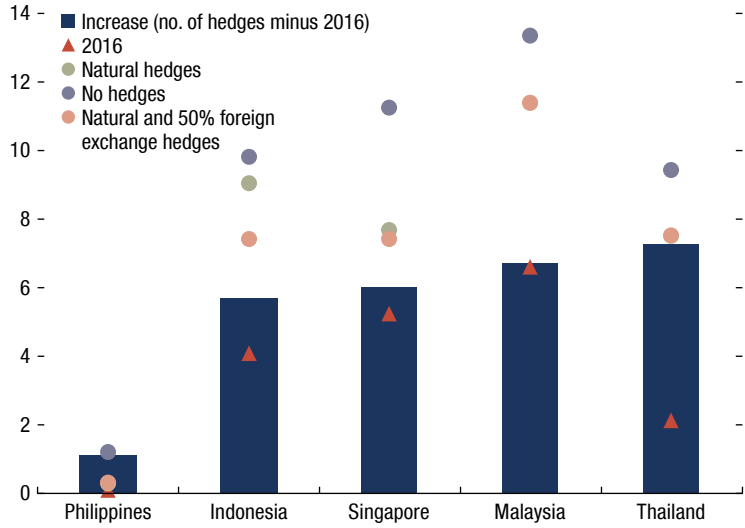
Corporate Vulnerabilities

An increase in global trade protectionism measures could significantly affect exports and corporate earnings in emerging market economies, including ASEAN-5 countries. Historically, world trade and corporate returns on assets are positively associated (Figure 8.13). In 2009, global trade declined close to 25 percent year over year, driven by protectionist measures, in addition to the sharp contraction in global demand in the aftermath of the global financial crisis and reduced access to credit to finance trade. Recently, the number of discriminatory trade measures has been on the rise again. Further increases in trade protectionism, including retaliations, could disrupt global trade and jeopardize corporate earnings. At the same time, cyclical headwinds associated with volatility in global financial markets could lead to exchange rate depreciation and higher risk premiums and borrowing costs. A combination of these factors could increase corporate sector risks.

One way to quantitatively assess corporate vulnerabilities is to examine debt-service capacity and the share of debt at risk. Using firm-level data for about 2,600 companies from the Bloomberg database, the interest coverage ratio for each firm is computed by dividing earnings before interest and taxes by interest expenses in 2016. The share of debt at risk is the sum of the debt of all firms with an interest coverage ratio lower than 1 divided by the sum of the debt of all firms.

To examine the sensitivity of firms to shocks, an illustrative sensitivity analysis of the firms' balance sheets based on publicly available information is undertaken using the following three shocks:

Figure 8.14. Debt at Risk
(Percent of total debt)



Sources: Bloomberg Finance L.P.; IMF, Corporate Vulnerability Utility; and IMF staff calculations.

- Firms' earnings decline by ¾ standard deviation, based on regression analysis that shows that a 25 percent decline in global trade leads to a ¾ standard deviation deterioration in corporate return on assets in emerging market economies. Implicit in this assumption is that global trade will decline by the same order of magnitude as in 2009.
- The exchange rate depreciates by 15 percent against the US dollar, derived from Fibonacci retracement of the US Dollar Index from 2000 to June 2017, which suggests potential US dollar appreciation by another 15 percent.[4]
- Interest expenses increase by 20 percent, based on the average of the largest increase in emerging market economies during 2008–16.

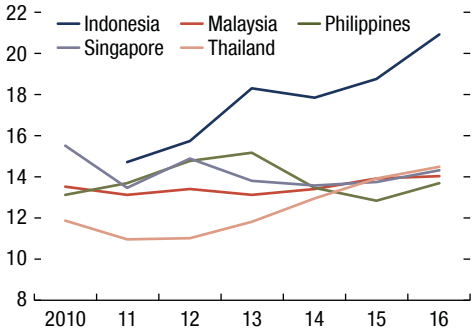
The results suggest that corporate debt at risk could increase significantly in some ASEAN-5 countries, though it would remain at low levels overall (Figure 8.14). To an extent, the level of debt at risk will depend on the magnitude of foreign exchange hedging from natural hedges (export and foreign currency earnings) and derivative hedges. In this exercise, the median ratios of foreign sales to total sales are used as a proxy for natural hedges. It is worth noting that although foreign exchange derivative hedging instruments and markets are more developed now than during the Asian financial crisis, some of these instruments are complex. For example,

[4]Fibonacci retracement is a popular technical analysis tool that shows the possible price-level movements of an underlying asset (foreign exchange in this case). It takes two extreme points (usually a major peak and a trough), computes the distance between them, and, using some key Fibonacci ratios, identifies a range for price movements.

Figure 8.15. The Banking Sector

Bank capital had been increasing ...

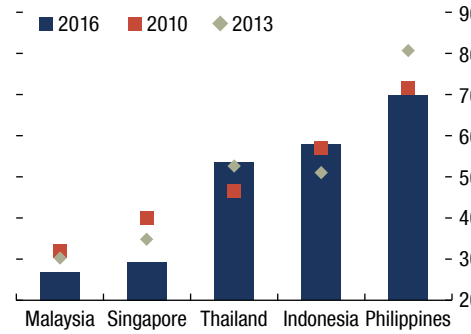
1. Tier 1 Capital Ratio (Percent)



Source: IMF, Financial Soundness Indicators.

... but provisioning had weakened somewhat.

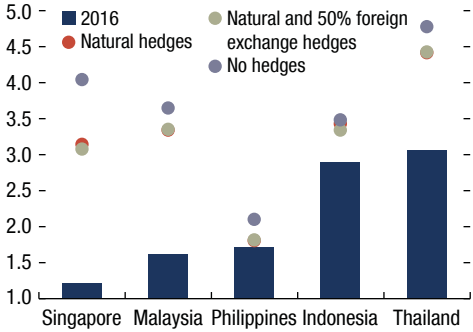
2. Provisions-to-Nonperforming-Loans Ratio (Percent)



Source: IMF, Financial Soundness Indicators.

Defaults of corporate debt at risk will erode asset quality ...

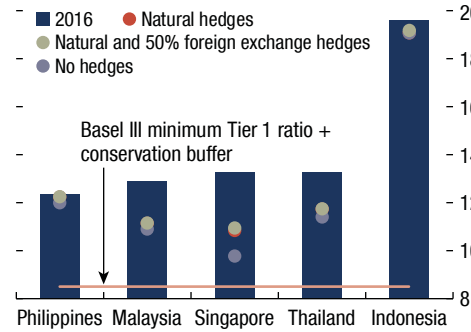
3. Gross Nonperforming Loan Ratio (Percent)



Source: IMF staff calculations.

... leading to a decline in bank buffers, although they remain strong by Basel III standards.

4. Loss-Absorbing Buffers (Percent)



Sources: IMF, Financial Soundness Indicators; and IMF staff calculations.

some currency hedges terminate when exchange rates depreciate beyond certain "knock-out" thresholds, thus rendering the hedges worthless. Moreover, firms are exposed to liquidity and rollover risks when these contracts expire.

Interconnectivity with Banks

Weaknesses in the corporate sector could put pressure on banks' asset quality through increases in nonperforming loans. The ability of banks to withstand these shocks will depend on the size of their buffers, comprising Tier 1 capital and provisions (Figure 8.15). Since 2010, the banking sector's Tier 1 capital ratios

have been rising in the region. Nonetheless, provision coverage has weakened somewhat in recent years in a number of countries, as shown by the decline in the ratio of bank provisions to nonperforming loans.

Assuming in a stress scenario that all the corporate debt at risk owed to banks defaults, sensitivity analysis suggests that gross nonperforming loan ratios could increase 0.4–2.8 percentage points. This would erode banks' loss-absorbing buffers by 0.4–3.5 percentage points. However, banks' capital ratios would remain strong when benchmarked against Basel III's minimum capital requirements.

The reduction in bank capital could lead to weaker credit growth, though, because banks tend to de-risk when their capital ratios fall to limit losses and meet regulatory requirements. In emerging market economies, a 1 percentage point decline in banks' capital-to-assets ratio could lead to as much as a 4.6 percentage point reduction in loan growth. In turn, the decline in bank credit could weaken economic growth. Previous studies have found the sensitivity of GDP growth to bank credit growth ranging from 0 to 0.4, depending on the extent of credit deepening and economic circumstances. Within the ASEAN-5 region, bank credit growth has already slowed compared with average growth rates, except in the Philippines (Figure 8.1).

CHALLENGES AND POLICY AGENDA AHEAD

The global financial crisis propelled a wave of reforms in financial sector regulation across the world. Existing financial regulations were considered too weak, and a multilateral reform effort kicked off with the goal of making financial systems worldwide more resilient to shocks. The Basel III agreement reached in 2011 was a major achievement toward enhancing regulatory standards for capital and liquidity requirements. It also included special capital requirements for global systemically important financial institutions. Some final elements of the Basel III reforms, aiming to improve the credibility of the bank capital framework, were agreed to only in late 2017.

An important lesson from the global financial crisis is that traditional microprudential regulation is not sufficient to secure the stability of the financial system as a whole. A broader macroprudential approach is needed to mitigate systemic risks and safeguard financial systems. Moreover, the global financial crisis exposed the limitations of crisis management and resolution frameworks, particularly when systemic institutions operating on a large and cross-border basis are involved.

Microprudential regulation focuses on the financial soundness of an individual financial entity, while macroprudential regulation focuses on the financial soundness of the whole system. Yet, even with strong micro- and macroprudential regulation in place, some financial institutions may eventually fail. Against this backdrop, sound crisis management frameworks are essential to contain the risks to taxpayers. The international standards on how banks should be restructured or closed are known as the Key Attributes of Effective Resolution Regimes for Financial Institutions, elaborated by the Financial Stability Board.

The rest of this chapter outlines challenges and the policy agenda ahead for strengthening financial stability frameworks in ASEAN-5 countries. It first delves into current issues in financial sector regulation from a microprudential perspective and then elaborates on next steps for upgrading macroprudential frameworks and crisis management and resolution regimes. The last subsection discusses the potential benefits and risks of new financial technologies such as cryptocurrencies.

Financial Sector Regulation

Basel III is a comprehensive set of voluntary capital and liquidity requirements, developed by the Basel Committee on Banking Supervision, that aims to strengthen banking sectors. These requirements were agreed to by the committee in 2011 and were scheduled for gradual adoption during 2013–27. They call on banks to have (1) more and better capital to absorb shocks and (2) more liquid assets to weather liquidity shocks.

An important challenge in the implementation of the Basel III standards is to ensure that they are reasonable for each financial system and each financial institution. Adrian and Narain (2017) argue that the Basel III standards were a response to the global financial crisis and hence naturally focus on global systemically important financial institutions. This suggests that there is a need for proportionality in the application of the standards for less complex financial systems and institutions.

ASEAN-5 countries made significant strides in strengthening microprudential regulations after the Asian financial crisis. The main challenge ahead is to adopt Basel III standards but also to tailor the rules to the sophistication of the financial sector and financial institutions of each country. ASEAN-5 economies are at different stages in this process:

- Indonesia implemented new capital and liquidity rules in line with Basel III. New rules for systemically important banks were approved in March 2016. A liquidity coverage ratio was established in December 2015. Large banks (banks with core capital of at least 30 trillion rupiah) and foreign branch offices were required to have an liquidity coverage ratio of at least 70 percent at the end of 2015. Midsize banks (banks with core capital between 5 trillion and 30 trillion rupiah) and foreign banks have had a 70 percent liquidity coverage ratio since July 2016.
- Malaysia adopted new capital rules in January 2013. Global standards related to capital conservation and countercyclical capital buffers were met in 2016, and the bank leverage ratio has been in effect since January 2018, in line with the global timeline. A minimum liquidity coverage ratio of 60 percent came into force in mid-2015 and will be stepped up gradually to 100 percent by January 2019.
- In the Philippines, commercial banks have stricter capital requirements than mandated under Basel III. Local regulations stipulate a 6 percent ratio for common equity Tier 1 capital, compared with 4.5 percent under Basel III; a 7.5 percent ratio for Tier 1 capital (6 percent under Basel III); and a

10 percent ratio for total capital (8 percent under Basel III). The authorities also introduced a 2.5 percent capital conservation buffer at the start of 2014, five years ahead of the Basel III schedule. In 2015, the authorities set a leverage ratio of 5 percent for local banks.

- In Singapore, capital requirements for banks are higher than those established by Basel III, and their adoption has been front-loaded. The introduction of the capital conservation buffer follows the same phase-in schedule as Basel III. The liquidity coverage ratio was introduced in January 2015. The minimum requirement started at 60 percent and is scheduled to rise in equal annual steps to reach 100 percent by January 2019.
- In Thailand, Basel III capital rules have been in force since January 2013. The Bank of Thailand issued seven notifications regarding the Basel III capital framework to require Thai banks to maintain a minimum common equity ratio of 4.5 percent, Tier 1 ratio of 6 percent, and total capital ratio of 8.5 percent. In 2017, the Bank of Thailand also identified systemically important banks required to hold a capital buffer above the minimum requirements. In 2016, the Band of Thailand began to phase in the liquidity coverage ratio requirement at 60 percent for all commercial banks; it will reach 100 percent in 2020.

Macroprudential Frameworks

ASEAN-5 countries have been at the frontier in the implementation of macroprudential policies, especially those applicable to specific sectors of the economy (see Chapter 6). Still, although the use of macroprudential tools has grown, an important agenda to upgrade and fully develop macroprudential frameworks lies ahead. Perhaps the most important challenge in the ASEAN-5 is to enhance the ability to identify and monitor emerging systemic risks in a structural dimension, especially with the expansion of nonbank financial institutions (see the "Financial Interconnectivity" section). Macroprudential policies remain hampered by data and institutional gaps. Moreover, the experience and evidence on the use of macroprudential tools continue to evolve worldwide.

ASEAN-5 institutional frameworks for macroprudential policies follow a wide range of models (Box 8.1). The IMF (2011b) classifies macroprudential institutions using five key dimensions, leading to seven distinct models (Table 8.3). The dimensions are (1) the degree of institutional integration between central bank and financial regulatory policy functions, (2) ownership of the macroprudential mandate, (3) the role of the government, (4) the degree to which there is organizational separation of decision-making and control over instruments, and (5) whether there is a coordinating committee that, while not itself charged with the macroprudential mandate, helps coordinate several bodies. The ASEAN-5 countries sit in either model 1 or 4, characterized by partial or full central bank independence, with ownership of macroprudential policies mainly with the central bank.

Recognizing the numerous approaches, the IMF (2014) establishes some criteria for assessing the strengths and weaknesses of macroprudential frameworks:

Box 8.1. Macroprudential Institutional Arrangements in the ASEAN-5

The ASEAN-5 have used a mixture of institutional arrangements to implement macroprudential policies.

Indonesia: The central bank formally began conducting macroprudential surveillance of the Indonesian financial system in 2003. A law passed in 2011 established the Indonesian Financial Services Authority, which is independent and enumerates microprudential powers. The law also assigned responsibility for macroprudential regulation and supervision to the central bank. Overall, financial stability is in the hands of Financial System Stability Forum, coordinated by the minister of finance. The forum is responsible for monitoring and assessing financial stability, making policy recommendations, and facilitating information exchange among government agencies and, in crisis situations, with crisis management.

Malaysia: Under the Central Bank of Malaysia Act 2009, the bank has been given a financial stability mandate and broad powers to ensure financial stability. In addition to powers to regulate and supervise financial institutions and specific markets under its purview, the bank can invoke powers over financial institutions beyond its regulatory reach and make recommendations to any other supervisory authority. Governance for these latter powers is provided by the Financial Stability Executive Committee, chaired by the governor and comprising one deputy governor and three to five other members appointed by the finance minister—which includes a Treasury representative in practice.

Philippines: Responsibility for financial stability is shared among different agencies: the Bangko Sentral ng Pilipinas (BSP) has responsibility for, among other things, monetary policy and banking sector stability; the Securities and Exchange Commission is responsible for market conduct and consumer protection; the Insurance Commission, a government agency under the Department of Finance, regulates and supervises life and non–life insurance companies. The Financial Stability Committee, chaired by the central bank governor, was set up in 2010 to develop an overarching approach to systemic risk monitoring. The BSP has been promoting the exchange of financial stability issues in the framework of the high-level Financial Stability Coordination Council since 2011.

Thailand: Thailand currently has no law explicitly defining financial stability or assigning the mandate of financial stability to any institution. In practice, dating back to 2004, the Bank of Thailand's mandate as spelled out in its law, "maintaining monetary stability, financial institutions system stability and payment stability," broadly supports its activities as the lead financial stability framework agency. At the national level the central bank's role is limited by the existence of other regulators. The Securities and Exchange Commission and the Office of Insurance Commission have narrower mandates. Nevertheless, these areas have important links with banks and the broader financial system. The establishment of the Financial Stability Unit housed in the Bank of Thailand in 2016 has facilitated information sharing, monitoring, and coordination among regulators.

Singapore: The Monetary Authority of Singapore (MAS) is responsible for conducting macroprudential policy. The MAS is both a central bank and an integrated financial supervisor overseeing all financial institutions and is mandated with promoting financial stability. Under the current institutional arrangement, the deputy prime minister and minister of finance serves as the chairman of the board of the MAS and presides over the board-level chairman's meeting, where microprudential and macroprudential policies, as well as monetary policy, are determined. At the level of the chairman's meeting, the MAS holds meetings with the Ministry of Finance to discuss macroeconomic and financial stability issues and seek agreement on policies that can have broad ramifications. The role of the chairman's meeting in macroprudential policy is supported by the MAS Management Financial Stability Committee, chaired by the MAS managing director and comprising other MAS senior managers. It coordinates policies aimed at maintaining financial stability as well as the stability of asset and consumer prices and collaborates with all relevant government agencies.

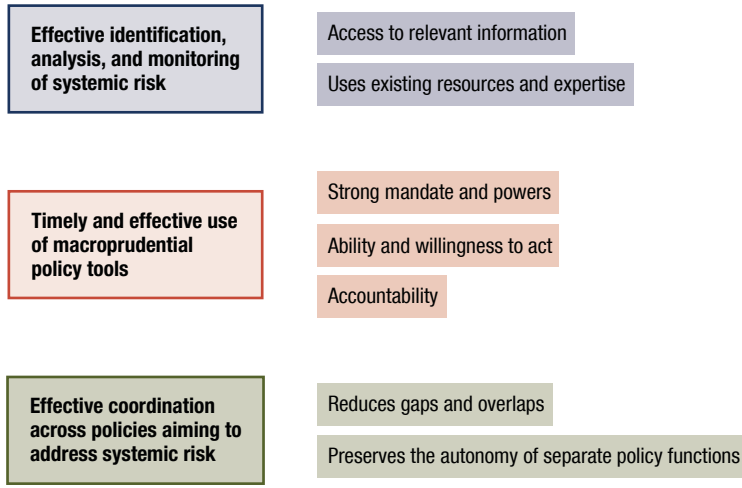
TABLE 8.3.

Models of Macroprudential Institutions

Features of the Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Degree of Institutional Integration of Central Bank and Supervisory Agencies	Full	Partial	Partial	Partial	None	None	None
Ownership of Macroprudential Policy and Financial Stability Mandate	Central bank	Committee related to central bank	Independent committee	Central bank	Multiple agencies	Multiple agencies	Multiple agencies
Role of Ministry of Finance, Treasury, Government	Active	Passive	Active	None	Passive	Active	None
Separation of Policy Decisions and Control over Instruments	No	In some areas	Yes	In some areas	No	No	No
Existence of Separate Body Coordinating across Policies	No	No	No	No	Yes	Yes	No
Examples of Specific Model	***Singapore, Malaysia,*** Czech Republic, Ireland	Romania, United Kingdom, Cambodia	Brazil, France, United States	***Thailand, Philippines, Indonesia,*** Hong Kong SAR, Lao P.D.R., Netherlands	Australia	Canada, Vietnam	Iceland, Japan, Korea, Peru, Switzerland

Source: IMF (2011b).

Figure 8.16. Criteria for Effectiveness of Macroprudential Institutional Model



Source: IMF 2011b.

- *Analysis:* The central bank should have an important role within the framework reflecting its experience in monitoring macro-financial developments and conducting risk assessment.
- *Monitoring:* The framework should provide for the effective monitoring and identification of systemic risk, which require, among other things, assured access by agencies to all relevant information.
- *Organization:* It must be clear where the mandate and powers reside for the timely and effective use of macroprudential policy once concerns about systemic risk have been identified.
- *Prudential policies:* Since macroprudential policy relies on the use of microprudential tools, the framework must facilitate a very high level of coordination across agencies and provide adequate respect for their policy autonomy.

This framework provides for effective identification, analysis, and monitoring of systemic risk and timely and effective use of macroprudential policy tools, and it avoids coordination problems when addressing systemic risk to reduce gaps and overlaps (Figure 8.16).

Within their current arrangements, all ASEAN-5 countries have scope to close gaps in their macroprudential frameworks. Challenges and priorities ahead include the following:

- *Data and surveillance:* The surveillance of cross-border financial flows needs to be enhanced to derive a comprehensive picture of the deeper network of interconnections and spillovers across countries. Each country also needs to continue identifying and closing data gaps. In Indonesia, the general frame-

work that underpins information sharing between agencies is adequate, although there are some practical difficulties, particularly related to data collection and validation. In the Philippines, a financial stability coordination council was created in 2014 to address informational and regulatory gaps among the financial regulators. In Thailand, there is significant scope to gather and analyze granular data on balance sheet exposures and interconnectedness, as well as to develop macro stress-testing tools.

- *Policy tools:* Upgrading the macroprudential framework requires advancing the agenda on analytical frameworks for assessing systemic stability, developing new instruments, and advancing the work on interactions between macroprudential and other policy instruments. The authorities should select a set of macroprudential instruments that can help address the key potential sources and dimensions of systemic risk. Since the manifestations of systemic risk may be country specific, the set of desirable tools will vary from country to country. In general, ASEAN-5 countries have been prominent users of sectoral macroprudential tools, including for the housing sector. More recently, some countries (for example, Indonesia, Philippines, Thailand) have added capital surcharges for domestic systemically important banks to their toolkits. On the time dimension of systemic risk, many ASEAN-5 countries have implemented capital adequacy ratios in a countercyclical manner on a de facto basis (see Chapter 6). However, only Indonesia and Malaysia have rules-based countercyclical capital buffer requirements.
- *Communication:* Macroprudential policy cannot rely on rules but must be based on a continuous assessment of evolving risks (IMF 2014); therefore, ASEAN-5 authorities should communicate openly on macroprudential policy. Clear communication of policy intentions can improve transmission of macroprudential action, both when measures are taken and when they are relaxed. Communication can also promote public understanding of the need for macroprudential measures, counter biases in favor of inaction, and enhance legitimacy and accountability of macroprudential policy. Clear communication can be achieved by setting out and maintaining a policy strategy, periodically publishing risk assessments, and publishing the records of policy meetings.
- *Coordination:* Interagency coordination needs to be improved, and clarity about roles, responsibilities, and powers is key to ensuring effective and timely decisions. Since macroprudential policy relies on the use of microprudential tools, the framework must facilitate a very high level of coordination across agencies and provide adequate respect for each agency's policy autonomy.

Crisis Management

Contingency planning is a critical element of crisis preparedness that lays out responsibilities and implementation arrangements for early intervention and resolution measures. Advanced preparation covering the way in which difficult decisions will be made and coordinated among institutions if a broad-based financial crisis gets underway can help promote an effective response to a crisis.

Although early intervention is likely to restore financial soundness in most financial distress situations, there will be occasions when such intervention is not possible and some form of resolution will be required. The procedure for resolving banks must swiftly protect systemic functions and reassure depositors. Ordinary insolvency proceedings normally cannot guarantee this result, which is why most countries already have special administrative (out-of-court) procedures for handling bank resolution.

An effective resolution framework has clear mandates for resolution, provides independence and adequate legal protection for supervisors, and grants appropriate resolution powers to the resolution authority. The Key Attributes of Effective Resolution Regimes for Financial Institutions adopted by the Financial Stability Board is the new, nonbinding international standard. The attributes specify essential features that should be part of the resolution framework to make resolution feasible without severe systemic disruption and without exposing taxpayers to loss.

In all ASEAN-5 countries, there is scope for improving coordination mechanisms:

- In Indonesia, the responsibilities of each agency have been further clarified in the Prevention and Resolution of Financial System Crisis Law, enacted in 2016. However, the legal protection of staff and agencies involved in bank resolution could be strengthened.
- In Malaysia, the Deposit Insurance Corporation is the resolution authority for its member institutions, while the central bank is the resolution authority for other financial entities. The Deposit Insurance Corporation's resolution powers could be strengthened; it currently must seek High Court approval for some measures.
- In the Philippines, weaknesses in resolution-related legal powers and protection remain. For example, the central bank's authority to place a bank in receivership or suspend shareholder rights, even when a bank's failure is imminent, is very limited.
- In Singapore, crisis management and resolution agreements are generally strong, but could be further enhanced. The resolution regime does not accord any preference to deposit liabilities held at foreign branches of local banks, which could encourage ring-fencing measures in host jurisdictions and discourage cooperative approaches.
- In Thailand, although the central bank has de facto responsibility for bank resolution, much of the legal authority rests with the Cabinet. The Ministry of Finance is still in charge of granting, suspending, and revoking licenses; approving mergers and acquisitions; and liquidating problem assets.

Cryptocurrencies

Cryptocurrencies challenge the paradigm of state-supported fiat currencies and the dominant role that central banks and conventional financial institutions have played in the operation of the financial system (IMF 2016). They are issued

without the backing of a state and allow for direct peer-to-peer transactions and eliminate the need for central clearinghouses. They have the potential to deepen financial inclusion by offering secure and lower-cost payment options.

Cryptocurrencies also pose serious risks because they can facilitate money laundering, terrorism financing, tax evasion, and other illegal activities. They could eventually entail risks to financial stability if their use becomes widespread.

ASEAN-5 countries have adopted a variety of regulatory responses for dealing with cryptocurrencies:

- The central bank of Indonesia issued a statement in 2014 saying that Bitcoin and other virtual currencies are not legitimate payment instruments and may not be used for payment in Indonesia. That statement was affirmed in January 2018. The central bank prohibits all payment system operators and financial technology from processing transactions using virtual currencies.
- The central bank of Malaysia issued a statement in 2014 saying that although it did not recognize Bitcoin as legal tender, the central bank would not impose prudential or consumer conduct regulations on cryptocurrency exchangers. In December 2017, the central bank announced that cryptocurrency exchangers would be designated as reporting entities under anti–money laundering laws.
- The central bank of the Philippines adopted a cautious approach to cryptocurrencies. In June 2014, it released a warning regarding the proliferation of virtual currencies in the Philippines, citing that without authorities regulating these platforms, no institution could provide consumers protection and insurance in the event of financial losses. In February 2017, the central bank issued guidelines for cryptocurrency registration, operations management, and reporting requirements.
- The central bank of Singapore indicated that it would not regulate cryptocurrencies but plans to stay watchful of the risks posed by the technology. The emphasis is more on the risks associated with activities surrounding cryptocurrencies.
- The central bank of Thailand has repeatedly warned consumers and investors that cryptocurrencies are just electronic data with no intrinsic worth, whose value can vary rapidly based on market conditions. The central bank remains concerned about the general public's potential lack of understanding on the subject. From a legal standpoint, regulations in place do not explicitly address the use of digital currencies.

The international standard-setter in the area of anti–money laundering and combating the financing of terrorism (AML/CFT) is the Financial Action Task Force (FATF). In 2015, it adopted guidance for the application of the AML/CFT standard in the area of virtual currency. The FATF has issued specific guidance for countries to impose customer due diligence obligations and other AML/CFT preventive measures on virtual currency service providers (IMF 2017a).

CONCLUSION

Sustaining financial stability will require continuous efforts in ASEAN-5 countries. Financial systems are much more resilient today than during the Asian financial crisis. The global financial crisis and the taper tantrum in 2013 were two "stress tests" that were passed without much trouble. But financial systems should always aim to be ready for the next stress episode.

Credit growth in ASEAN-5 countries accelerated significantly after the global financial crisis. However, there is no clear evidence of credit booms in any of these countries. It should be underscored that not all credit booms end in financial crisis. Often credit booms emerge in the context of a financial deepening process. High interconnectivity within financial systems and between financial systems and the rest of the economy highlight how financial distress in one sector of the economy can spill over to other sectors. Closely monitoring financial links across sectors is essential to ring-fence the propagation of adverse shocks.

Policymakers should carefully monitor and contain the rapid growth of corporate leverage using a combination of macro- and microprudential policies. In particular, there is a need to guard against a buildup of leverage and accumulation of unhedged foreign currency liabilities, as well as to monitor corporate liquidity and debt maturity to ensure sound debt-servicing capacity. Where necessary, preemptive measures such as debt rescheduling, capital requirements, and non–core asset disposal should be undertaken, particularly for highly leveraged corporations with low interest coverage ratios.

Household debt is high in some ASEAN-5 countries, entailing both macroeconomic and financial stability risks. Those risks could be contained with demand-side measures (such as limits on debt-service-to-income and loan-to-value ratios) and supply-side measures (such as limits on banks' credit growth, loan contract restrictions, and loan loss provisions).

Because they can smooth credit cycles, macroprudential policies are a key pillar for containing the dangers of rapid credit growth. Financial system regulation and supervision and crisis management frameworks are other key pillars for resilience. The Basel III standards should be a benchmark that all countries aspire to meet. Similarly, the Key Attributes for Effective Resolution of Financial Institutions are the relevant metric for resolution frameworks. Regulatory frameworks for cryptocurrencies are still evolving, but they should balance containing risk against promoting innovation.

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CHAPTER 9

MACROECONOMIC POLICY SYNERGIES FOR SUSTAINED GROWTH

INTRODUCTION

Managing boom-and-bust cycles in the presence of global spillovers remains a key policy challenge for Association of Southeast Asian Nations–5 (ASEAN-5) authorities. Recessions that follow a bust can lead to both temporary and permanent output losses. Moreover, these losses are magnified in the presence of financial downturns. At the same time, setting the base for sustained growth not only increases economic opportunities in the longer term but also contributes to stability in the short term by reducing the burden from past debt accumulation and other financial risks.

Countercyclical monetary policy can play a key role in managing boom-and-bust cycles, but on its own its effectiveness can sometimes be diminished. For example, in low inflation–low natural rate environments, the zero lower bound on nominal interest rates can become binding, limiting monetary policy's ability to deliver on inflation targets. In addition, lack of synchrony between financial and real cycles can make it difficult to manage both cycles with a single instrument (the policy rate). Moreover, setting the basis for sustained growth frequently requires appropriately tailored structural policies that stimulate the main drivers of potential growth over the medium term. In this context, exploiting synergies between monetary, macroprudential, and fiscal policies can bring powerful benefits to managing business cycle fluctuations, preserving financial stability, and sustaining long-term growth.

Guarding both macroeconomic and financial stability usually requires gearing different policy tools toward different objectives: First, macro policies that are effective in managing the business cycle may not be as effective in managing the financial cycle. Second, the business and the financial cycles typically have different lengths and amplitudes, as documented in Chapter 6. Countries may find themselves experiencing a financial boom (bust) during a business cycle bust (boom). As a result, managing the business and financial cycles may require careful calibration of macro-stabilization policies along with macroprudential policies.

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Although monetary policy is tasked directly with price and output stability objectives, fiscal policy can also play a key role. Fiscal policy may be an effective tool for managing business cycles and supporting aggregate demand during a recession. Moreover, fiscal stimulus in the form of productive spending on physical and human capital can also support potential growth over the medium to long term, helping overcome some of the possible permanent losses following a recession. Well-designed fiscal policy is important for short-term growth as well as for long-term productivity.

This chapter elaborates on macroeconomic policy synergies for managing economic cycles and sustaining growth. In particular, it analyzes the scope for macroprudential and fiscal policy to aid in overcoming some of the challenges faced by monetary policy in ASEAN-5 economies in the current global environment. The chapter first documents the output costs of boom-and-bust cycles in ASEAN-5 countries. It then presents model-based simulations of the possible synergies between monetary policy and macroprudential policies in smoothing business and financial cycles. It continues with a focus on the interactions between monetary and fiscal policy as stabilization tools. The final section offers concluding remarks.

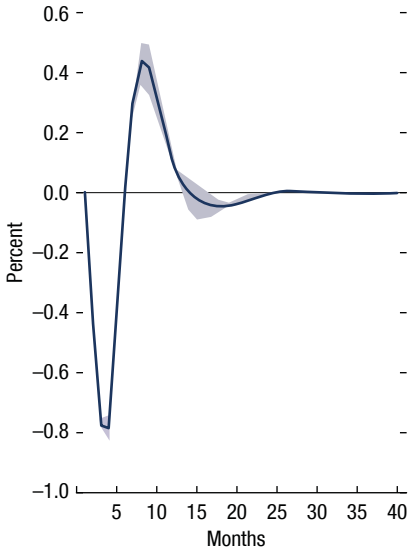
RECESSIONS AND OUTPUT LOSSES IN ASEAN-5 COUNTRIES

Crises and even recessions can lead to permanent output losses, according to the literature, especially when they accompany financial instability. Using a panel of 190 countries, Cerra and Saxena (2008) document the persistence of large output losses associated with financial (as well as political) crises. In addition, Cerra and Saxena (2017) find that all types of recessions, on average, lead to permanent output losses. These results contrast with the more traditional view that recessions have only a temporary impact on output, based on the view that output will return to its trend once full employment of resources is reestablished.

In line with the results from Cerra and Saxena (2008), novel estimates for ASEAN-5 economies presented in this chapter also suggest that, following a recession, growth has tended to rebound, but not strongly enough to fully restore output to its precrisis trend.[1] Figure 9.1 shows the impulse response of a "typical" ASEAN growth recovery following a recession. The results show that after about 6 months, growth bounces back, with positive growth for about nine quarters following an economic downturn. However, the response of real GDP growth implies that the growth bounce-back is not directly proportional to the output loss. Figure 9.2 illustrates the effect of the typical recession on real GDP. The

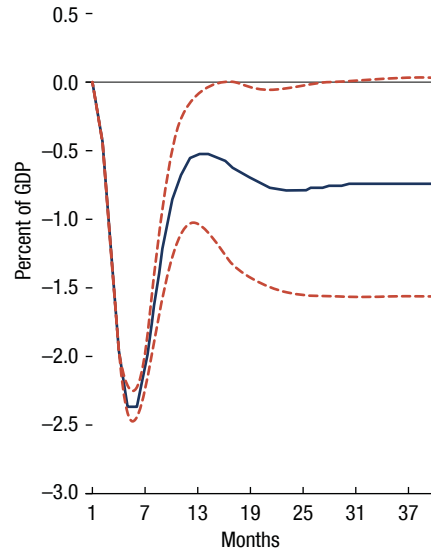
[1]Annex 9.1 presents vector autoregression estimates for ASEAN-5 countries for the period 1996–2017, using Pesaran's panel mean group estimator to generate the impulse response for a typical ASEAN country when hit by a recession.

Figure 9.1. Typical Response of ASEAN Real GDP Growth to a Recession, January 1996–January 2017



Source: IMF staff calculations.

Figure 9.2. Response of ASEAN-Level Real GDP



Source: IMF staff calculations.

estimates imply that recessions have tended, at least over the sample period in question (1996–2016), to have had hysteresis effects on the level of real GDP.[2]

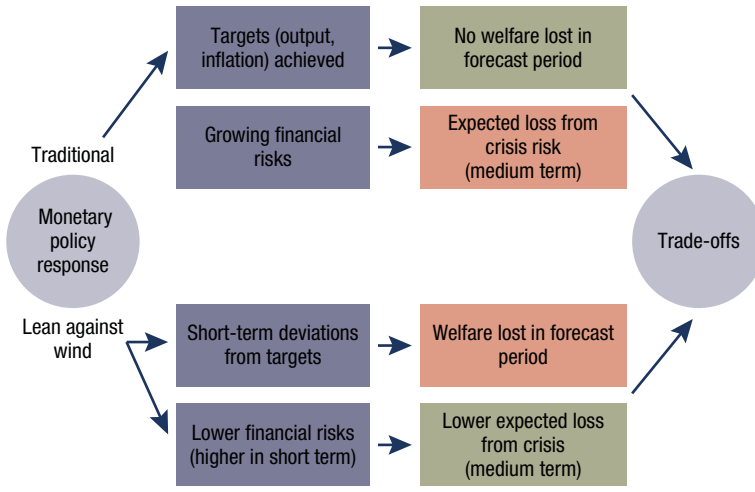
These findings reinforce the need for countercyclical fiscal and monetary policies to mitigate economic downturns or prevent them from having long-term adverse effects on economic growth.

SYNERGIES BETWEEN MONETARY AND MACROPRUDENTIAL POLICIES

The global financial crisis brought into greater focus both the need for macroeconomic policy to include financial stability among its objectives and the debate on whether financial stability should be a mandate of monetary policy. Although the crisis reinforced the importance of well-anchored inflation expectations and long-term price stability, it also challenged the notion that price stability is sufficient for macroeconomic stability. Confronted with a severe financial and economic crisis, central banks and researchers have been called to reconsider the role

[2]The Asian financial crisis of the late 1990s and the 2008–09 global financial crisis were certainly big shocks during the sample period, and the results likely reflect the impact of these two events to a large extent.

Figure 9.3. To Lean or Not to Lean, Such Are the Trade-Offs



Source: IMF 2015.

of financial sector and asset price imbalances in the design and implementation of monetary policy.[3]

Figure 9.3 illustrates the trade-offs involved when monetary policy is used for financial stability purposes and the circumstances that alleviate or augment them. Traditional monetary policy focuses on targeting inflation and output. In the absence of growing financial risks, this focus allows the authorities to pursue inflation and output targets in the medium term with no financial stability concerns. However, such policy could also lead to growing financial risk and expected losses from a crisis in the medium term, in which case a monetary policy that also targets financial stability by "leaning against the wind" could be beneficial. This result will depend on the effectiveness of the interest rate in lowering financial risks and the expected losses from a crisis in the medium term. This benefit would need to be compared with the cost from short-term deviations from inflation and output targets and the corresponding welfare losses over the forecast period.

Absent other tools, results from mainly closed-economy New Keynesian dynamic stochastic general equilibrium models support the case for leaning against the wind (Curdia and Woodford 2009; Woodford 2012; Ajello and others 2016). However, the implied deviations from more standard inflation-output gap decision rules are quantitatively small in these linear models (Gambacorta and

[3]There have been voices strongly advocating in favor (for example, Olsen 2015) and against (for example, Svensson 2014) such a role for monetary policy, while others portray a more balanced view (for example, Yellen 2014). Detailed discussions can be found in Smets (2014), Stein (2014), and Svensson (2014), among others.

Signoretti 2014; Filardo and Rungcharoenkitkul 2016). Moreover, the case for leaning against the wind is even weaker in small open economies, where the impact of such policy on international capital flows may exacerbate macroeconomic and financial stability concerns (Sahay and others 2014; Menna and Tobal 2017).

Macroprudential policy tools can help alleviate tensions between monetary and financial stability objectives.[4] First, divergences between monetary and financial stability mandates stem, to a large extent, from attempts to achieve two different objectives with a single policy instrument, the monetary policy rate. This is particularly relevant given that, as shown in Chapter 6, the real and financial cycles are not always synchronized. Using macroprudential tools to curb systemic risks may ease those tensions. Ghilardi and Peiris (2016), for example, show that monetary and macroprudential policy coordination can enhance the policy effectiveness in attenuating the real and financial cycles. Second, macroprudential policies can also be more effective than interest rate policy in dampening the financial cycle at a lower cost to output. Moreover, financial stability risks come in all shapes and forms. And while macroprudential tools can be customized to address specific risks, movements in the monetary policy rate would have a macroeconomic impact.

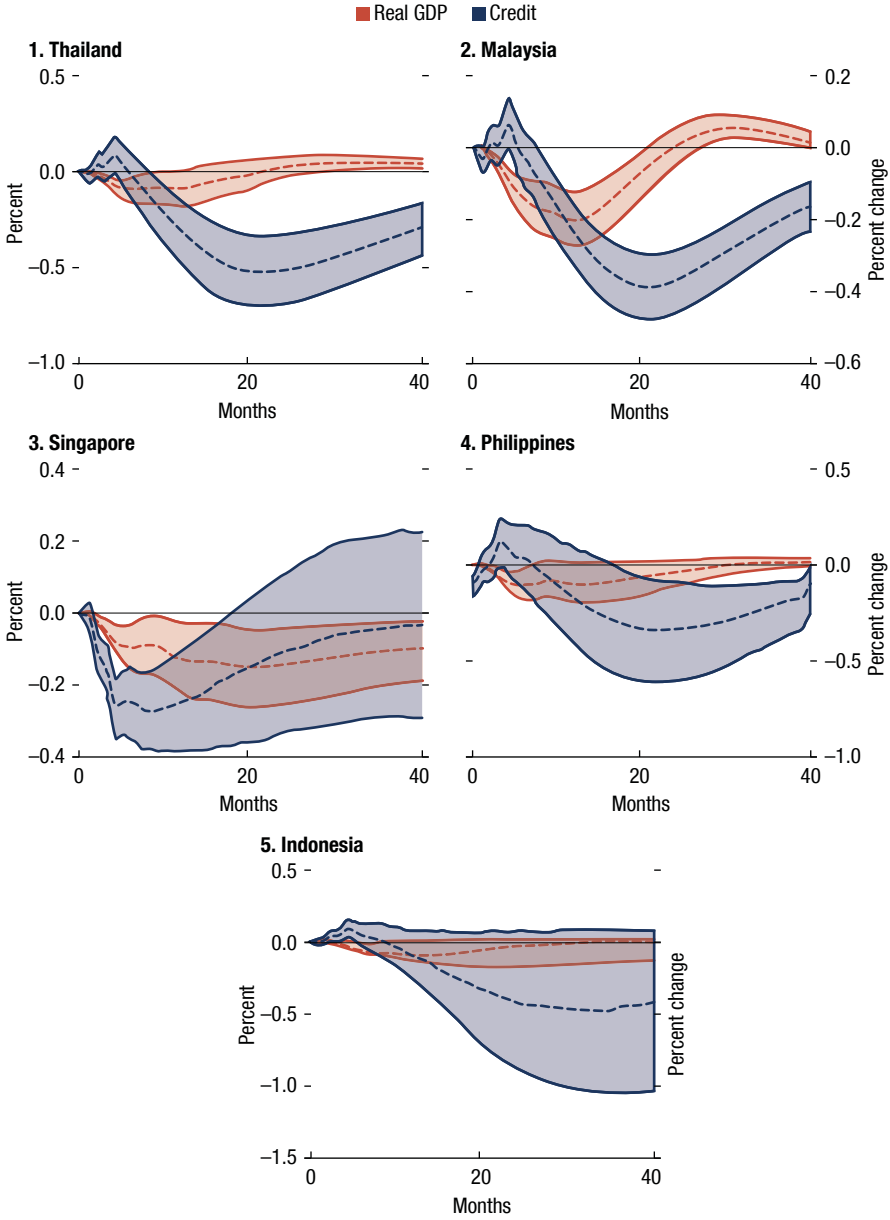
For the ASEAN-5, empirical estimates prepared in this chapter show that macroprudential policies have been effective in taming the financial cycle without significantly affecting the real business cycle. Using a Bayesian vector autoregression, Figure 9.4 (and Annex 9.2) presents the response of credit and output growth to a shock in the macroprudential policy stance in the ASEAN-5 economies. Results suggest that for several countries credit growth is significantly more sensitive to macroprudential policies than is real GDP growth, especially in Malaysia, the Philippines, and Thailand over the medium term.

Nevertheless, macroprudential tools remain relatively new and untested, and their implementation faces challenges. Macroprudential tools are prone to circumvention and political economy problems (IMF 2012) and may be difficult to adjust depending on institutional settings. Also, financial stability has multiple dimensions and many potential policy indicators and targets. Moreover, bubbles and the imminence of a systemic crisis are difficult to identify in real time, and policy needs to strike a balance between guarding against financial risks and allowing for healthy financial activity (IMF 2014a).[5] In sum, the effects of

[4]Macroprudential policy has been defined as "the use of primarily prudential tools to limit systemic risk, that is the risk of disruptions to the provision of financial services that is caused by an impairment of all or parts of the financial system, and can cause serious negative consequences for the real economy" (IMF 2014b). It includes a range of instruments, such as measures to address sector-specific risks (for example, loan-to-value and debt-to-income ratios), countercyclical capital requirements, dynamic provisions, reserve requirements, liquidity tools, and measures to affect foreign-currency-based or residency-based financial transactions.

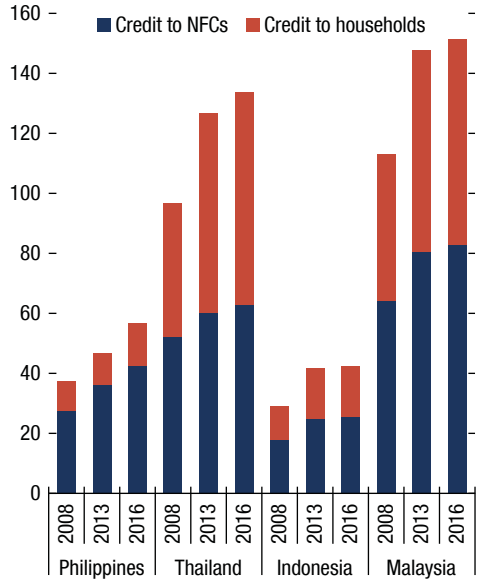
[5]Difficulties in identifying financial risks hinder the use of monetary policy to attenuate the financial cycle as well.

Figure 9.4. Median Response of Credit and Real GDP Growth to a Tightening in Macroprudential Policy



Source: IMF staff calculations.

Figure 9.5. Asia: Private Sector Debt
(Percent of GDP)



Sources: Bank for International Settlements; Dealogic; Haver Analytics; national authorities; and IMF staff calculations.
Note: NFCs = nonfinancial corporations.

macroprudential policies on financial markets and economic outcomes and the interactions with monetary policy need to be investigated further.

The rest of this section explores how synergies between monetary and macroprudential policies in the ASEAN-5 countries can achieve better macro outcomes. Model-based simulations for the Philippines and Thailand are presented to analyze whether the use of countercyclical macroprudential policies can complement the ability of monetary policy to target inflation while containing financial stability risks in the face of shocks. Then, outcomes for level and volatility of inflation, consumption, investment, and private credit are compared under the different monetary and macroprudential policy reaction functions.

The focus is on excessive leverage in the private sector as the key source of financial instability. Private sector debt has been increasing as a percentage of GDP among ASEAN-5 economies since the global financial crisis (Figure 9.5), and increasing evidence indicates that the buildup of private sector debt is harmful for growth. Schularick and Taylor (2012) show that credit growth is a powerful predictor of financial crises, and Jordà, Schularick, and Taylor (2013) show that more-credit-intensive expansions tend to be followed by deeper recessions (in financial crises or otherwise) and slower recoveries. The composition of private

TABLE 9.1.

GDP Growth Impact of Nonfinancial Private Debt in ASEAN-5 Economies

Variables	(1) GDP Growth over 3 Years	(2) GDP Growth over 3 Years ($t+1$)	(3) GDP Growth over 3 Years ($t+2$)	(4) GDP Growth over 3 Years ($t+3$)	(5) GDP Growth over 3 Years ($t+4$)	(6) GDP Growth over 3 Years ($t+5$)
Nonfinancial Private Debt (3-year change) ($t-1$)	−0.0624***	−0.0994***	−0.0948***	−0.0775***	−0.0514***	−0.0290**
	(0.0105)	(0.0104)	(0.0105)	(0.0107)	(0.0111)	(0.0113)
ASEAN-5-Specific Nonfinancial Private Debt (3-year change) ($t-1$)	0.0134	−0.0605**	−0.0629**	−0.0371	−0.0139	−0.00867
	(0.0271)	(0.0265)	(0.0267)	(0.0272)	(0.0276)	(0.0277)
Constant	10.55***	10.73***	10.65***	10.47***	10.24***	9.996***
	(0.159)	(0.157)	(0.159)	(0.162)	(0.167)	(0.170)
Observations	1,744	1,700	1,655	1,610	1,565	1,519
R^2	0.021	0.055	0.051	0.033	0.014	0.005
Number of Countries	47	47	47	47	47	47
Country Fixed Effects	YES	YES	YES	YES	YES	YES

Source: IMF staff calculations.

Note: This table shows regressions of GDP growth at t, $t+1$, . . ., $t+5$ on total nonfinancial private debt. Nonfinancial private debt coefficients show the average impact of private debt in the whole pool of countries (excluding ASEAN-5). ASEAN-5–specific debt coefficients show the impact of debt on GDP growth in ASEAN-5 countries alone. As in the rest of the pool, nonfinancial private sector debt in ASEAN-5 countries has a negative impact on growth throughout the short and medium term, but is statistically significant only two and three years ahead. Standard errors are in parentheses. ASEAN-5 = Indonesia, Malaysia, Philippines, Singapore, Thailand.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

sector debt also matters. For example, Mian, Sufi, and Verner (2017) and IMF (2017) show that increases in household debt can accelerate growth in the short term but can then have significant negative effects over the medium term, thereby producing a boom-bust cycle. They also show that corporate debt has a negative impact on growth in the short term but not in the medium to long term.

Regression analysis for the ASEAN-5 economies indicates that private debt accumulation has a negative impact on growth. Table 9.1 shows that after two and three years of private debt accumulation, growth in ASEAN-5 economies tends to decline by about 0.06 percentage point for every 1 percent of GDP increase in debt. These estimates are statistically significant for the second and third year following the debt buildup. Although the impact is significant, it is smaller than the average impact obtained for the rest of countries in the sample (a pool of 42 countries comprising advanced and emerging markets—see Annex 9.3 for more details).

Table 9.2 disaggregates the impact of household debt from that of nonfinancial corporate private credit. Within the ASEAN-5, the results are based on data for Thailand and Singapore, the only two countries with household and corporate debt data going back to the Asian financial crisis. In line with Mian, Sufi, and Verner (2017), the results indicate that household debt has a positive impact on growth in the short term but a negative impact in the medium term for the pool of countries as a whole and also for Thailand and Singapore alone. With respect to nonfinancial corporate debt, results for Singapore and Thailand indicate a

TABLE 9.2.

GDP Growth Impact of Debt in Thailand and Singapore versus Other Countries

Variables	(1) GDP Growth over 3 Years	(2) GDP Growth over 3 Years ($t+1$)	(3) GDP Growth over 3 Years ($t+2$)	(4) GDP Growth over 3 Years ($t+3$)	(5) GDP Growth over 3 Years ($t+4$)	(6) GDP Growth over 3 Years ($t+5$)
Household Debt (3-year change) ($t-1$)	0.0481	−0.0497	−0.216***	−0.361***	−0.425***	−0.394***
	(0.0332)	(0.0343)	(0.0357)	(0.0372)	(0.0395)	(0.0409)
Thailand- or Singapore-Specific Household Debt (3-year change)	0.457**	0.358*	0.0446	−0.481**	−0.559***	−0.294
	(0.195)	(0.199)	(0.201)	(0.203)	(0.211)	(0.232)
Corporate Debt (3-year change) ($t-1$)	−0.0857***	−0.109***	−0.0700***	−0.0235*	0.0139	0.0396***
	(0.0141)	(0.0138)	(0.0139)	(0.0139)	(0.0142)	(0.0143)
Thailand- or Singapore-Specific Corporate Debt (3-year change) ($t-1$)	−0.295***	−0.348***	−0.239***	−0.0151	0.0630	0.0206
	(0.0841)	(0.0876)	(0.0905)	(0.0907)	(0.0915)	(0.0972)
Constant	8.906***	9.195***	9.604***	9.991***	10.11***	9.769***
	(0.211)	(0.213)	(0.221)	(0.230)	(0.242)	(0.250)
Observations	1,111	1,064	1,017	970	923	876
R^2	0.045	0.087	0.094	0.122	0.130	0.105
Number of Countries	47	47	47	47	47	45
Country Fixed Effects	YES	YES	YES	YES	YES	YES

Source: IMF staff calculations.

Note: This table shows regressions of GDP growth at t, $t+1$, . . ., $t+5$ on household and corporate debt. Household and corporate debt coefficients show the average impact of household and corporate debt in the whole pool of countries (excluding Singapore and Thailand). Thailand- or Singapore-specific debt coefficients show the impact of debt on GDP growth in Thailand and Singapore alone. As in other countries, household debt in Thailand and Singapore has a negative impact on growth over the medium term (four and five years ahead). The impact in the short term is positive. As in other countries, private corporate debt in Thailand and Singapore has a statistically significant negative impact on GDP growth in the short term but not in the medium term. The average results for all countries are in line with those presented in Mian, Sufi, and Verner 2017. Standard errors are in parentheses.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

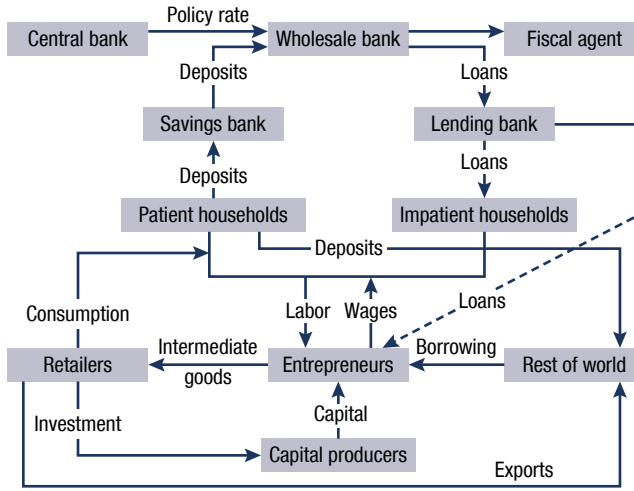
negative impact on growth in the shorter term (one or two years ahead) that is stronger than the average impact for the other countries in the sample.

Model Description

The framework of Anand, Delloro, and Peiris (2014) is extended to incorporate a household borrowing, housing and macroprudential policies. It is based on a New Keynesian dynamic stochastic general equilibrium model for small open economies with price rigidities and financial friction. Figure 9.6 depicts the relationships between agents in this economy.

- There are two types of households, patient (with a lower intertemporal discount rate) and impatient, which both derive utility from consumption, leisure, and housing. In equilibrium, the patient households save part of their income, which is invested in domestic bank deposits and foreign bonds. Impatient households end up borrowing to consume and purchase houses.
- Entrepreneurs borrow from domestic banks and from abroad to purchase capital. They also hire labor and produce goods that are then sold to retailers

Figure 9.6. Structure of the DSGE Model



Source: IMF staff.
Note: DSGE = dynamic stochastic general equilibrium.

who subsequently sell to consumers, capital producers, and foreign markets in a monopolistically competitive environment.

- Banks can lend to the government, entrepreneurs, or households. Interest rates are sticky because banks face increasing marginal costs associated with changes in interest rates. At the same time, bank borrowing is subject to macroprudential measures.

Government policies are described by two policy reaction functions: one for the monetary policy interest rate that follows a Taylor rule and one for macroprudential policy measures. The simulations look at two different macroprudential tools. In Thailand, with a high household-debt-to-GDP ratio, the focus is on the impact of a countercyclical loan-to-value ceiling that restricts lending to households to a certain proportion of the value of their houses. In the Philippines, where more concern is placed on rapid bank credit growth and rising corporate debt, the focus is on the impact of a countercyclical capital adequacy ratio (or countercyclical capital buffer, an extension of the Basel III capital conservation buffer), which restricts overall bank borrowing.

Simulations for Thailand: Adding a Countercyclical Loan-to-Value Ratio

For Thailand, the model is calibrated to assess the impact of a temporary positive shock on the demand for housing. The starting conditions mirror the current juncture: inflation is below target and there is a small negative output gap, but

household debt and house prices are relatively high. In this context, lowering the monetary policy rate to improve the inflation and growth outlook could fuel further imbalances in the housing sector. In turn, further accumulation of household debt could produce a negative feedback loop on growth.

The response of the economy to this shock is examined under two variants of the Taylor rule and two variants of the macroprudential policy rule. The two variants of the Taylor rule are as follows:

1. Standard Taylor rule—focused on inflation and output gaps

$$i = \alpha_1 \cdot \textit{inflation gap} + \alpha_2 \cdot \textit{output gap}, \tag{9.1}$$

in which i is the policy interest rate, *inflation gap* is the difference between actual inflation and the target, and *output gap* is the difference between actual and potential output.

2. Modified Taylor rule—focused on inflation, output, and credit gaps

$$i = \alpha_1 \cdot \textit{inflation gap} + \alpha_2 \cdot \textit{output gap} + \alpha_3 \cdot \textit{credit gap}, \tag{9.2}$$

in which *credit gap* is the difference between the actual stock of household credit and the steady-state level.

The two variants for the macroprudential policy measure are as follows:

1. Constant macroprudential policy measures: The loan-to-value ceiling applied to household credit and the minimum capital adequacy ratio applied to bank credit are kept constant.
2. Countercyclical loan-to-value ratios: The loan-to-value ceiling applied to household credit decreases as the stock of household loans increases relative to the steady-state value.

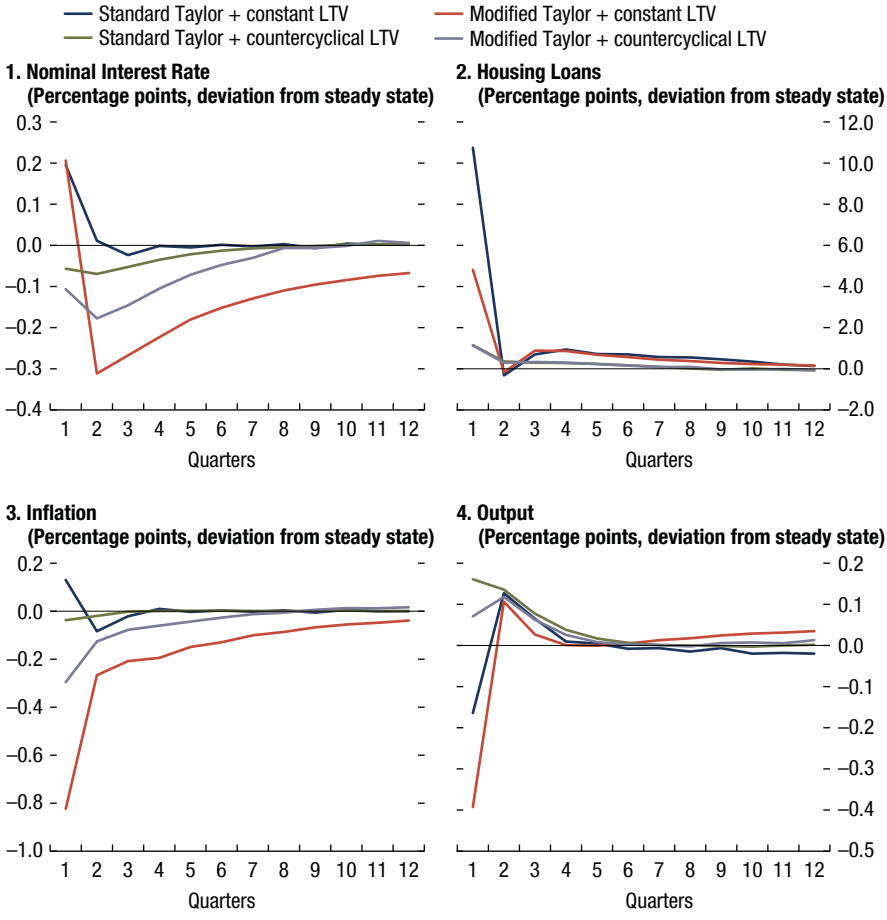
These variants in policy functions yield four possible scenarios:

1. Standard Taylor rule + constant macroprudential measures
2. Modified Taylor rule + constant macroprudential measure
3. Standard Taylor rule + countercyclical macroprudential measure
4. Modified Taylor rule + countercyclical macroprudential measure

In the simulations the authorities can use monetary policy, macroprudential policy, or both to respond to the impact of the housing demand shock. The policy reaction functions follow the four possible scenarios described above. A first set of results compares outcomes when monetary policy is the only instrument available for tackling both macroeconomic and financial imbalances. Macroprudential policy is passive with a constant loan-to-value ratio that does not react to signals of growing financial imbalance in the housing sector.

- In scenario 1 (dark blue line, Figure 9.7), with monetary policy following a standard Taylor rule and a constant loan-to-value ratio, a positive shock to the demand for housing leads to an increase in house prices and in the level for housing loans in the economy. Inflation increases and output falls slightly on impact, but then they converge to the steady state on a cyclical path.

Figure 9.7. Response to Positive Shock on Demand for Housing



Source: IMF staff simulations.
Note: LTV = loan to value.

The authorities respond with an initial increase in the nominal and real policy rates, then reduce them in subsequent quarters.

- In scenario 2 (red line, Figure 9.7), where the authorities are concerned about a buildup in household loans, but use interest rates as the single instrument (modified Taylor rule and constant loan-to-value scenario), the increase in household loans is significantly mitigated, while output and inflation drop. Interestingly, the paths of the nominal interest rates are below those under scenario 1. The threat of an increase in the real rate in response to higher housing loans reduces the equilibrium demand for housing loans and goods. This actually preempts the need for nominal and real rates to be raised above those in scenario 1, except on impact, when the real rate is now higher.

These two scenarios illustrate the trade-off faced by the authorities when trying to target both household debt and inflation using the policy interest rate as the only instrument. When the cycles for household debt and inflation are not synchronized, achieving the inflation target requires letting go of the household debt target. Conversely, moderating the household debt increase requires letting go of the inflation target. Moreover, incorporating household debt concerns in the Taylor rule leads to even lower nominal rates over the medium term, thereby increasing the likelihood of hitting the zero lower bound given the current low-interest-rate environment.

A second set of results looks at the benefits of introducing a countercyclical loan-to-value ratio into the authorities' toolbox.

- In scenario 3 (green line, Figure 9.7), with a standard Taylor rule and a countercyclical loan-to-value ratio, the loan-to-value ceiling is tightened in response to an increase in household debt, and the impact of the housing demand shock on household debt is mitigated. In turn, interest rate policy remains focused on inflation and output, delivering on macroeconomic stability. Some downward adjustment in nominal rates takes place, but much less than in scenario 2.
- In scenario 4 (light blue line, Figure 9.7), with a modified Taylor rule and a countercyclical loan-to-value ratio, the imbalance in the housing sector is addressed, but inflation and output are still lower than in scenario 3.

Considering all scenarios together, results suggest that the separation principle holds. Better outcomes in growth, inflation, and financial stability can be achieved with monetary policy focused on its traditional targets of inflation and output and macroprudential policy targeting the specific source of financial instability. Asking monetary policy to do too much (that is, to also target financial stability) comes at the cost of suboptimal inflation and growth. Moreover, in a low inflation–low interest rate environment, it may increase the risk of hitting the zero lower bound.

Critical in these results is that both interest rate and macroprudential policies are effective in achieving their respective targets. In this model, macroprudential policy does not suffer from leakages, and interest rate policy transmission operates smoothly. Also, countercyclical loan-to-value ratios and interest rates under the modified Taylor rule are assumed to react immediately and strongly to dynamics in household loans. Implementation lags or weaker transmission in either macroprudential or monetary policy could potentially affect the conclusion on the size of the gains from the separation principle or even its superiority.[6] For example, alternative simulations[7] in which the interest rate

[6]For example, in Thailand, nonbank financial institutions play a significant role in household credit, and the reach of macroprudential instruments is more limited in this sector. In addition, the supervision of banks and nonbanks is carried out by different institutions, which could present coordination challenges when implementing a countercyclical macroprudential policy.

[7]Available on request from the authors.

transmission mechanism is diminished by a flatter Phillips curve (one in which the impact of the output gap on inflation is much lower) yield smaller trade-offs between scenarios 1 and 2.[8] As a result, it is still optimal to use macroprudential policy to contain housing credit growth while focusing the policy rate only on inflation and output gaps, but the gains are smaller. Other simulations also show that, in cases in which the ability to adjust macroprudential tools is very limited or the macroprudential tools applied are too blunt and affect credit well beyond vulnerable sectors, the separation principle is sometimes an inferior option.

An Application to the Philippines: A Countercyclical Capital Buffer

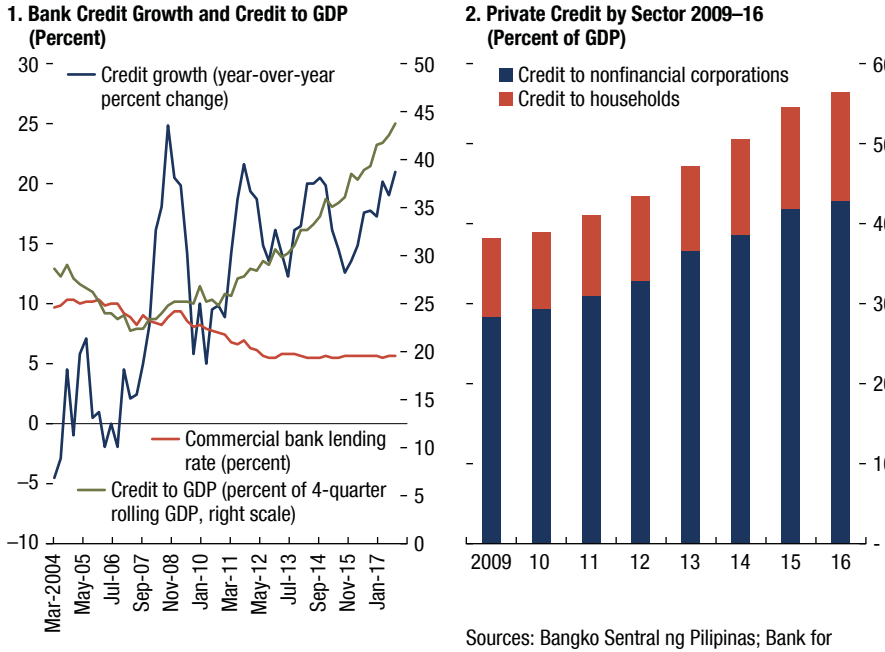
In the Philippines, the model is first calibrated to assess the impact of a negative interest rate shock. Historic low real interest rates since the global financial crisis have fueled rapid bank credit growth, raising financial stability risks. Household debt is relatively low compared with corporate debt, and bank credit is concentrated in lending to businesses, particularly large conglomerates (Figure 9.8). External borrowing by businesses has also risen since the global financial crisis and, as a result, the corporate sector in the Philippines is also exposed to global financing conditions. Hence, a key policy challenge is managing rising bank credit and corporate leverage while sustaining robust growth momentum.

The simulations focus on the synergies between monetary policy and a countercyclical macroprudential tool, in particular, a countercyclical capital buffer, in response to a decline in interest rates. Such a buffer could potentially help mitigate a credit boom in a very-low-interest-rate environment such as that of the Philippines over the past decade or so. Exploiting synergies between monetary and macroprudential policies may also help insulate the economy from global financial volatility that would raise the external financing premium.

Figure 9.9 presents the response to a negative shock to the domestic interest rate under different macroprudential policy reaction functions. Scenario 1 (blue line) plots the results from a standard Taylor rule for the policy rate (similar to that specified for Thailand) with a constant capital ratio, while scenario 2 (red line) plots the results from a standard Taylor rule with a countercyclical capital buffer. The use of a countercyclical buffer yields better results; that is, it tempers the rise in bank credit and real estate prices by mandating that banks hold more capital, thereby discouraging a reduction in the lending rate. Consumption does not rise as much as in scenario 1, so there is a welfare cost, but consumption is still higher than it was before the shock. In summary, the countercyclical buffer

[8]In this case, the increase in household credit in response to the positive housing demand shock would be smaller under scenario 1, but the drop in inflation and output when leaning against the wind (scenario 2) would also be smaller.

Figure 9.8. Private Credit



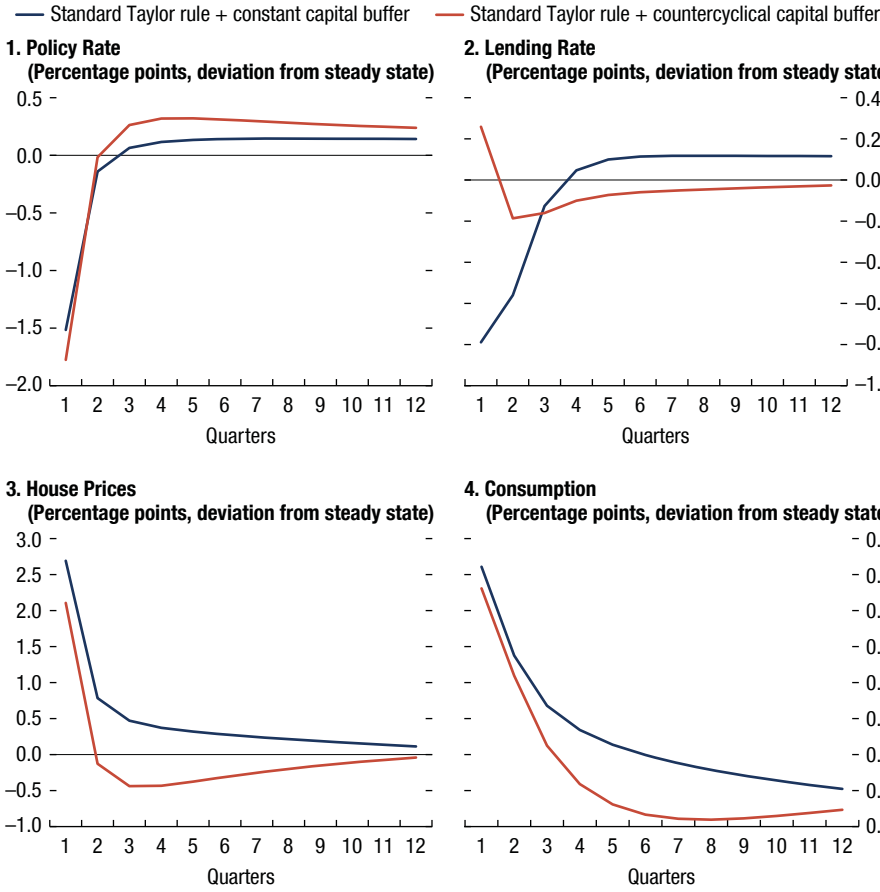
Sources: CEIC; and IMF staff estimates.

Sources: Bangko Sentral ng Pilipinas; Bank for International Settlements; Dealogic; and IMF staff calculations.

in response to a negative interest rate shock mitigates a generalized credit and asset price boom while allowing the economy to benefit from the lower borrowing costs.

The use of countercyclical capital buffers to mitigate the procyclicality of the financial system can help reduce systemic risks and macroeconomic volatility, but may not be optimal in response to all types of shocks (see IMF 2009). A second simulation for the Philippines looks at the response to a productivity shock that is welfare enhancing. In this case, the use of a countercyclical capital buffer would result in lower investment and potential growth compared with a policy framework that relies only on interest rate policy. Under a technology or productivity shock, reducing the procyclicality of the financial system would result in a real cost (Figure 9.10, red line). The policy trade-offs would depend partly on whether the economy is more frequently and severely affected by productivity shocks as opposed to financial shocks. The conventional view that financial shocks tend to dominate over productivity shocks in emerging markets provides a rationale for considering the use of countercyclical capital buffers, a macroprudential tool still absent from the toolkit in ASEAN-5 countries.

Figure 9.9. Response to a Negative Domestic Policy Rate Shock

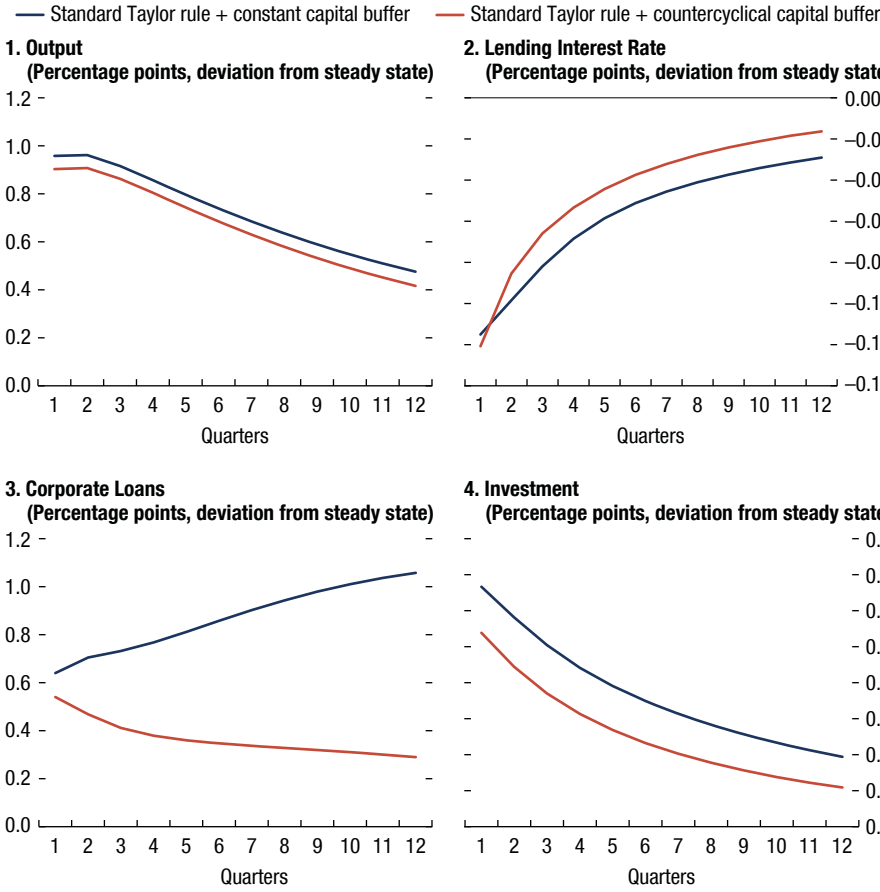


Source: Author simulations.

SYNERGIES BETWEEN MONETARY AND FISCAL POLICY

As discussed in the previous section, low interest rates since the global financial crisis have spawned challenges for monetary policy and financial stability in the ASEAN-5 economies. Historically low global interest rates have spilled over to domestic interest rates (see Chapter 4). In some countries, the resulting easy financing conditions have amplified domestic financial cycles, resulting in elevated household debt, corporate debt, or both, even when inflation pressure has remained subdued (Chapter 7). Diverging business and financial cycles have put to the test the calibration of monetary policy and possible synergies with macroprudential policies.

Figure 9.10. Response to a Positive Technology Shock



Source: Author simulations.

Yet the same environment that has put monetary policy to the test has likely made fiscal policy all the more powerful as a tool for stabilizing the business cycle. In countries with economic slack and low inflation, fiscal stimulus can stimulate aggregate demand, reducing the burden on countercyclical monetary policy and any potential trade-offs with financial stability. In contrast, in countries with robust growth and inflation, fiscal stimulus and the spur to domestic demand may need to be compensated for by monetary policy tightening. In this case, fiscal and monetary policy may work at cross-purposes rather than in sync.

The use of fiscal policy to stabilize the cycle, however, is not free of challenges. Changes in fiscal policy frequently require legislative changes and are often opposed by well-organized groups whose interests would be harmed. Even if such

changes are approved, implementation is often cumbersome and subject to delays. These hurdles help explain why fiscal policy in most emerging markets has been found to be procyclical over the past few decades (Ilzetzki and Vegh 2008). Coordination with monetary authorities can also be challenging, given the importance of a central bank that is independent and that is regarded as such.

This section looks at the conditions under which exploiting synergies between monetary and fiscal policies may improve macroeconomic outcomes. In particular, it analyzes the impact of fiscal stimulus from public investment in infrastructure under different reactions of monetary policy as well as different government financing strategies. Although development needs vary across ASEAN-5 countries, many face common challenges from infrastructure gaps. There is scope to increase the quality of infrastructure to catch up with regional leaders such as Singapore (Figure 9.11). Better infrastructure could also help increase total factor productivity where there is currently a significant gap with respect to advanced economies (Figure 9.12).

Model Description

The simulations are based on the APDMOD, a module of the IMF's Flexible System of Global Models.[9] This is a semistructural model of the global economy, with individual blocks for 16 Asian countries and 8 additional regions to represent the rest of the world. The model has a rich fiscal sector with seven possible instruments, including spending on consumption, infrastructure, or transfers; lump sum taxation on households; and distortionary taxation on consumption, labor, and capital. Only some households hold debt as a source of wealth, which allows them to smooth consumption in the face of shocks or policy changes. Other households cannot save effectively and live off only their current income. These non-Ricardian properties allow fiscal policy to have a powerful role in the long term, not just the short term. Monetary policy is assumed to follow an inflation-targeting regime. With its rich fiscal sector, this model is well suited to simulate the impact of different fiscal policies under different financing scenarios.[10]

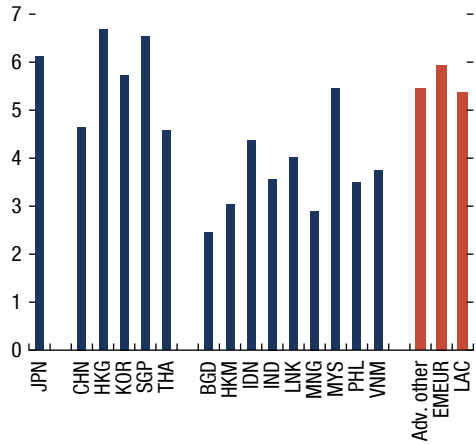
Simulations

This first set of results illustrates an expansion of 1 percent of GDP in infrastructure investment every year over a period of five years for all ASEAN-5 countries. All of the infrastructure push is implemented through traditional public investment financed by lower government transfers to households in a budget-neutral

[9]See Andrle and others (2015) for a detailed description and Corbacho and others (forthcoming) for a recent application to Asian economies.

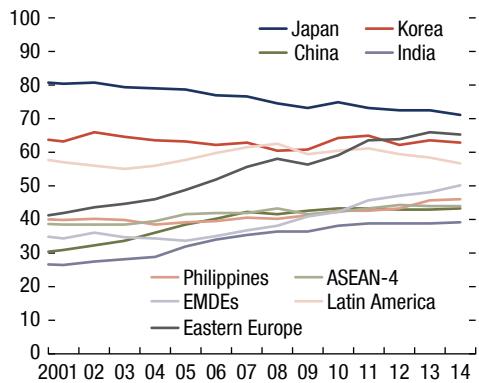
[10]Its results, however, are not directly comparable with those obtained in the previous section, where the model used had a more sophisticated financial sector (but a very simple fiscal sector) and where policies simulated included a monetary and macroprudential policy component but no fiscal component.

Figure 9.11. Indicator of Quality of Infrastructure
(Index, 1–7; 7 = best)



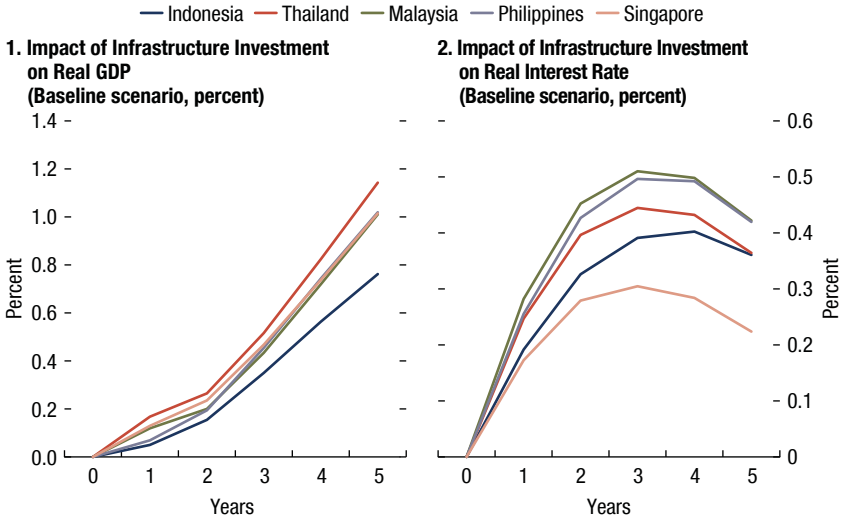
Sources: IMF, World Economic Outlook database; World Economic Forum; and IMF staff calculations.
Note: Figure uses International Organization for Standardization country codes. EMEUR = emerging Europe; LAC = Latin America and the Caribbean.

Figure 9.12. Total Factor Productivity
(At current PPP; United States = 1)



Sources: Penn World Table 9.0; and IMF staff calculations.
Note: All TFP is weighted by PPP. EMDEs include Bangladesh, Bhutan, Cambodia, Fiji, Lao P.D.R., Myanmar, Nepal, Sri Lanka, and Vietnam. EMDEs = emerging market and developing economies; PPP = purchasing power parity; TFP = total factor productivity.

Figure 9.13. Impact of Infrastructure Investment on ASEAN-5 Countries



Source: IMF staff calculations.

manner. In turn, monetary policy follows a standard Taylor rule, with the interest rate path set to close inflation and output gaps over the forecast horizon.

The simulations show that the total 5 percentage point increase in infrastructure investment leads to an increase in real GDP within the range of 0.8–1.2 percentage points in ASEAN-5 countries over five years (Figure 9.13, panel 1), with growth increasing by 0.16–0.24 percentage point a year, on average. Infrastructure investment raises growth in the short term, but it also has a lasting impact on growth through higher productivity. In these baseline simulations, the impact of additional infrastructure spending on growth is partly dampened by two factors: (1) the reaction of monetary policy, with an increase in real interest rates of up to 0.3–0.5 basis point at their maximum (Figure 9.13, panel 2); and (2) budget-neutral financing through lower transfers. Both factors crowd out private domestic demand, and the resulting impact of fiscal stimulus on inflation is relatively small.

However, a legacy of the global financial crisis has been subdued inflation pressure on a global scale, which has affected some ASEAN-5 countries in a significant way (see Chapter 7). In countries facing persistently low inflation, central banks have plenty of room for inflation to rise before breaching their targets. These central banks could follow a policy of monetary accommodation in the short term, which would lead to real interest rates noticeably lower than those that would prevail if monetary policy worked to offset the inflationary impact of the fiscal stimulus. Such a strategy could be justified to prevent a low-growth, low-inflation trap and mitigate the risks of hitting the zero lower bound. The

combination of fiscal and monetary stimulus would allow inflation to converge to target from above (that is, some temporary overshooting),[11] and the impact on real activity would be larger. Moreover, the longer the period of monetary accommodation, the greater the gain from fiscal stimulus because the private sector would expect inflation to be more responsive, further reducing the real interest rate.

A second set of results illustrates the payoff from exploiting synergies between fiscal and monetary policy in a low-inflation, low-interest-rate environment. Figure 9.14 shows simulations calibrated for Singapore and Thailand. Consider first the baseline scenario with the infrastructure push financed through lower general transfers and monetary policy working to offset the inflationary impact (Figure 9.14, blue line). If the central bank instead chose to accommodate the stimulus over the five years, there would be a significant increase in the fiscal multiplier. Over a five-year horizon, the impact on real GDP more than doubles to 2.4–2.6 percentage points with monetary accommodation, while prices increase by about 1.5 percentage points in cumulative terms (Figure 9.14, red line).

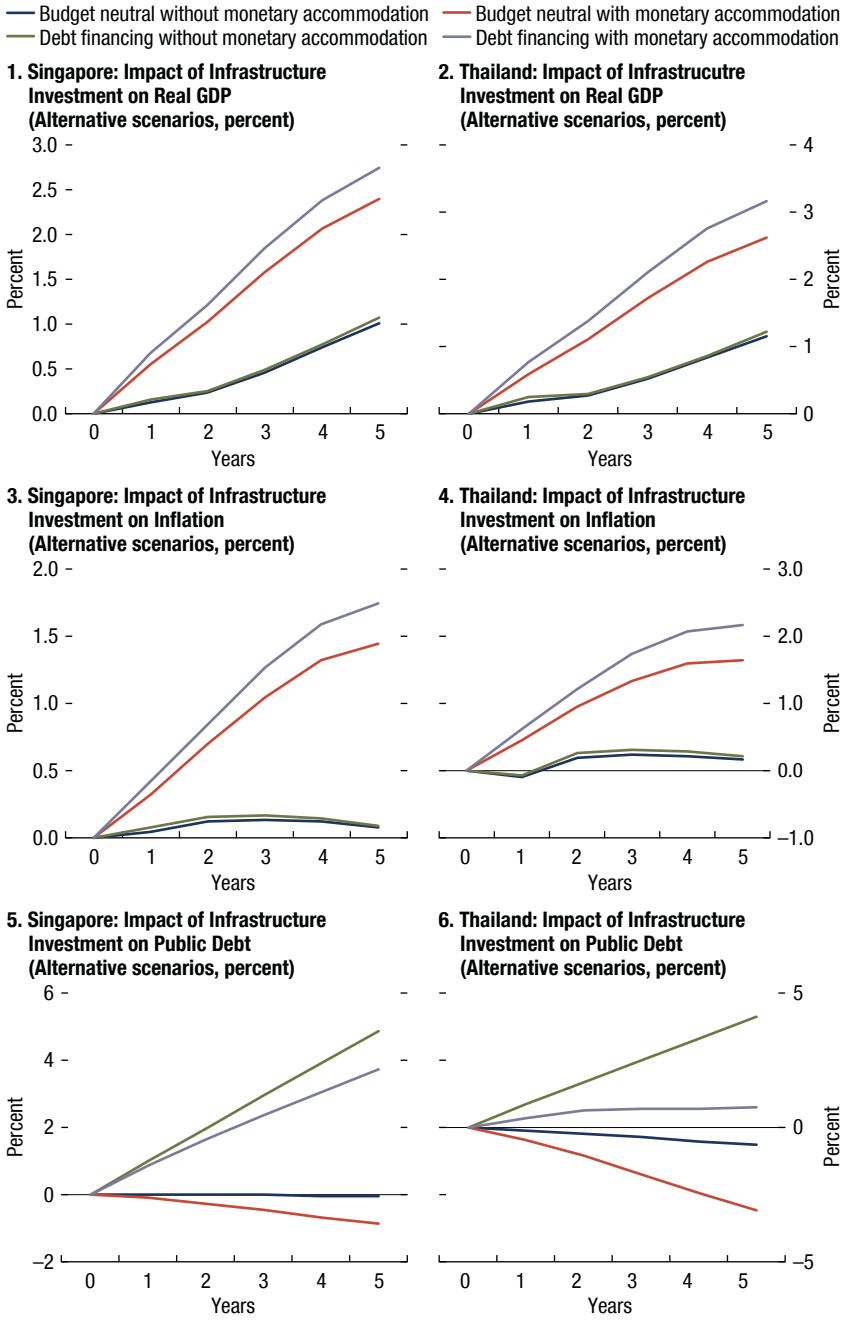
Yet fiscal policy can still do more. Low interest rates also imply cheap financing costs for the government. If the government were to use debt financing rather than a budget-neutral strategy, the size of the multiplier would increase further. Monetary accommodation with debt financing (Figure 9.14, light blue line) leads to an additional 0.5 percentage point increase in real GDP and a 0.4 percentage point increase in prices over a five-year period. Real GDP and growth increase for two reasons: first, there is no cut in transfers to households, and second, the real interest rate is lower. Both factors provide greater support to private domestic demand, amplifying the initial impact of fiscal stimulus on growth and inflation.

Through their positive impact on nominal GDP, over the short and medium term joint public investment and monetary accommodation policies can also help preserve fiscal space. Financing the scaled-up investment with debt and without monetary accommodation (Figure 9.14, green line) leads to a significant increase in the debt-to-GDP ratio (about 5 percentage points in Singapore and 4 percentage points in Thailand) as the fiscal primary deficit increases. In contrast, in Thailand, allowing for monetary accommodation significantly reduces the debt buildup to less than 1 percent of GDP because the growth-adjusted real interest rate that applies to its old debt stock drops significantly. In Singapore, the impact of lower real interest rates on debt accumulation is negligible given that its initial stock of net debt is close to zero. A case can be made for debt financing in countries with low inflation and low interest rates, as long as the medium-term debt profile remains sustainable and the sovereign risk premium is contained.

For countries where monetary accommodation and debt financing are not appropriate, increasing the efficiency of public investment would be a way to raise

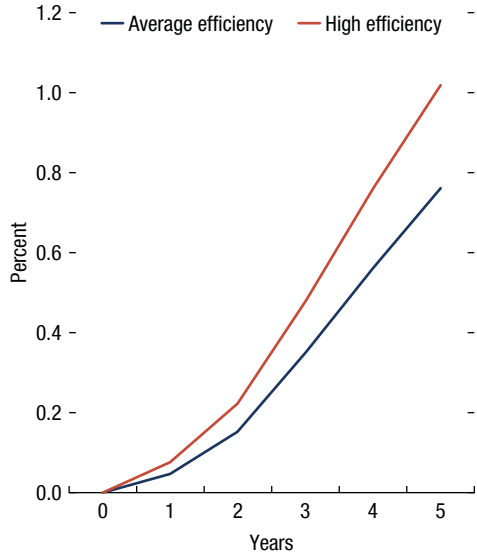
[11]Similar results can be obtained under a scenario in which monetary policy, rather than a standard linear Taylor rule, follows a policy reaction function that minimizes a quadratic loss function of inflation and output gaps.

Figure 9.14. Impact of Infrastructure Investment under Alternative Scenarios



Source: IMF staff calculations.

Figure 9.15. Indonesia: Impact of High-Efficiency Infrastructure Investment on Real GDP



Source: IMF staff calculations.

the multiplier. Figure 9.15 shows the impact of high-efficiency investment in Indonesia, a country with more limited fiscal space and inflation currently within the target range. A budget-neutral scale-up in investment, with no monetary accommodation, would allow for nearly 0.8 percentage point in additional real GDP over five years at the current average investment efficiency level. In contrast, new investment with efficiency levels comparable to those of Singapore (a country at the investment efficiency frontier within the region) would raise the impact on real GDP by another 0.2 percentage point.

CONCLUSION

Exploiting synergies between monetary, macroprudential, and fiscal policies can be beneficial for guarding the economy against fluctuations along the real and financial cycles. Recessions have been seen to have permanent impacts on GDP, including in the ASEAN-5, and both household and corporate debt accumulation could have a significantly negative impact on growth a few years down the road. At the same time, the business and financial cycles have different amplitudes and durations in ASEAN-5 countries (just as in many other countries); therefore, a single policy instrument is insufficient for smoothing out both cycles.

In this context, macroprudential policies can play an important role in complementing countercyclical monetary policy. Model simulations show that a strategy based on countercyclical loan-to-value ratios and a Taylor rule focused on price and output stability yields better results than a lean-against-the-wind monetary policy rule when there is a shock to the demand for housing. This result is robust to a relative flattening in the Philips curve. Countercyclical capital buffers could also help mitigate the procyclicality of the financial system and reduce systemic risks with minimal real costs in response to a wide array of shocks.

Fiscal policy can complement monetary policy in smoothing out the cycle while supporting medium- and long-term growth. Infrastructure investment can lead to significant increases in real GDP. When coupled with monetary accommodation, the investment multiplier doubles. When financed through debt and coupled with monetary accommodation, the investment multiplier can even triple. These policy options are particularly attractive for countries with persistently low inflation. The additional growth also allows these countries to protect their fiscal space even in scenarios in which the investment scale-up is financed with debt. For countries with more limited fiscal space and high inflation, a focus on high-efficiency investment is likely to be the best option for achieving a higher multiplier effect.

ANNEX 9.1: THE LONG-TERM IMPACT OF RECESSIONS

This annex examines whether recessions (no matter how long or deep) affect long-term trend real GDP. Following DeLong and Summers (1988) and Beaudry and Koop (1989), the current depth of a recession (denoted CDR_t) is defined as the gap between the current level of output and the economy's historical maximum level, that is:

$$CDR_t = max\left\{Y_{t-j}\right\}_{j\geq 0} - Y_t. \qquad \text{(A9.1.1)}$$

The values taken by the *CDR* variable over the period 1996 through 2017 are measured using real quarterly GDP data for Indonesia, Malaysia, the Philippines, and Thailand. As an example, Annex Figure 9.1.1 shows the CDR_t indicator for Thailand. The impacts of the Asian financial crisis and the global financial crisis episodes stand out in the figure and are likely to be important drivers of the results for all ASEAN-5 countries.

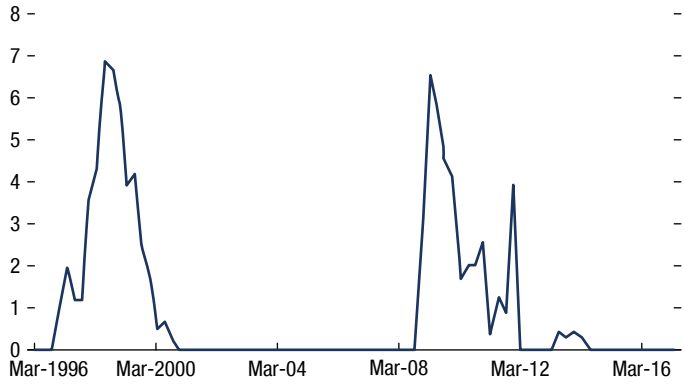
Using Pesaran's panel mean group estimator, the response of real GDP can be drawn as follows:

$$\Phi(L)\Delta Y_t = Drift + \{\Omega(L) - 1\} CDR_t + \Theta(L)\varepsilon_t. \qquad \text{(A9.1.2)}$$

Results:

Figure 9.1 presents the impulse response function of the "typical" ASEAN country following an economic recession. The model shows that, after about 15 months, growth bounces back, with positive growth for about 9 months

Annex Figure 9.1.1. Thailand: Depth of Recession
(Percent)



Source: IMF staff calculations.

following an economic downturn. However, the response of real GDP growth implies that the growth bounce-back is not directly proportional to the output loss, as would be predicted by the natural rate theory (which essentially states that output fluctuates around a fixed trend and, therefore, booms help predict busts).

This can be illustrated by looking at the response in Figure 9.2, which illustrates the level effect of the typical recession on real GDP. The estimates imply that recessions have tended, at least over the sample period in question, to have had hysteresis effects on the level of real GDP.

These findings reinforce the need for countercyclical fiscal and monetary policies to prevent economic downturns from having long-term adverse effects on economic growth.

ANNEX 9.2. IMPACT OF MACROPRUDENTIAL POLICY ON THE FINANCIAL AND REAL CYCLES

To consider the impact of macroprudential policies on the financial and real cycles, a Bayesian panel vector autoregression model is estimated for ASEAN-5 countries. The specification uses accounts for cross-sectional heterogeneity and can be expressed in basic terms as follows:

$$y_{ct} = \sum_{l-1}^{L} \mathrm{B}'_{cl} y_{c(t-l)} + \Delta'_c w_t + \Gamma'_c z_{ct} + u_{ct}, \qquad \text{(A9.2.1)}$$

in which $c = 1, \ldots, 5$ denotes the country; $l = 1,\ldots,L$ denotes the number of lags; y_{ct} is a vector of n endogenous variables; w_t is a vector of W exogenous variables that are common across the ASEAN-5 countries; and z_{ct} includes country-specific constant terms. Individual country results can be drawn from the panel by extracting the individual country coefficients assumed to be drawn from a normal

distribution with a common mean β and a variance Λ_c, which may be country-specific:

$$p\left(\beta_c|\bar{\beta},\Lambda_c\right) = N\left(\bar{\beta},\Lambda_c\right). \quad \text{(A9.2.2)}$$

The final assumption pertains to Λ_c, the variance of β_c around the common mean. The model sets these parameters with respect to the uncertainty about these variances and how heterogeneous these countries are. In the vector autoregression for country *c*, the coefficient of the variable *k* (in which $k = 1, \ldots, K$ run over lags of endogenous variables and common exogenous controls) in equation *n* has a variance equal to

$$var\left(\beta_c(k,n)\right) = \lambda\frac{\hat{\sigma}^2_{cn}}{\hat{\sigma}^2_{ck}}. \quad \text{(A9.2.3)}$$

Since some of the country coefficients (β_c) are large and some small, each country coefficient's variance is scaled by a factor that adjusts for the size of the country coefficient λ.

The model contains an index of macroprudential policy, real GDP growth (as a measure of the real cycle), credit growth (as a measure of the financial cycle), and the stock price to capture asset price dynamics. The data run from 2000 to 2012 at a monthly frequency. The ASEAN panel results show the following, as illustrated in Figure 9.4:

- The response functions show that a tightening of macroprudential policy leads to a statistically significant decline in credit growth (red lines). The impact on the real cycle of a tightening in macroprudential policy is much smaller and less persistent, with the response becoming progressively more statistically insignificant at conventional levels over the medium to long term.
- A joint cumulative equality test on the null hypothesis that the responses of real and financial cycles to a tightening in macroprudential policies are the same can be rejected at the 10 percent significance level, based on a *p*-value of 0.06 from a chi-squared distribution.
- One could construe these findings as being consistent with the idea that real and financial cycles operate at different frequencies and, therefore, their responses to different policy instruments (such as macroprudential policy) are likely to differ. These estimates for the ASEAN-5 imply that the economic adjustment to a tightening in macroprudential policy falls principally on the financial—as opposed to the real—cycle.

ANNEX 9.3. MEDIUM-TERM IMPACT OF PRIVATE DEBT ON GROWTH

This annex examines the impact of a buildup in private sector debt on current and future GDP growth with a focus on Singapore and Thailand (the only two ASEAN-5 countries with sufficiently long household and corporate debt series).

The methodology follows Mian, Sufi, and Verner (2017) and uses the Bank for International Settlements database on nonfinancial credit, which allows for an irregular panel of 47 countries spanning 1990 to 2016 for the longest series.

The regression analysis intends to explain the cumulative growth in country *i*'s real GDP over three years ($\Delta_3 y_{i,t+k}$)[12] as a function of the buildup over three years in private sector debt[13] ($\Delta_3 d^s_{i,t-1}$). The regression is run for $k = 0, \ldots, 5$.

Using fixed effects, a panel regression is run for the entire pool of countries, allowing for one set of coefficients for ASEAN-5 and another set of coefficients for the rest of the countries in the pool.

The first set of regressions (Table 9.1) looks at the impact of private sector debt (household plus corporate debt) on growth. Accumulations of private sector debt in ASEAN-5 countries between years $t - 4$ and $t - 1$ have an initially positive but statistically insignificant impact on growth accumulated over the three years to t, but this impact turns negative and significant in years $t + 1$ and $t + 2$.

The second set of regressions (Table 9.2) looks at the impact of household and corporate debt on growth. Accumulation of household debt in Singapore and Thailand (the only ASEAN-5 countries with sufficiently long series for household and corporate debt) has a positive and significant impact on growth two and three years ahead, whereas the impact turns negative and significant four and five years ahead. This result is similar to the one obtained for the other countries in the pool, although the positive effect in the first two years is significantly higher in Singapore and Thailand, and the negative impact starts one year earlier. The accumulation of household debt produces a boom-bust pattern in growth in Singapore and Thailand.

In contrast, the accumulation of corporate debt in Singapore and Thailand has a negative and significant impact starting just one year ahead and through the medium term. The impact of corporate debt on growth in Singapore and Thailand is significantly stronger (in statistical and economic terms) than in the rest of the countries in the pool.

ANNEX 9.4. DSGE MODEL TO SIMULATE SYNERGIES BETWEEN MONETARY AND MACROPRUDENTIAL POLICIES

The Model Economy

The open economy dynamic stochastic general equilibrium (DSGE) model of Anand, Delloro, and Peiris (2014) is extended to incorporate household

[12]Cumulative growth in GDP as of $t + k$ is calculated as the percent change in growth between year $t + k - 3$ and $t + k$.

[13]Changes in private sector debt are calculated as the change in the ratio of debt to GDP over years $t - 4$ to $t - 1$.

borrowing, housing, and macroprudential policies. The sectoral breakdown and model structure is as follow:

(1) Households

The economy is populated by two groups of households (patient *P* and impatient *I*) as well as entrepreneurs (*E*). Each group of households is assumed to be composed of a unit mass of identical and infinitely lived households indexed by *j*. The key difference between the two groups is the degree of impatience: the discount factor of patient household (β_p) is higher than that of impatient households (β_I). The heterogeneity in discount factors determines the direction of financial flows in equilibrium: patient households purchase a positive amount of deposits and do not borrow, while impatient households (as well as entrepreneurs) borrow a positive amount of loans.

(1.1) Patient Households

The representative patient household *j* maximizes expected lifetime utility

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta_P^{\,t} \left[\frac{(1-b)\left(C_t^P(j) - b\,C_{t-1}^P\right)^{1-\sigma}}{1-\sigma} + \frac{\phi_h e_t^h \left(h_t^P(j)\right)^{1-\sigma_h}}{1-\sigma_h} - \frac{\phi_n L_t^P(j)^{1+\phi}}{1+\phi} \right]$$

in which C_{t-1}^P is lagged aggregate consumption and $b \in (0,1)$ is a parameter that determines the degree of habit persistence. e_t^h represents a shock to the housing demand. The maximization is subject to the following budget constraint:

$$C_t^P(j) + q_t^h\left(h_t^P(j) - h_{t-1}^P(j)\right) + D_t(j) + \epsilon_t B_{t+1}^f(j) = w_t^P L_t^P(j) + \epsilon_t\left(\frac{1+i_{t-1}^d}{\pi_t}\right) D_{t-1}(j)$$

$$+\epsilon_t\left(\frac{1+i_{t-1}^f}{\pi_t^*}\right) B_t^f(j) + \int_0^1 \pi_t^r(s)ds + \int_0^1 (1-w^b)\,\pi_{t-1}^B(i)di,$$

wherein resources are spent on consumption $C_t^P(j)$, housing investment $\left(h_t^P(j) - h_{t-1}^P(j)\right)$ at price q_t^h, making new deposits $D_t(j)$, and purchases of foreign-currency-denominated bonds $B_{t+1}^f(j)$ that can be priced in domestic currency using the real exchange rate ϵ_t. Domestic and international inflation factors (1 plus the inflation rate) are denoted by π_t and π_t^*, respectively. Sources of income include real wage earnings w_t^P, interest earnings on previous period holdings of foreign bonds (at a rate i_t^f) and deposits (at a rate i_t^d), and profits from retail firms and banks, denoted by $\pi_t^r(s)$ and $\pi_t^B(i)$, respectively. Dividends from banks are set to be a fraction $(1-w^b)$ of bank profits. Patient households are assumed to own retail firms, indexed by *s*, and banks, indexed by *i*. The first-order conditions of the optimization problem are given by

$$\lambda_t^P = (1-b)\left(C_t^P(j) - b\,C_{t-1}^P\right)^{-\sigma} \tag{A9.4.1}$$

$$\phi_h e_t^h \left(h_t^P(j)\right)^{-\sigma_h} - \lambda_t^P q_t^h + \beta_P \mathbb{E}_t\left[\lambda_{t+1}^P q_{t+1}^h\right] = 0 \tag{A9.4.2}$$

$$\lambda_t^P w_t^P = \phi_n (1-b) L_t^P(j)^{\phi} \tag{A9.4.3}$$

$$\lambda_t^P = \beta_P \mathbb{E}_t\left[\lambda_{t+1}^P \left(\frac{1+i_t^d}{\pi_{t+1}}\right)\right] \tag{A9.4.4}$$

$$\lambda_t^P = \beta_P \mathbb{E}_t\left[\lambda_{t+1}^P \left(\frac{1+i_t^f}{\pi_{t+1}^*}\right)\left(\frac{\epsilon_{t+1}}{\epsilon_t}\right)\right], \tag{A9.4.5}$$

in which λ_t^P is the Lagrange multiplier on the budget constraint.

Combining equations (4) and (5) gives the uncovered interest parity condition.

$$\mathbb{E}_t\left(\frac{\epsilon_{t+1}}{\epsilon_t}\right) = \mathbb{E}_t\left[\frac{1+i_t^d}{1+i_t^f}\frac{\pi_{t+1}^*}{\pi_{t+1}}\right].$$

(1.2) Impatient Households

The representative impatient household j maximizes expected lifetime utility

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta_I^t \left[\frac{(1-b)\left(C_t^I(j) - b\,C_{t-1}^I\right)^{1-\sigma}}{1-\sigma} + \frac{\phi_h e_t^h \left(h_t^I(j)\right)^{1-\sigma_h}}{1-\sigma_h} - \frac{\phi_n L_t^I(j)^{1+\phi}}{1+\phi}\right]$$

subject to its budget constraint

$$C_t^I(j) + q_t^h\left(h_t^I(j) - h_{t-1}^I(j)\right) - \left(\frac{1+i_{t-1}^{IH}}{\pi_{t-1}}\right) B_{t-1}^H(j) = w_t^I L_t^I(j) + B_t^H(j),$$

wherein resources are spent on consumption C_t^I, housing investment $\left(h_t^P - h_{t-1}^P\right)$, and gross reimbursement of borrowing B_{t-1}^H with a net interest rate of i_{t-1}^{IH}. Impatient households are assumed to borrow exclusively from domestic banks (foreign borrowing is prohibitively costly). In addition, impatient households face a borrowing constraint: a fraction m of the expected value of their housing stock must guarantee repayment of debt and interest.

$$\left(1+i_t^{IH}\right) B_t^H(j) = m_t \mathbb{E}_t\left[\pi_{t+1} q_{t+1}^h h_t^I(j)\right].$$

The first-order conditions of the optimization problem are given by

$$\lambda_t^I = (1-b)\left(C_t^I(j) - b\,C_{t-1}^I\right)^{-\sigma} \tag{A9.4.6}$$

$$\phi_h e_t^h \left(h_t^I(j)\right)^{-\sigma_h} - \lambda_t^I q_t^h + \beta_I \mathbb{E}_t\left[\lambda_{t+1}^I q_{t+1}^h\right] - s_t m_t \mathbb{E}_t\left[\pi_{t+1} q_{t+1}^h\right] = 0 \tag{A9.4.7}$$

$$\lambda_t^I w_t^I = \phi_n (1-b) L_t^{I\phi} \tag{A9.4.8}$$

$$\lambda_t^I = \beta_I \mathbb{E}_t\left[\lambda_{t+1}^I \left(\frac{1+i_t^{IH}}{\pi_{t+1}}\right)\right] + s_t\left(1+i_t^{IH}\right), \tag{A9.4.9}$$

in which λ_t^P and s_t are Lagrange multipliers on the budget constraint and the borrowing constraint, respectively.

(1.3) Aggregation

The aggregated consumption bundle $C_t \equiv C_t^P + C_t^I$ consists of domestically produced goods $C_{H,t}$ and imported foreign goods $C_{F,t}$, and is given by a CES aggregator function

$$C_t = \left[\gamma^{\frac{1}{\vartheta}}\left(C_{H,t}\right)^{\frac{\vartheta-1}{\vartheta}} + (1-\gamma)^{\frac{1}{\vartheta}}\left(C_{F,t}\right)^{\frac{\vartheta-1}{\vartheta}}\right]^{\frac{\vartheta}{\vartheta-1}},$$

in which ϑ is the elasticity of substitution between domestic and foreign goods and γ refers to the home bias. Each group of households minimizes consumption expenditure $P_t C_t = P_{H,t} C_{H,t} + P_{F,t} C_{F,t}$. The demand function for domestic and imported consumption goods, as well as the consumer price index are given by the following expressions:

$$C_{H,t} = \gamma \left(\frac{P_{H,t}}{P_t} \right)^{-\vartheta} C_t \tag{A9.4.10}$$

$$C_{F,t} = (1 - \gamma) \left(\frac{P_{F,t}}{P_t} \right)^{-\vartheta} C_t \tag{A9.4.11}$$

$$P_t = \gamma \left(P_{H,t} \right)^{1-\vartheta} + (1 - \gamma) \left(P_{F,t} \right)^{1-\vartheta}. \tag{A9.4.12}$$

(1.4) Deposit and Loan Demand

Patient households determine how much to deposit in retail banks by maximizing the interest payments from deposits

$$\int_0^1 i_t^d(i) D_t(i) di$$

subject to the deposit and deposit rate aggregator functions, respectively given by

$$D_t = \left[\int_0^1 D_t(i)^{\frac{1+\varepsilon^d}{\varepsilon^d}} di \right]^{\frac{\varepsilon^d}{1+\varepsilon^d}}$$

$$i_t^d = \left[\int_0^1 i_t^d(i)^{1+\varepsilon^d} di \right]^{\frac{1}{1+\varepsilon^d}}.$$

The first-order condition gives the *i*th retail bank's deposit demand function:

$$D_t(i) = \left[\frac{i_t^d(i)}{i_t^d} \right]^{\varepsilon^d} D_t. \tag{A9.4.13}$$

Similarly, impatient households decide how many loans to take out by minimizing interest payments from loans:

$$\int_0^1 i_t^{lH}(i) B_t^H(i) di$$

subject to analogous loan and lending rate aggregator functions. Similarly to the deposit demand of patient households, loan demand by impatient households will take a functional form of

$$B_t^H(i) = \left[\frac{i_t^{lH}(i)}{i_t^{lH}} \right]^{-\varepsilon^{lH}} B_t^H. \tag{A9.4.14}$$

(2) Entrepreneurs

Entrepreneurs purchase capital K_{t+1} for the next time period at price q_t. They finance capital acquisition partly through their net worth n_t and partly through borrowing. Total borrowing B_t^E of the entrepreneur satisfies the following balance sheet identity:

$$B_t^E = q_t K_t - n_t. \tag{A9.4.15}$$

A proportion of total borrowing $L_t^d = \bar{\omega} B_t^E$ comes from domestic banks at a nominal rate of i_t^{lE}, and the remaining proportion $L_t^f = (1 - \bar{\omega}) B_t^E$ comes from foreign borrowing. We assume that the rate charged for foreign borrowing is the same for foreign-currency-denominated bonds held by patient households. The real costs of domestic and foreign loans are respectively given by

$$\bar{\omega} \mathbb{E}_t \left[\frac{1 + i_t^{lE}}{\pi_{t+1}} \right]$$

$$(1 - \bar{\omega}) \mathbb{E}_t \left[\frac{1 + i_t^f}{\pi_t^*} \frac{\epsilon_{t+1}}{\epsilon_t} \right].$$

Entrepreneurs decide how many domestic loans to take out by minimizing interest payments from those loans:

$$\int_0^1 i_t^{lE}(i) L_t^d(i) di$$

subject to analogous loan and lending rate aggregator functions. Similarly to impatient households, loan demand by entrepreneurs will take a functional form of

$$L_t^d(i) = \left[\frac{i_t^{lE}(i)}{i_t^{lE}} \right]^{-\epsilon^{lE}} L_t^d. \tag{A9.4.16}$$

We assume that there exists an agency problem between foreign banks and entrepreneurs, which makes foreign external finance more expensive than internal funds. The entrepreneur's marginal external financing cost $\mathbb{E}_t f_{t+1}$ is given by

$$\mathbb{E}_t f_{t+1} = (1 + \Gamma_t) \left[\varpi \mathbb{E}_t \left[\frac{1 + i_t^l}{\pi_{t+1}} \right] + \Theta \left(\frac{n_{t+1}}{q_t K_{t+1}} \right) (1 - \varpi) \mathbb{E}_t \left[\frac{1 + i_t^f}{\pi_{t+1}^*} \frac{\epsilon_{t+1}}{\epsilon_t} \right] \right], \tag{A9.4.17}$$

in which Γ_t is a shock to the cost of borrowing. We specify the external finance premium as

$$\Theta \left(\frac{n_{t+1}}{q_t K_{t+1}} \right) = \left(\frac{n_{t+1}}{q_t K_{t+1}} \right)^{-\eta}. \tag{A9.4.18}$$

At the end of the period, entrepreneurs lease their undepreciated capital to capital goods producers. The expected marginal real return on capital yields the expected gross return

$$\mathbb{E}_t R_{t+1}^k = \mathbb{E}_t \left[\frac{r_{t+1}^k + (1 - \delta) q_{t+1}}{q_t} \right]. \tag{A9.4.19}$$

The optimal loan contract condition between banks and entrepreneurs is given by

$$\mathbb{E}_t f_{t+1} = (1 + \Gamma_t) \Theta \left(\frac{n_{t+1}}{q_t K_{t+1}} \right) \left[\varpi \mathbb{E}_t \left(\frac{1 + i_t^l}{\pi_{t+1}} \right) + (1 - \varpi) \mathbb{E}_t \left(\frac{1 + i_t^f}{\pi_t^*} \frac{\epsilon_{t+1}}{\epsilon_t} \right) \right], \tag{A9.4.20}$$

which states that the marginal return of capital should equal its marginal cost. The net worth of an individual entrepreneur V_t is given by

$$V_t = R_t^k q_{t-1} K_t - f_t B_t^E. \quad \text{(A9.4.21)}$$

We assume that a proportion v of entrepreneurs survive until the next period. A fraction $1 - v$ of entrepreneurs exits the economy and is similarly replaced by new entrepreneurs. We further assume that the new entrepreneurs receive an exogenous transfer H from the exiting entrepreneurs. The transfer of resources is necessary to ensure that all entrepreneurs have sufficient funds to borrow and settle their loans. Aggregate entrepreneurial net worth evolves according to

$$n_t = v V_t + (1 - v)H - \varepsilon_t^n, \quad \text{(A9.4.22)}$$

in which ε_t^n is a zero mean independent and identically distributed shock to net worth.

Entrepreneurs exiting the economy consume and transfer some funds to new entrepreneurs. Thus, the consumption of entrepreneurs, denoted by C_t^e, is given by

$$C_t^e = (1 - v)(V_t - H). \quad \text{(A9.4.23)}$$

(3) Capital Producers

Capital producers combine the existing capital stock leased from entrepreneurs to transform gross investment I_t into new capital. We assume that the production of new capital entails quadratic adjustment costs. Capital accumulation in the economy is given by a linear technology:

$$K_{t+1} = (1 - \delta) K_t + \varsigma_{I,t+1} I_{t+1} - \frac{\zeta}{2}\left(\frac{I_{t+1}}{K_t} - \delta\right)^2 K_t, \quad \text{(A9.4.24)}$$

in which $\varsigma_{I,t}$ is a shock to the marginal efficiency of investment. Gross investment consists of domestic and foreign final goods, denoted respectively as $I_{H,t}$ and $I_{F,t}$. We further assume that it has the same aggregation function as the consumption bundle.

$$I_t = \left[\gamma^{\frac{1}{\vartheta}} \left(I_{H,t}\right)^{\frac{\vartheta-1}{\vartheta}} + (1 - \gamma)\left(I_{F,t}\right)^{\frac{\vartheta-1}{\vartheta}}\right]^{\frac{\vartheta}{\vartheta-1}}.$$

Minimizing the capital producers' investment expenditure $P_t I_t = P_{H,t} I_{H,t} + P_{F,t} I_{F,t}$ gives the demand function for domestic and imported investment goods, respectively,

$$I_{H,t} = \gamma \left(\frac{P_{H,t}}{P_t}\right)^{-\vartheta} I_t \quad \text{(A9.4.25)}$$

$$I_{F,t} = (1 - \gamma)\left(\frac{P_{F,t}}{P_t}\right)^{-\vartheta} I_t. \quad \text{(A9.4.26)}$$

Capital-producing firms seek to maximize expected profits:

$$\mathbb{E}_t\left[q_t\left[\varsigma_{I,t} I_t - \frac{\zeta}{2}\left(\frac{I_t}{K_t} - \delta\right)^2 K_t\right] - I_t\right].$$

The first-order condition gives the capital supply equation:

$$q_t\left[\varsigma_{I,t} - \zeta\left(\frac{I_t}{K_{t-1}} - \delta\right)\right] = 1. \quad \text{(A9.4.27)}$$

(4) Wholesale Sector

The wholesale sector in the economy is assumed to be a perfectly competitive market. It is composed of the economy's entrepreneurs, who combine labor provided by each group of households and capital purchased from capital-producing firms, in order to produce wholesale goods Y_t through a constant return to scale (CRS) Cobb-Douglas production function.

$$Y_t = \theta_t K_{t-1}^{\psi} \left[\left(L_t^P \right)^{\mu} \left(L_t^I \right)^{1-\mu} \right]^{1-\psi}, \tag{A9.4.28}$$

in which θ_t is a shock to total factor productivity. Entrepreneurs determine how much labor and capital to employ by maximizing profits subject to the production function

$$w_t^P = \mu(1-\psi) mc_t \frac{Y_t}{L_t^P} \tag{A9.4.29}$$

$$w_t^I = (1-\mu)(1-\psi) mc_t \frac{Y_t}{L_t^I} \tag{A9.4.30}$$

$$r_t^k = \psi mc_t \frac{Y_t}{K_{t-1}}, \tag{A9.4.31}$$

in which mc_t is the real marginal cost of production.

(5) Retail Sector

The retail sector of the economy is assumed to be monopolistically competitive and is composed of a continuum of retailers with a unit mass. Retailers purchase wholesale goods, and differentiate them at no cost, to produce domestic goods Q_t^d and export goods Q_t^x. Final domestic goods from the retail sector is a composite of individual retail goods

$$Q_t^d = \left[\int_0^1 Q_t^d(s)^{\frac{v-1}{v}} ds \right]^{\frac{v}{v-1}}$$

with a corresponding demand function facing each retailer

$$Q_t^d(s) = \left[\frac{P_{H,t}(s)}{P_{H,t}} \right]^{-v} Q_t^d.$$

For simplicity, we assume that the aggregate export demand function is given by

$$Q_t^x = \left(\frac{P_{X,t}}{P_t^*} \right)^{-\vartheta_x} Y_t^*, \tag{A9.4.32}$$

in which variables with asterisks indicate their exogenous counterpart. We also assume that the law of one price holds in the export market, so that $P_{x,t} = e_t P_{H,t}$.

To incorporate nominal rigidity in the model, we assume that in each period, only a fraction $1 - \alpha$ of firms can change their prices. All other firms can only index their prices to the previous price set. Retailers seek to maximize expected profits

$$\mathbb{E}_t \sum_{t=0}^{\infty} (\alpha\beta)^s \lambda_{t+s} \left[\left(\frac{P_{H,t+s}}{P_{t+s}} \right)^{1-v} Y_{t+s} - mc_{t+s} \left(\frac{P_{H,t+s}}{P_{t+s}} \right)^{-v} Y_{t+s} \right], \tag{A9.4.33}$$

in which λ_{t+s} is the stochastic discount factor derived from patient household utility maximization. Profit maximization yields the New Keynesian Phillips Curve

$$P_{H,t} = (1-\alpha)\left(P_{H,t}\right)^{1-v} + \alpha\left(P_{H,t-1}\right)^{1-v}. \quad \text{(A9.4.34)}$$

We assume that the price of imported goods is set in the similar way.

(6) Banking Sector

The banking sector operates in a monopolistically competitive environment in which it sets the deposit and lending rates, correspondingly. It is divided into a wholesale and retail branch. The retail branch consists of deposit and loan banks. We incorporate nominal rigidities in interest rate setting by assuming that deposit and loan banks face quadratic adjustment costs when setting their respective rates.

(6.1) Retail Branch

Each deposit bank collects deposits $D_t(i)$ from patient households and passes them on to the wholesale branch, which pays them a wholesale deposit rate i_t^s. The representative deposit bank determines the retail deposit rate i_t^d by maximizing its expected profit function

$$\mathbb{E}_t \sum_{t=0}^{\infty} \beta^t \left[i_t^s D_t(i) - i_t^d(i) D_t(i) - \frac{\phi_{i^d}}{2}\left(\frac{i_t^d(i)}{i_{t-1}^d(i)} - 1\right)^2 D_t \right]$$

subject to deposit demand of patient households given in equation (A9.4.13). In a symmetric equilibrium, the first-order condition gives the optimal retail deposit rate

$$\frac{1+\varepsilon^d}{\varepsilon^d} i_t^d = i_t^s - \frac{\phi_{i^d}}{\varepsilon^d}\left(\frac{i_t^d}{i_{t-1}^d} - 1\right)\frac{i_t^d}{i_{t-1}^d} + \beta\frac{\phi_{i^d}}{\varepsilon^d}\mathbb{E}_t\left[\left(\frac{i_{t+1}^d}{i_t^d} - 1\right)\frac{i_{t+1}^d}{i_t^d}\frac{D_{t+1}}{D_t}\right]. \quad \text{(A9.4.35)}$$

Each loan bank obtains wholesale loans $L_t^d(i)$ from the wholesale branch at the rate i_t^b. The retail loan rates i_t^{lH} and i_t^{lE} are determined from the expected profit maximization of the representative loan bank, given by

$$\mathbb{E}_t \sum_{t=0}^{\infty} \beta^t \left[i_t^{lH}(i) B_t^H(i) + i_t^{lE}(i) L_t^d(i) - i_t^b(i)\left(B_t^H(i) + L_t^d(i)\right) - \frac{\phi_{i^{lH}}}{2}\left(\frac{i_t^{lH}(i)}{i_{t-1}^{lH}(i)} - 1\right)^2 B_t^H - \frac{\phi_{i^{lE}}}{2}\left(\frac{i_t^{lE}(i)}{i_{t-1}^{lE}(i)} - 1\right)^2 L_t^d \right]$$

subject to the loan demand of impatient households and entrepreneurs given in equations (A9.4.14) and (A9.4.16). Similarly, in symmetric equilibria, the optimal retail loan rates for impatient households and entrepreneurs are

$$i_t^{lH} = \frac{\varepsilon^{lH}}{\varepsilon^{lH}-1} i_t^b - \frac{\phi_{i^{lH}}}{\varepsilon^{lH}-1}\left(\frac{i_t^{lH}}{i_{t-1}^{lH}} - 1\right)\frac{i_t^{lH}}{i_{t-1}^{lH}} + \beta\frac{\phi_{i^{lH}}}{\varepsilon^{lH}-1}\mathbb{E}_t\left[\left(\frac{i_{t+1}^{lH}}{i_t^{lH}} - 1\right)\frac{i_{t+1}^{lH}}{i_t^{lH}}\frac{B_{t+1}^H}{B_t^H}\right] \quad \text{(A9.4.36)}$$

$$i_t^{lE} = \frac{\varepsilon^{lE}}{\varepsilon^{lE}-1} i_t^b - \frac{\phi_{i^{lE}}}{\varepsilon^{lE}-1}\left(\frac{i_t^{lE}}{i_{t-1}^{lE}} - 1\right)\frac{i_t^{lE}}{i_{t-1}^{lE}} + \beta\frac{\phi_{i^{lE}}}{\varepsilon^{lE}-1}\mathbb{E}_t\left[\left(\frac{i_{t+1}^{lE}}{i_t^{lE}} - 1\right)\frac{i_{t+1}^{lE}}{i_t^{lE}}\frac{L_{t+1}^d}{L_t^d}\right] \quad \text{(A9.4.37)}$$

(6.2) Wholesale Branch

The wholesale branch takes the deposits from the deposit bank. We assume that the wholesale branch meets the cash reserve ratio (CRR) and the statutory liquidity ratio (SLR) imposed by the central bank. The latter can be thought of as an exogenously determined share of deposits in government securities. The central bank varies these requirements to control credit supply by changing the availability of resources with which the banks can make loans. Let α_t^s and α_t^d denote the CRR and SLR, respectively. The wholesale branch keeps $\alpha_t^s D_t(i)$ in the form of cash, and $\alpha_t^d D_t(i)$ in the form of government securities, which earns an interest of i_t^t.

The wholesale branch combines bank capital $Z_t(i)$ with the remaining deposit $\left(1-\alpha_t^s-\alpha_t^d\right)D_t(i)$ to make wholesale loans $B_t^H(i)$ and $L_t^d(i)$. Since the wholesale branch can finance its loans using either deposits or bank capital, it must obey the balance sheet identity, given by

$$\left(1-\alpha_t^s-\alpha_t^d\right)D_t+Z_t = B_t^H+L_t^d. \tag{A9.4.38}$$

We assume that there exists an exogenously given capital-to-assets (leverage) ratio κ_t for banks. The bank pays a quadratic cost whenever the capital-to-asset ratio moves away from κ_t. This modeling choice gives bank capital a key role in providing the conditions of credit supply.

Bank capital is accumulated each period out of retained earnings according to

$$Z_t = (1-\delta^b)Z_{t-1}+\omega^b\Pi_{t-1}^B-\varepsilon_t^B, \tag{A9.4.39}$$

in which $1-\omega^b$ summarizes the dividend policy of the bank, δ^b measures the resources used in managing bank capital and conducting overall banking activity, and ε_t^B is a mean zero shock to the bank capital. The dividend policy is assumed to be exogenously fixed, so that bank capital is not a choice variable for the bank.

The problem for the wholesale branch is to choose loans and deposits so as to maximize profits subject to the balance sheet identity:

$$\mathbb{E}_t\sum_{t=0}^{\infty}\beta^t\Bigg[i_t^b\left(B_t^H(i)+L_t^d(i)\right)-i_t^s(i)\,\alpha_t^d D_t(i)-i_t^s D_t(i)-Z_t(i) -\frac{\phi_z}{2}\left(\frac{Z_t(i)}{B_t^H(i)+L_t^d(i)}-\kappa_t\right)^2 Z_t\left(i\right)\Bigg].$$

The solution yields an optimality condition that links the spread between wholesale loan and deposit rates to the degree of the bank's leverage position.

$$i_t^b = \frac{i_t^s}{1-\alpha_t^s-\alpha_t^d}-\phi_z\left(\frac{Z_t(i)}{B_t^H(i)+L_t^d(i)}-\kappa_t\right)\left(\frac{Z_t(i)}{B_t^H(i)+L_t^d(i)}\right)^2-\frac{\alpha_t^d}{1-\alpha_t^s-\alpha_t^d}i_t^t. \tag{A9.4.40}$$

We assume that banks can invest excess liquidity in the special deposit account (SDA) facility of the central bank, from which they are remunerated at rate i_t^{SDA}. Assuming that there exists no arbitrage between the SDA facility and the deposit market, we have $i_t^s = i_t^{SDA}$. In addition, invoking the policy rate–SDA rate identity implies that $i_t^{SDA} = i_t$. After imposing a symmetric equilibrium, we have

$$i_t^b = \frac{i_t}{1 - \alpha_t^s - \alpha_t^d} - \phi_z\left(\frac{Z_t}{B_t^H + L_t^d} - \kappa_t\right)\left(\frac{Z_t}{B_t^H + L_t^d}\right)^2 - \frac{\alpha_t^d}{1 - \alpha_t^s - \alpha_t^d} i_t^t,$$

which links the wholesale loan rate to the central bank policy rate and Treasury bill rate, as well as to the leverage of the banking sector. Overall, profits of banks are the sum of earnings from the wholesale and retail branches. After deleting intragroup transactions, bank profit is given by

$$\Pi_t^B = i_t^{lH} B_t^H + i_t^{lE} L_t^d + i_t^t \alpha_t^d D_t - i_t^d D_t - \frac{\phi_{i^{lH}}}{2}\left(\frac{i_t^{lH}}{i_{t-1}^{lH}} - 1\right)^2 B_t^H - \frac{\phi_{i^{lE}}}{2}\left(\frac{i_t^{lE}}{i_{t-1}^{lE}} - 1\right)^2$$
$$L_t^d - \frac{\phi_{i^d}}{2}\left(\frac{i_t^d}{i_{t-1}^d} - 1\right)^2 D_t - \frac{\phi_z}{2}\left(\frac{Z_t}{B_t^H + L_t^d} - \kappa_t\right)^2 Z_t. \qquad \text{(A9.4.41)}$$

(7) Public Sector

Government spending and the government security rate are assumed to be determined exogenously. The central bank sets the policy rate using a Taylor-type rule

$$i_t = \gamma_i i_{t-1} + (1 - \gamma_i) i + \gamma_\pi(\pi_t - \pi) + \gamma_Y(Y_t - Y) + \varepsilon_t^i, \qquad \text{(A9.4.42)}$$

while it sets the cash reserve ratio and statutory liquidity ratio according to

$$\alpha_t^s = (1 - \rho_{\alpha s})\alpha^s + \rho_{\alpha s}\alpha_{t-1}^s + \gamma_\pi(\pi_t - \pi) + \gamma_Y(Y_t - Y) + \varepsilon_t^{\alpha s} \qquad \text{(A9.4.43)}$$

$$\alpha_t^d = (1 - \rho_{\alpha d})\alpha^d + \rho_{\alpha d}\alpha_{t-1}^d + \varepsilon_t^{\alpha d}. \qquad \text{(A9.4.44)}$$

The central bank exercises macroprudential regulation on the banking sector by setting the capital adequacy ratio requirement using the following rule:

$$\kappa_t = (1 - \rho_\kappa)\kappa + (1 - \rho_\kappa)\chi_\kappa\left(B_t^H + L_t^d - B^H - L\right) + \rho_\kappa \kappa_{t-1}. \qquad \text{(A9.4.45)}$$

This macroprudential policy rule is analogous to the Basel III countercyclical capital buffer—the capital requirement of banks is increased when economic conditions are good and relaxed during downturns. Similarly, we assume that the loan-to-value ratio for impatient households is determined by the following rule:

$$m_t = (1 - \rho_m)m + (1 - \rho_m)\left(B_t^H - B^H\right) + \rho_m m_{t-1}. \qquad \text{(A9.4.46)}$$

(8) Market Clearing Conditions

Households, exiting entrepreneurs, capital producers, government, and the rest of the world buy final goods from retailers. The economy-wide resource constraint is given by

$$Y_t = Q_t^d + Q_t^x, \qquad \text{(A9.4.47)}$$

in which $Q_t^d = C_{H,t} + C_{H,t}^e + I_{H,t} + G_t$. The national income accounting equation is given by

$$ZZ_t = C_t + C_t^e + I_t + \left(\frac{P_{H,t}}{P_t}\right)G_t + \left(\frac{P_{X,t}}{P_t^*}\right)\epsilon_t Q_t^x - \left(\frac{P_{F,t}}{P_t}\right)Q_t^m. \qquad \text{(A9.4.48)}$$

Note that the aggregated housing stock is fixed: $h = h_t^p + h_t^I$; therefore, housing investment is not included in the aggregate demand. The model allows for nonzero holdings of foreign-currency-denominated bonds by patient households and foreign-currency-denominated debt by entrepreneurs. The balance of payments equation is

$$\left(\frac{P_{X,t}}{P_t^*}\right)\epsilon_t Q_t^x - \left(\frac{P_{F,t}}{P_t}\right)Q_t^m + i_t^f\left(B_t^f + L_t^f\right) = \left(B_{t+1}^f + L_{t+1}^f\right) - \left(B_t^f + L_t^f\right), \quad \text{(A9.4.49)}$$

in which the left side of the equation is the current account, and the right side is the capital account. In order to close the small open economy model, we specify a foreign debt elastic risk premium whereby holders of foreign debt are assumed to face an interest rate that is increasing the country's net foreign debt:

$$1 + i_t^f = \left(1 + i_t^*\right) - \chi\left[\left(B_t^f + L_t^f\right) - \left(B^f + L^f\right)\right], \quad \text{(A9.4.50)}$$

in which χ is the degree of capital mobility.

(9) Specification of the Stochastic Processes

The model includes 13 structural shocks: shocks to technology (θ_t), investment efficiency $(\varsigma_{I,t})$, and housing demand $\left(e_t^h\right)$; two financial shocks to the entrepreneur's cost of borrowing (Γ_t) and net worth (ε_t^n); a shock to bank capital $\left(\varepsilon_t^B\right)$; two foreign shocks to the world interest rate $\left(i_t^*\right)$ and foreign demand $\left(Y_t^*\right)$; a government spending shock $\left(G_t\right)$; a shock to the CRR (α_t^s); a shock to the SLR $\left(\alpha_t^d\right)$; a shock to the Treasury bill rate (i_t^t); and a shock to monetary policy $\left(\varepsilon_t^i\right)$. Aside from the monetary policy shock and net worth shock, which are zero mean independent and identically distributed shocks with standard deviations σ_i and σ_{nw}, respectively, the other structural shocks follow an AR(1) process of the form

$$x_t = \left(1 - \rho_x\right)x + \rho_x x_{t-1} + \varepsilon_t^x,$$

in which $x_t = \left\{\theta_t, \varsigma_{I,t}, e_t^h, \Gamma_t, i_t^*, Y_t^*, G_t, \alpha_t^s, \alpha_t^d, i_t^t\right\}$, $x \geq 0$ is the steady state of x_t, $\rho_x \in (-1,1)$, and ε_t^x is normally distributed with a zero mean and a standard deviation σ_{xt}.

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CHAPTER 10

The Future of ASEAN-5 Financial Integration

INTRODUCTION

Regional financial integration is prominent on the agenda of Association of Southeast Asian Nations–5 (ASEAN-5) policymakers. The experience of the Asian financial crisis demonstrated the importance of a resilient financial system for managing volatile capital flows. It also spurred regional financial integration and cooperation. In the face of the financial crisis, national mechanisms to stem the spread of financial panic proved inadequate or ineffective. These countries have since taken steps to exploit regional economies of scale to make financial systems more efficient to cope with external shocks.

Recent years have witnessed substantial progress in regional economic integration among the ASEAN-5, and more broadly among all ASEAN economies. As a major milestone on the integration agenda, the ASEAN Economic Community (AEC) came into being in 2015. The AEC Blueprint had been the key vehicle for achieving the free flow of goods, services, investment, and skilled labor, as well as a freer flow of capital within the region. Its successful implementation led to the creation of the AEC five years earlier than the initially planned date of 2020. A successor blueprint, the AEC Blueprint 2025, lays out a 10-year vision for regional economic integration.

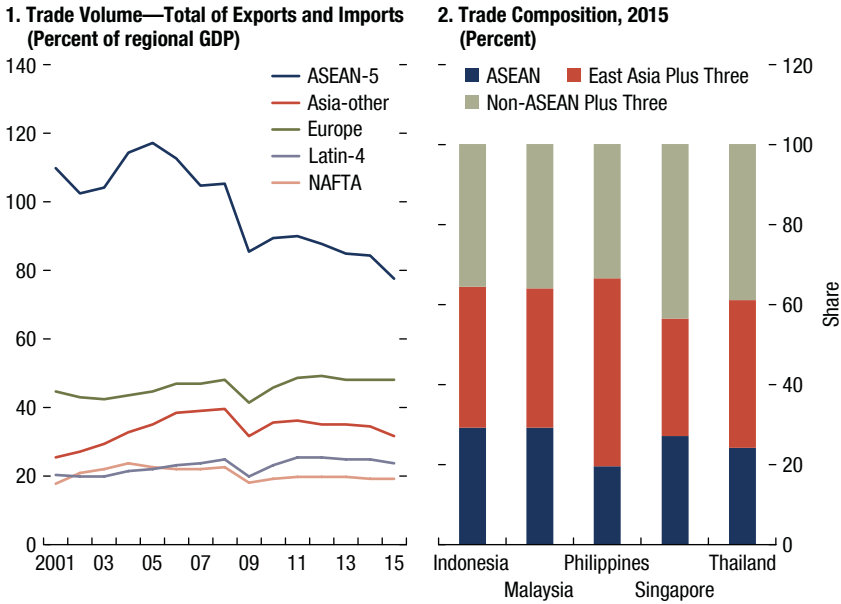
Financial integration is a critical component of this broader regional economic integration agenda. Recognizing that financial integration complements trade flows, in 2011 ASEAN leaders adopted a financial integration framework, envisaging a more integrated financial region by 2020. Subsequently, in the AEC Blueprint 2025, the leaders have outlined the move toward financial liberalization and freer capital flow for the next decade.

Against this backdrop, this chapter addresses three questions: (1) What is the current status of financial integration in the ASEAN-5 countries? (2) What are the key drivers of financial integration? and (3) What are the benefits and costs?

This chapter is structured as follows: After the second section takes stock of the current status of financial integration in ASEAN-5 economies, the third

This chapter was prepared by Khristine L. Racoma, Yiqun Wu and Xiaohui Sharon Wu, under the guidance of Ana Corbacho.

Figure 10.1. Trade Integration in ASEAN Countries



Sources: IMF, *Direction of Trade Statistics*; and IMF staff calculations.
Note: Asia-other = Australia, China, Hong Kong SAR, India, Japan, Korea, New Zealand, Taiwan Province of China; Latin-4 = Argentina, Brazil, Chile, Colombia; NAFTA = North American Free Trade Agreement (Canada, Mexico, United States).

Sources: IMF, *Direction of Trade Statistics*; and IMF staff calculations.
Note: ASEAN Plus Three = ASEAN plus China, Japan, Korea.

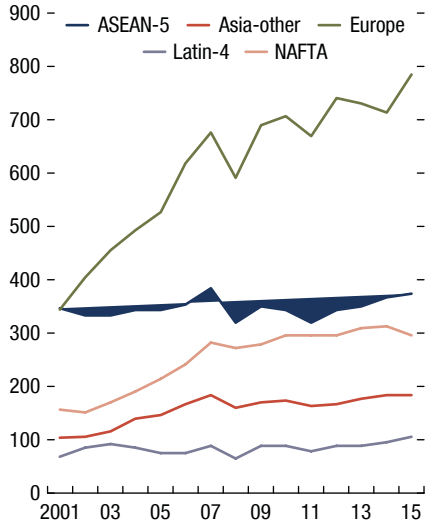
section analyzes the drivers of financial integration based on a financial gravity model. The fourth section explores the benefits and costs of financial integration, and the fifth section discusses the challenges the ASEAN-5 economies will confront in fostering regional financial integration and implementing policy initiatives. The sixth section draws conclusions and presents policy implications.

CURRENT STATE OF FINANCIAL INTEGRATION IN ASEAN-5 COUNTRIES

ASEAN-5 economies are increasingly integrated in trade, both globally and regionally. Global trade integration in these economies, measured by the ratio of total trade to regional GDP, reached 76 percent in 2016 (Figure 10.1, panel 1). In fact, trade openness in this region is already higher than the average in advanced economies and other Asian countries. A closer look shows that the ASEAN-5 economies' trade with each other accounted for a large share of their

Figure 10.2. International Investment Position

(Sum of assets and liabilities, percent of regional GDP, financial centers included)



Sources: IMF, *Balance of Payments Statistics*; and IMF staff calculations.
Note: ASEAN-5 = Indonesia, Malaysia, Philippines, Singapore, Thailand; Asia-other = Australia, China, Hong Kong SAR, India, Japan, Korea, New Zealand, Taiwan Province of China; Latin-4 = Argentina, Brazil, Chile, Colombia; NAFTA = North American Free Trade Agreement (Canada, Mexico, United States).

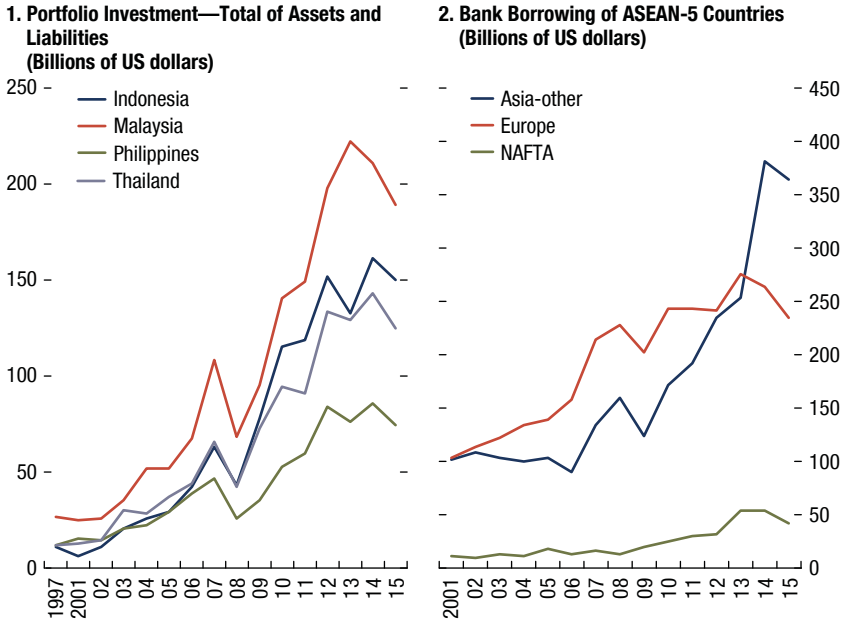
total trade. In 2015, about 60 percent of trade in ASEAN-5 countries was transacted within ASEAN Plus Three economies (Figure 10.1, panel 2).[1] Intraregional trade has benefited from trade liberalization across the region (almost all goods in the region are now traded at zero tariff) and from participation in global value chains.

Financial integration in ASEAN-5 economies has also risen, partly driven by trade. Figure 10.2 shows that ASEAN-5 overall financial integration, measured by the sum of cross-border asset and liability holdings, is quite high, lagging only that of Europe. But if financial centers such as Singapore are excluded from the sample, the overall financial integration level for the rest of the ASEAN-5 countries ranks quite low, lagging all regions except Latin America.

Given a lack of data to track all financial flows, financial integration is examined based on data from portfolio flows. Data from bank flows are used as a

[1]The Plus Three economies are China, Japan, and Korea.

Figure 10.3. Financial Integration in ASEAN Countries



Sources: IMF, Coordiated Portfolio Investment Survey; and IMF staff calculations.

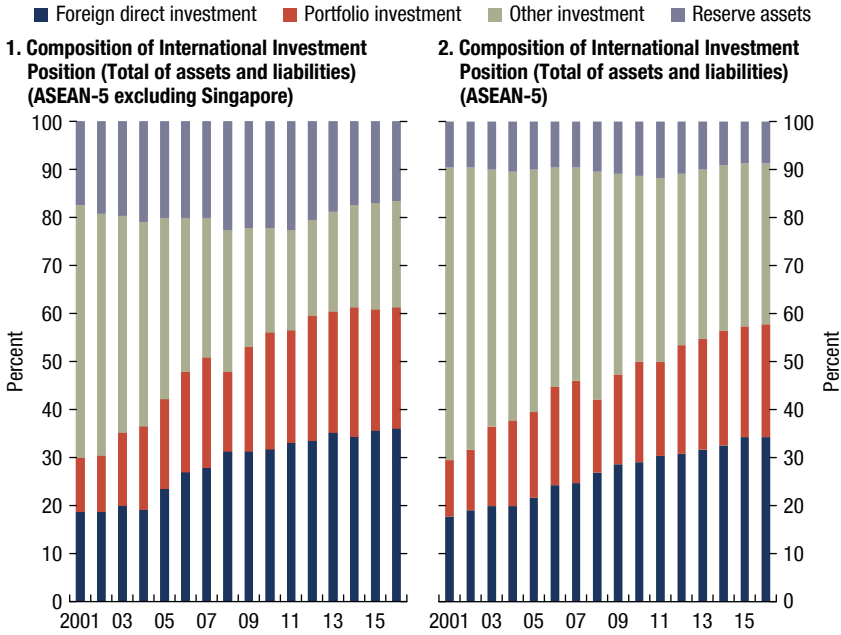
Sources: Bank for International Settlements; and IMF staff calculations.
Note: Asia-other = Australia, China, Hong Kong SAR, India, Japan, Korea, New Zealand, Taiwan Province of China; NAFTA = North American Free Trade Agreement (Canada, Mexico, United States).

robustness check.[2] Although foreign direct investment still dominates trade-driven financial flows, the portfolio investment position has experienced an upward trend since the Asian financial crisis, despite setbacks during 2008 (Figure 10.3, panel 1). ASEAN-5 bank borrowing has also grown, with intraregional bank borrowing growing especially fast since the global financial crisis (Figure 10.3, panel 2).

Portfolio investment has become increasingly important over the years, as reflected in its increasing share in the total international investment position (Figure 10.4). Portfolio investment accounted for more than 20 percent of the total international investment position as of 2016, up from 12 percent in 2001. Excluding Singapore, whose banking position is especially large, from the sample, the share of portfolio investment has exceeded the share of other investment, and was below only the share of foreign direct investment.

[2]Using bank flows in the regressions for robustness check does not alter the conclusions.

Figure 10.4. Composition of International Investment Position (Total Assets and Liabilities)



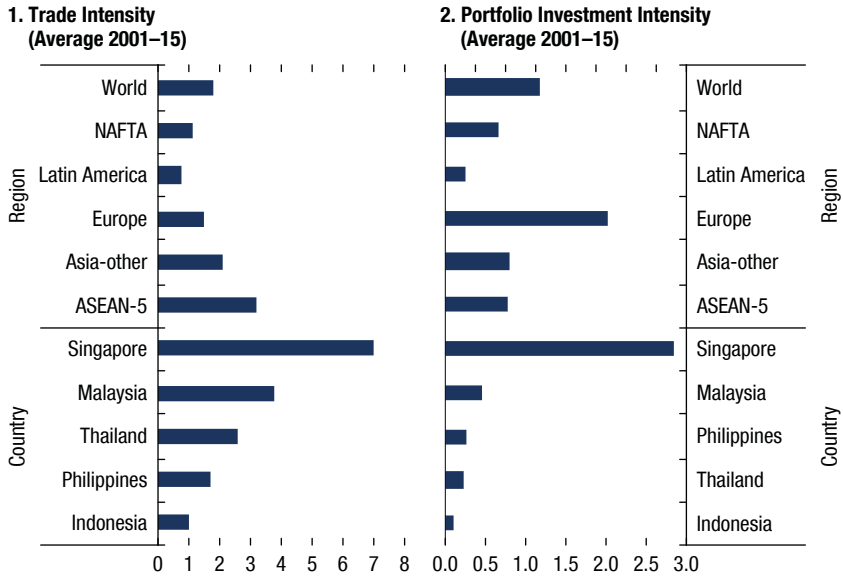
Sources: IMF, *Balance of Payments Statistics*; and IMF staff calculations.

However, the degree and pace of financial integration in ASEAN are not commensurate with those of trade integration. This discrepancy can be illustrated by comparing the intensity scores for trade and portfolio investment.[3] Trade intensity of the ASEAN-5 economies during 2001–15 was higher than in all other regions (Figure 10.5, panel 1). In contrast, their portfolio investment intensity was lower than the world average, and in fact was only about one-third of their trade intensity (Figure 10.5, panel 2).

Financial integration in ASEAN-5 is lagging when using other metrics. Although the portfolio investment position (sum of assets and liabilities) was about 60 percent of GDP in 2015, this ratio would drop to about 20 percent if Singapore were excluded—which is much lower than that of Europe or North American Free Trade Agreement partners (Figure 10.6, panel 1). The share of

[3]The trade intensity score is calculated as a country's share in global trade as a proportion of its GDP share. Portfolio investment intensity score is calculated as a country's share in the world's portfolio assets and liabilities as a proportion of its GDP share. The intensity score formula is $intensity_{it} = \frac{(f_{it}/\sum_{i=1}^{n} f_{it})}{(GDP_{it}/\sum_{i=1}^{n} GDP_{it})}$, in which f_{it} is the sum of imports and exports or the sum of portfolio investment assets and liabilities for country i at time t; n is the number of countries in the sample.

Figure 10.5. Trade and Portfolio Investment Intensity



Sources: IMF, Coordinated Portfolio Investment Survey; IMF, *Direction of Trade Statistics*; and IMF staff calculations.
Note: Asia-other = Australia, China, Hong Kong SAR, India, Japan, Korea, New Zealand, Taiwan Province of China; Latin America = Argentina, Brazil, Chile, Colombia; NAFTA = North American Free Trade Agreement (Canada, Mexico, United States).

intraregional portfolio investment is also relatively low in the ASEAN-5 economies if portfolio asset composition is considered (Figure 10.6, panel 2).

DRIVERS OF REGIONAL FINANCIAL INTEGRATION

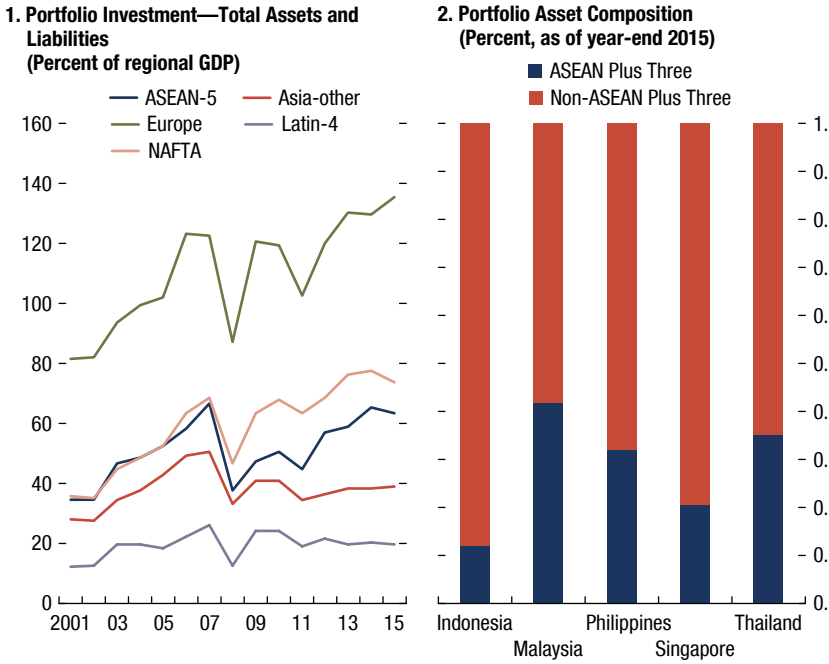
The drivers of financial integration in ASEAN countries are examined using a financial gravity model based on cross-border portfolio investment.[4] In addition to standard gravity factors, the model analyzes the role of regulatory and institutional quality as well as capital control measures.[5] Empirical evidence suggests that lower regulatory and institutional quality, as well as restrictions on cross-border capital flows, negatively affect regional financial integration.

Gravity models of trade predict that bilateral trade flows will be proportional to market size and inversely proportional to distance between trading partners.

[4]Alternative financial integration measures such as banking positions are used in robustness checks.

[5]See Fernández and others (2015).

Figure 10.6. Portfolio Investment



Sources: IMF, Coordinated Portfolio Investment Survey; and IMF staff calculations.
Note: Asia-other = Australia, China, Hong Kong SAR, India, Japan, Korea, New Zealand, Taiwan Province of China; Latin-4 = Argentina, Brazil, Chile, Colombia; NAFTA = North American Free Trade Agreement (Canada, Mexico, United States).

Sources: IMF, Coordinated Portfolio Investment Survey; and IMF staff calculations.
Note: ASEAN Plus Three = ASEAN 10 countries plus China, Japan, and Korea.

The gravity relationship arises when trade costs and barriers increase with distance. Similarly, gravity models of asset trade (for example, Portes and Rey 2001) show that distance, which proxies for information asymmetry, has a negative impact on bilateral asset trade flows. Countries with geographic proximity usually have more knowledge and a better understanding of each other due to the ease of interaction; this is especially important for information-intensive financial investment.

The baseline gravity equation includes indicators for market size and information asymmetry. Two additional variables, bilateral trade volume and a common language indicator, are used as a proxy for information asymmetry. The analysis is based on a panel of 45 economies from 1990 to 2015, consisting of ASEAN economies together with representative advanced and emerging market economies.

TABLE 10.1.

Baseline Gravity Model

	−1 Portfolio Assets	−2 Portfolio Assets and Liabilities
GDP Borrower	0.83***	0.77***
	−0.07	−0.07
GDP Lender	0.11	0.70***
	−0.09	−0.08
Distance	−0.51***	−0.39***
	−0.03	−0.02
Trade	0.45***	0.42***
	−0.02	−0.02
Common Language	0.19***	0.28***
	−0.04	−0.04
Constant	−12.35***	−19.95***
	−3.23	−2.69
Year Effect	Yes	Yes
Borrower Effect	Yes	Yes
Lender Effect	Yes	Yes
Observations	18,554	17,732
Adjusted R^2	0.825	0.83

Source: IMF staff calculations.
Note: Standard errors are in parentheses.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

The estimates point to the following findings (Table 10.1):[6]

- *Bilateral financial integration increases with trade integration*. The trade coefficient shows that when bilateral trade volume increases by 10 percent, financial holdings increase by more than 4 percent. The results are especially strong for banking position. These findings are consistent with the stylized facts discussed in the previous section: financial integration has gone hand in hand with trade integration.
- *Financial integration increases with market size and common language ties*. Larger market size leads to higher demand for assets and higher asset prices and, in turn, to a greater number of endogenous assets. Estimates also suggest that closer language ties lower transaction costs and foster integration.
- *Financial integration decreases with distance between countries.* Countries with geographical proximity tend to be more integrated financially.

The results suggest that institutional quality matters for regional financial integration. To examine the role of institutional quality,[7] a wide range of institutional indicators are added to the baseline gravity model. They include governance quality; ease of doing business; and political, economic, and financial risks. The coefficients

[6]The results are robust when banking positions are used as the measure of financial integration.

[7]Institutional quality is found to be an important factor affecting trade in financial assets. See Papaioannou (2009) for a literature review. Ananchotikul, Piao, and Zoli (2015) find that the lack of regulatory harmonization has a more negative effect on intra-Asia investment.

TABLE 10.2.

Drivers of Financial Integration—Institutional Quality

	−1 Portfolio Assets	−2 Portfolio Assets and Liabilities
GDP Borrower	0.78***	0.83***
	−0.02	−0.02
GDP Lender	0.69***	0.80***
	−0.02	−0.02
Distance	−0.88***	−0.89***
	−0.02	−0.02
Trade	0.05**	−0.03
	−0.02	−0.02
Common Language	0.94***	0.97***
	−0.05	−0.04
Rule-of-Law Borrower	0.86***	1.53***
	−0.02	−0.02
Intra-ASEAN Dummy	1.14***	0.85***
	−0.12	−0.11
Intra-ASEAN Dummy × Rule-of-Law Borrower	0.42***	0.71***
	−0.1	−0.1
Rule-of-Law Lender	2.49***	1.47***
	−0.03	−0.02
Intra-ASEAN Dummy × Rule-of-Law Lender	−0.02	0.52***
	−0.11	−0.1
Constant	−17.09***	−18.01***
	−0.67	−0.59
Year Effects	Yes	Yes
Observations	15,788	15,491
Adjusted R^2	0.636	0.662

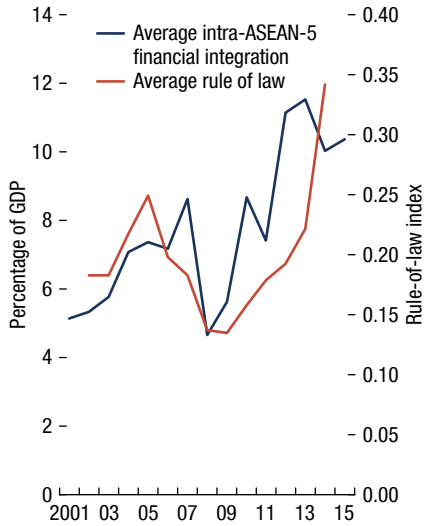
Source: IMF staff calculations.
Note: Standard errors are in parentheses.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

of all indicators are found to be positive and statistically significant, indicating that good institutional quality, including good governance and a business-friendly environment, is linked to greater financial integration (Table 10.2).

Improvements in institutional quality promote regional financial integration. Figure 10.7 shows the positive relationship between the rule-of-law index,[8] as a proxy for institutional quality, and intra-ASEAN financial integration. A reasonable explanation is that, while global investors are likely to have broader and stable relationships with high-quality clients, regional investors are more vulnerable to poor institutions, and thus benefit more from an improvement in institutional quality. It should be noted, however, that the results for ASEAN-5 economies show a high

[8]This index, taken from the World Bank's Worldwide Governance Indicators database, reflects a country's progress in enhancing law and enforcement and building a trustworthy society. Results are similar when other institutional-quality indicators are used. The results also hold when a lagged rule-of-law index and instrumental variable (latitude, fractionalization of language and religion) are used to account for the possible endogeneity of institutional quality.

Figure 10.7. Institutional Quality and Intraregional Financial Integration, ASEAN-5 Average



Sources: IMF, Coordinated Portfolio Investment Survey; World Bank, Worldwide Governance Indicators; and IMF staff calculations.

degree of heterogeneity. The positive effect of the rule-of-law index appears most significant for Thailand, the Philippines, and Singapore.

Finally, restrictions on capital flows undermine financial integration (Table 10.3). When the baseline gravity model is augmented with capital control measures from Fernández and others (2015), estimates show that in both equity and debt securities markets, controls restricting nonresidents' purchase of dometic securities or restricting residents' purchase of foreign securities have a significant negative impact on portfolio investment. These results confirm that capital controls are a barrier to trade in financial assets, similar to tariffs and quotas that impede trade of goods and services. Therefore, with continuing efforts toward liberalizing capital accounts, financial integration of ASEAN economies is set to further improve.

THE BENEFITS AND COSTS OF FINANCIAL INTEGRATION IN ASEAN-5 COUNTRIES

There are several potential advantages to financial integration. Financial integration allows consumption smoothing, risk sharing, and risk diversification. It can strengthen sources of growth in recipient countries, including through imports of capital for capital-scarce economies and technology spillover through foreign direct

TABLE 10.3.

Drivers of Financial Integration—Capital Controls

	−1 Equity Market[1]	−2 Bond Market[1]	−3 Money Market[1]
GDP Borrower	0.70***	0.80***	0.72***
	−0.05	−0.05	−0.05
GDP Lender	0.21***	0.21***	0.20***
	−0.05	−0.05	−0.05
Distance	−0.54***	−0.62***	−0.57***
	−0.09	−0.09	−0.09
Trade	0.51***	0.49***	0.52***
	−0.04	−0.04	−0.04
Common Language	1.54***	1.44***	1.36***
	−0.09	−0.09	−0.09
Real per Capita GDP Borrower	0.64***	0.65***	0.48***
	−0.07	−0.07	−0.07
Real per Capita GDP Lender	1.90***	1.85***	2.01***
	−0.08	−0.08	−0.08
Nonresident Purchase Control Borrower	−0.05	−0.41***	−0.70***
	−0.1	−0.1	−0.1
Resident Issuance Control Borrower	0.13	0.41***	0.32**
	−0.12	−0.16	−0.13
Resident Purchase Control Lender	−0.80***	−1.46***	−1.40***
	−0.12	−0.14	−0.13
Nonresident Issuance Control Lender	−0.88***	−0.09	0.22**
	−0.11	−0.11	−0.1
Constant	−37.10***	−37.34***	−36.21***
	−2.16	−2.03	−1.94
Year Effect	Yes	Yes	Yes
Observations	3,925	3,694	3,954
Adjusted R^2	0.589	0.595	0.588

Source: IMF staff calculations.
Note: Standard errors are in parentheses.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.
[1]Dependent variable: portfolio asset holding.

investment. It can increase access to finance for the poor and enhance financial inclusion. It can discipline policymakers and prevent them from adopting unsound polices that have undesirable market consequences (Kose and others 2009).

Regional financial integration could have extra benefits. Better economies of scale would make financial systems within the region more efficient. By growing and deepening local financial markets, financial integration helps develop a twin-engine financial system and reduces excessive reliance on banks in a bank-centric system. Regional financial integration can also help alleviate countries' reliance on financial centers; this funding diversification is shown to have had a buffering effect against global shocks such as the 2013 taper tantrum (Park and Shin 2016). Moreover, regional financial integration provides incentives for regional cooperation and enhancement of multilateral safety nets (Kim, Lee, and Shin 2006; Park and Shin 2016).

TABLE 10.4.

Benefits of Financial Integration—US Liquidity Condition

	−1 Portfolio Assets	−2 Portfolio Assets and Liabilities
GDP Borrower	0.31***	0.17*
	−0.09	−0.09
GDP Lender	−0.03	0.25***
	−0.1	−0.09
Distance	−0.47***	−0.34***
	−0.03	−0.02
Trade	0.43***	0.40***
	−0.02	−0.02
Real per Capita GDP Borrower	1.55***	1.26***
	−0.19	−0.19
Real per Capita GDP Lender	0.78***	1.06***
	−0.22	−0.21
Common Language	0.23***	0.33***
	−0.04	−0.04
US Broker-Dealer Sector Leverage	0.35***	0.16***
	−0.06	−0.05
Intra-ASEAN+3 Dummy	3.46***	3.23***
	−0.74	−0.67
Intra-ASEAN+3 Dummy × US Broker-Dealer Sector Leverage	−0.93***	−0.82***
	−0.24	−0.22
Constant	−14.23***	−20.05***
	−1.51	−1.32
Borrower Effect	Yes	Yes
Lender Effect	Yes	Yes
Observations	18,554	17,732
Adjusted R^2	0.825	0.83

Source: IMF staff calculations.
Note: Standard errors are in parentheses.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Regional financial integration would help ASEAN countries better weather external shocks and spillovers. This was particularly propitious when banks in advanced economies, weakened by the global financial crisis and constrained by tighter financial regulations, began retreating to their home bases. Based on different approaches, results suggest the following:[9]

- The investment position within the ASEAN Plus Three economies[10] was less affected by liquidity conditions in the United States and Europe. This finding is based on US security broker-dealer sector leverage as an indicator for the US liquidity cycle, and the change in Europe's M2 money stock for the European liquidity cycle (Tables 10.4 and 10.5).[11]

[9]These results are in line with Park and Shin (2016).

[10]The results are robust when the region is restricted to ASEAN (although less significant) or ASEAN-5 countries, and with or without Singapore.

[11]Adrian, Etula, and Muir (2011) propose US security broker-dealer sector leverage (assets-to-equity) as a better liquidity measure because it is market oriented and reflects timely

TABLE 10.5.

Benefits of Financial Integration—EU Liquidity Condition

	−1 Portfolio Assets	−2 Portfolio Assets and Liabilities
GDP Borrower	0.38***	0.19**
	−0.09	−0.09
GDP Lender	0.04	0.27***
	−0.1	−0.09
Distance	−0.47***	−0.35***
	−0.03	−0.02
Trade	0.43***	0.40***
	−0.02	−0.02
Real per Capita GDP Borrower	1.39***	1.22***
	−0.19	−0.19
Real per Capita GDP Lender	0.56***	1.01***
	−0.21	-0.2
Common Language	0.23***	0.33***
	−0.04	−0.04
EU M2 Growth	0.03***	0.02***
	0	0
Intra-ASEAN+3 Dummy	1.10***	1.17***
	−0.14	−0.13
Intra-ASEAN+3 Dummy × EU M2 Growth	−0.10***	−0.09***
	−0.02	−0.02
Constant	−13.68***	−20.09***
	−1.52	−1.32
Borrower Effect	Yes	Yes
Lender Effect	Yes	Yes
Observations	18,554	17,732
Adjusted R^2	0.825	0.83

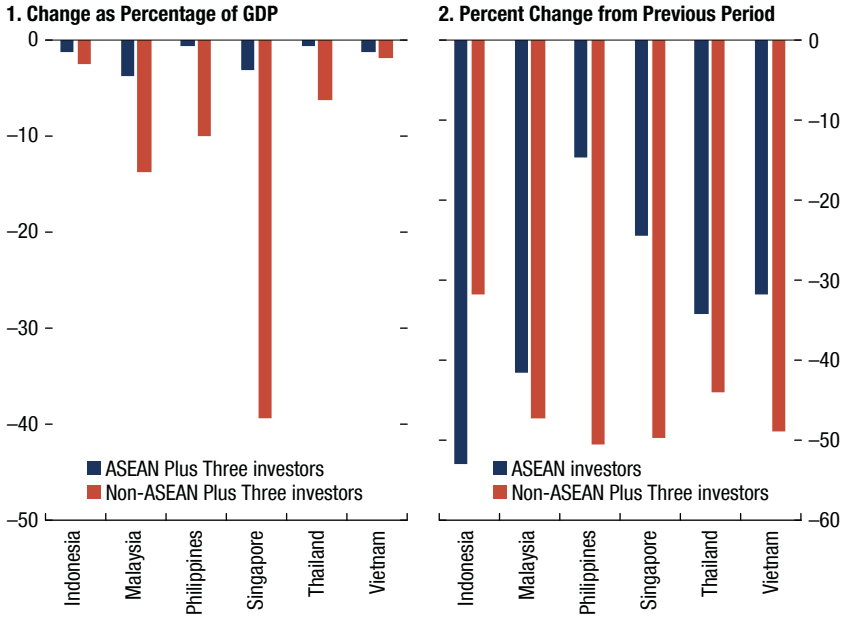
Source: IMF staff calculations.
Note: Standard errors are in parentheses.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

- Regional investors were less likely to join global investors in pulling out of investments during the global financial crisis (Figure 10.8).
- To test whether intraregional capital flows (capital flows to ASEAN-5 countries from ASEAN Plus Three countries) are more resilient to global shocks than capital flows from outside the region, we compared the impulse responses of the two aggregate flows to global shocks such as changes in the VIX.[12] Figure 10.9 shows that when there is a shock in the VIX, intraregional

underlying market conditions. Bruno and Shin (2013) use this leverage as their preferred global liquidity indicator. Our results using the Chicago Board Options Exchange Volatility Index (VIX) are similar although less significant, whereas using US and EU credit-to-GDP growth as liquidity indicators also yields similar results.

[12]Figure 10.9 shows the average of the impulse responses derived from structural vector autoregressions (SVARs) for each ASEAN-5 economy. In the SVAR there are three variables in the following order: a global factor (VIX), average real growth in ASEAN-5 economies, and capital inflows to the country under consideration. An aggregate approach using a similar SVAR with the

Figure 10.8. Change in Portfolio Inflows, 2008



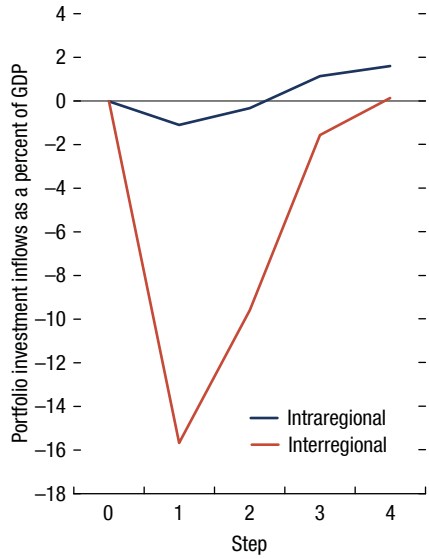
Sources: IMF, Coordinated Portfolio Investment Survey; and IMF staff calculations.
Note: ASEAN Plus Three = ASEAN-5 plus China, Japan, Korea.

portfolio inflows respond less negatively than capital flows from outside. This suggests that intraregional capital flows are less likely to reverse or experience a sudden stop at times of global financial volatility.

- There is also evidence that the influence of global shocks on regional equity markets is declining. We use a spillover index developed by Diebold and Yilmaz (2014) to analyze the interdependence of asset returns and volatilities in the ASEAN-5, China, and the United States. The index quantifies the contribution of shocks from one country's asset returns and volatilities to another's at different points in time. The time-varying spillover index is obtained as the generalized impulse responses, which are derived using two lags in the vector autoregression estimation and a 150-day rolling window. The results show that ASEAN-5 equity markets are affected more by one another than by the United States, whose influence is declining (Figure 10.10), partly due to greater regional financial integration. This

average capital inflows to each ASEAN-5 economy yields similar results. Both intraregional and interregional capital flow data are from the IMF Coordinated Portfolio Investment Survey data set from 2002 to 2015.

Figure 10.9. Impulse Response of Capital Flows to a Shock in the VIX



Source: IMF staff calculations.

suggests that compared with the past, these markets are likely to be more resilient in the face of global events.[13]

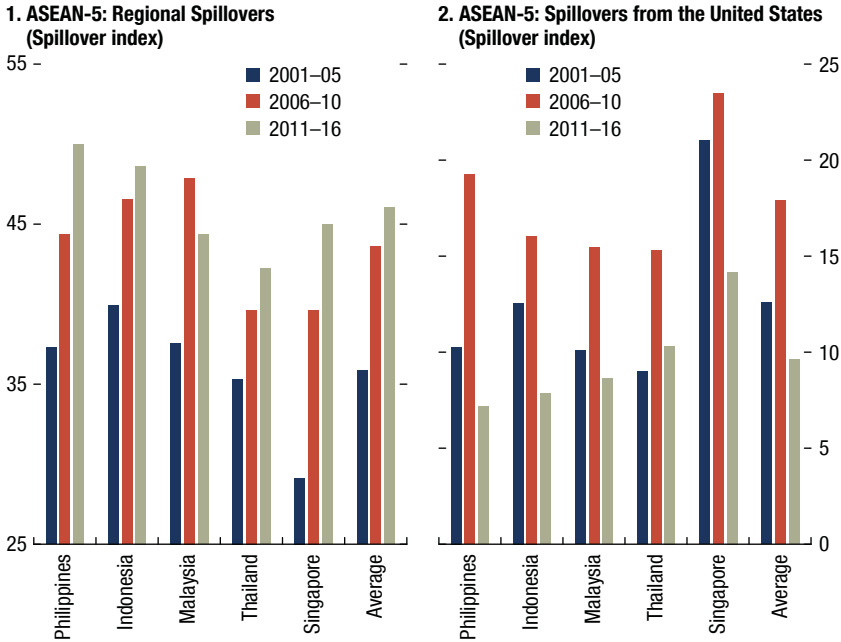
Regional financial integration can also play an important role in facilitating economic rebalancing. ASEAN economies are salient examples of the Lucas paradox (Lucas 1990). Despite substantial development potential and large infrastructure needs, these economies were all net capital exporters with high current account surpluses, averaging about 2 percent of GDP a year during 2009–16.

The current account imbalance is affected by structural factors. The current account imbalance is a mirror image of the savings-investment gap; the desirable savings-to-investment level, in turn, is affected by structural factors that are determined or influenced by the financial system.[14] Financial integration can play an important role in affecting such levels. It would lessen the need to rely on countries' own funds and improve access to financial services, and thus provide a net boost to consumption and investment.

[13]Our findings that the ASEAN-5 equity markets were less influenced by the US market were similar to those of Guimarães-Filho and Hong (2017), but we found a less influence from China's equity markets than Guimarães-Filho and Hong did.

[14]Financial markets are, in essence, the arrangements for processing information in networks of savers and investors (Gochoco-Bautista and Remolona 2012).

Figure 10.10. Spillovers to ASEAN-5 Equity Markets



Source: IMF staff estimates.

Regional financial integration can facilitate financing of investment.[15] We estimate a model based on the macroeconomic balance approach. The impact of rebalancing is assessed through the change in the current account balance to GDP (the dependent variable). Our results show that deeper financial integration, either global or regional, is associated with lower current account surpluses (Table 10.6).[16] These findings are in line with those of Pongsaparn and Unteroberdoerster (2011), who show that relative to their regional peers, Indonesia, Malaysia, and Thailand would be able to rebalance in a more significant way by moving toward a level of financial integration more consistent with their fundamentals.

The potential costs of financial integration should not obscure the potential benefits. To quantify the overall effect of financial integration, we look into the

[15]Our findings that regional investors are less likely to pull out of their investments in the face of a crisis also suggest that regional financial integration is a suitable vehicle for promoting much-needed long-term investment, such as in infrastructure. Indeed, through mobilizing savings and lowering financing costs, regional financial integration has been explored as a regional approach for financing infrastructure and other development needs (Ding, Lam, and Peiris 2014; Volz 2016).

[16]The ordinary least squares regression includes standard factors affecting the current account, such as the dependency ratio and fiscal balance, and global (regional) financial integration index (*z*-score). We include year and country fixed effects and use robust standard errors.

TABLE 10.6.

Benefits of Financial Integration—Rebalancing

	−1 Global	−2 Regional	−3 Both
Dependency Ratio	0.32***	0.33***	0.33***
	−0.1	−0.1	−0.1
Fiscal Balance	−0.09	−0.09*	−0.09*
	−0.05	−0.05	−0.05
Real GDP Growth	0.05	0.05	0.05
	−0.07	−0.07	−0.07
Global Financial Integration	−2.77***		−0.84
	−0.72		−2.12
Opening Balance of Net Foreign Assets	−0.00**	−0.00**	−0.00**
	0	0	0
Population Growth	0.02	0.09	0.07
	−0.57	−0.55	−0.56
Oil Income	0.96***	0.97***	0.97***
	−0.2	−0.2	−0.2
Regional Financial Integration		−2.95***	−2.15
		−0.71	−2.16
Constant	−1.35	−6.39	−4.48
	−5.04	−5.39	−5.91
Year Effect	Yes	Yes	Yes
Lender Effect	Yes	Yes	Yes
Observations	597	597	597
Adjusted R^2	0.908	0.909	0.908

Source: IMF staff calculations.
Note: Standard errors are in parentheses.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

relationship between financial integration and economic growth, applying the framework of Eyraud, Singh, and Sutton (2017). We include standard control variables such as trade openness and population growth in our regression, with real GDP growth as the dependent variable. Considering financial integration might be affected by economic growth, we use instrumental variables (IV) methods as well. The instruments used are one-period lag of the financial integration variable and capital control measures from Fernández and others (2015).

Our results show a positive and statistically significant association between global financial integration and economic growth.[17] In similar estimations for regional integration, a positive but statistically weaker association is found between regional financial integration and economic growth (Table 10.7).[18]

[17]Global (regional) financial integration in Table 10.7 refers to the global (regional) financial integration index (*z*-score) calculated from portfolio investment data. Using *z*-scores calculated from foreign direct investment data has similar results. Singapore is not included in this exercise; the results are less significant with Singapore, perhaps because of Singapore's status as a financial center and its higher stage of development.

[18]Columns (1)–(3) evaluate the effect of global financial integration, and columns (4)–(6) show the results for intraregional financial integration. Columns (1) and (4) use ordinary least squares estimation with time fixed effects. To correct for possible endogeneity, columns (2) and

TABLE 10.7.

Benefits of Financial Integration—Economic Growth

	−1	−2	−3	−4	−5	−6
Trade Openness	−0.79	−1.14*	−1.17	−1.03	−0.69	−0.99
	−0.72	−0.66	−0.83	−0.76	−0.58	−0.76
Real GDP per Capita	−2.39***	−1.99***	−2.12***	−2.53***	−1.23***	−1.53***
	−0.44	−0.41	−0.46	−0.48	−0.41	−0.47
GDP Share of Investment	−0.11	1.63	1.39	−0.42	1.73*	1.64
	−1	−1.01	−1.04	−1.02	−1.05	−1.06
GDP Share of Government Spending	3.00**	3.75***	3.72***	3.07**	2.70**	3.00**
	−1.2	−1.02	−1.29	−1.25	−1.06	−1.21
Population Growth	0.51	0.42	0.69	0.16	0.56	0.69
	−0.6	−0.59	−0.63	−0.61	−0.55	−0.61
Inflation Rate	0.10***	0.16***	0.17***	0.11***	0.16***	0.18***
	−0.03	−0.05	−0.05	−0.03	−0.06	−0.05
Political Risk Index	0.04	0.04	0.04	0.07	0.05	0.06
	−0.05	−0.05	−0.05	−0.05	−0.04	−0.05
Global Financial Integration	0.09	0.32**	0.31**			
	−0.1	−0.13	−0.15			
Regional Financial Integration				0.13	0.06	0.11
				−0.12	−0.14	−0.14
Constant	27.63***	28.04***	28.34***	28.95***	19.49***	21.54***
	−4.58	−4	−4.67	−5.22	−5.12	−5.11
Year Effect	Yes	No	No	Yes	No	No
Observations	98	84	84	91	74	74
Adjusted R^2	0.609	0.44	0.447	0.59	0.28	0.288

Source: IMF staff calculations.
Note: Standard errors are in parentheses.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

However, financial integration does not necessarily guarantee net benefits if sound institutional and policy frameworks are not in place.[19]

FOSTERING FINANCIAL INTEGRATION IN THE ASEAN-5: CHALLENGES AND POLICY INITIATIVES

In 2016, all ASEAN countries endorsed the strategic action plans for ASEAN Financial Integration 2025. Building on key milestones in the AEC Blueprint 2015, the financial sector integration vision for 2025 encompasses three strategic objectives: financial integration, financial inclusion, and financial stability; and three crosscutting areas: capital account liberalization, payment and settlement

(5) use two-stage least squares estimation, and columns (3) and (6) use the instrumental variable–generalized method of moments method. The instruments used are a one-period lag of the financial integration variable and capital control measures from Fernández and others (2015).

[19]For a fuller treatment on the risks and challenges of financial integration, see Obstfeld and Taylor (2004), and Barro and Lee (2011).

TABLE 10.8.

ASEAN Financial Integration Framework

Key Milestones in AEC 2015	End Goal in 2025
• Assessed and monitored developments in the openness of the CAL regime in ASEAN; established and conducted Policy Dialogue Mechanisms and capacity-building programs to support CAL.	• Substantial liberalization in ASEAN member states' capital accounts. • Strengthened policy dialogue and information exchange mechanism on capital flow statistics and capital flow measures among AMS.
• Created enabling environment for regional integration; facilitated the establishment of ASEAN Trading Link; and supported bond market development.	• Interconnected ASEAN stock markets. • Deep and liquid ASEAN capital markets. • Improved access to capital markets. • Greater private sector engagement to understand their insights into ASEAN financial markets. • Increased cross-border collective investment schemes in ASEAN.
• Negotiated, signed, and implemented packages of financial services liberalization commitments.	• More integrated financial services sector through enhanced financial liberalization among AMS.
• Approved the ASEAN Banking Integration Framework (ABIF); established the ABIF Guidelines; completed the signing of a Heads of Agreement between Bank Negara Malaysia and Bank Indonesia.	• Greater role of qualified ASEAN banks in facilitating intra-ASEAN trade and investment. • Greater coherence of banking regulations for all AMS to support financial integration. • Greater regional strength in the banking sector and market confidence.

Source: Association of Southeast Asian Nations (ASEAN).
Note: AEC = ASEAN Economic Community; AMS = ASEAN Member States; CAL = capital account liberalization.

systems, and capacity building (ASEAN 2015). The ASEAN financial integration framework focuses on banking, insurance, and capital market development initiatives, which are underpinned by a payment and settlement system that fosters interoperability and efficiency in cross-border payments (Table 10.8).

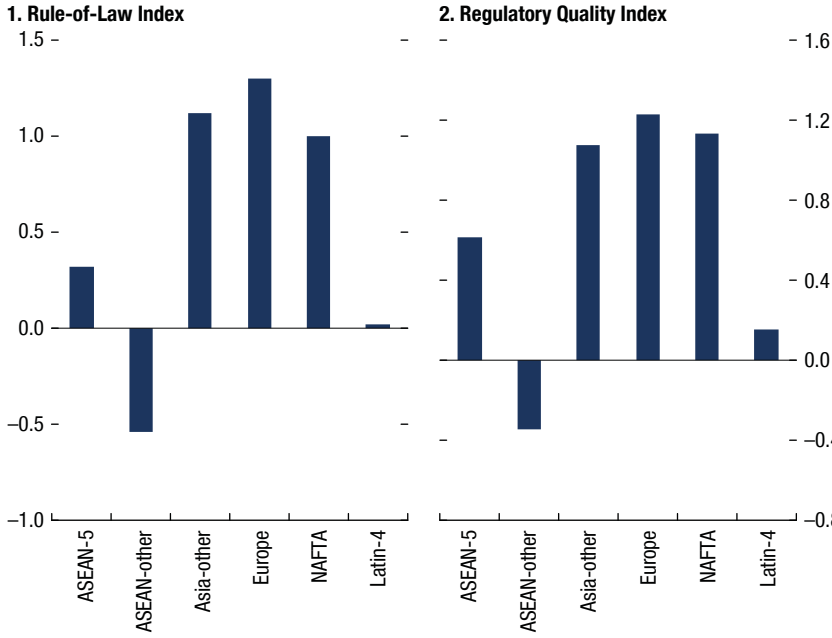
However, the ASEAN region is one of the world's most diverse. Substantial challenges are present in fostering two key components of regional financial integration: financial sector liberalization and capital account liberalization.

Financial Sector Liberalization

Varying paces of financial liberalization and divergent regulatory frameworks among these economies have led to fragmentation, severely inhibiting regional financial integration.

- *Varying paces of financial liberalization:* The financial systems across ASEAN economies are at very different stages of development. Banks in these countries are generally small by global standards. Most countries still have fragmented banking systems composed of many small financial institutions with weak financial profiles.
- *Substantial differences in regulatory frameworks and standards:* Differences in investor protection, ability to resolve commercial disputes, and bankruptcy procedures appear more pronounced within the ASEAN than in other regions (Figure 10.11). Such differences could complicate cross-border

Figure 10.11. Comparison of Regulatory Indices



Note: ASEAN-other = Brunei, Cambodia, Laos, Myanmar, Vietnam; Asia-other = Australia, China, Hong Kong SAR, India, Japan, Korea, New Zealand, Taiwan Province of China; Latin-4 = Argentina, Brazil, Chile, Colombia; NAFTA = North American Free Trade Agreement (Canada, Mexico, United States).
Source: World Bank, Worldwide Governance Indicators; and IMF staff calculation.

mergers. As shown in the previous analysis, institutional and regulatory differences would hinder further regional financial integration.

Capital Account Liberalization

Except for Singapore, ASEAN economies have less open capital accounts compared with emerging markets in other regions (Almekinders and others 2015). The findings in the "Drivers of Regional Financial Integration" section in this chapter show that relaxing restrictions on cross-border capital movements supports regional financial integration.

Important regional initiatives are promoting financial integration in the ASEAN region. The focus has been on translating the AEC Blueprint 2025 into strategic action plans and work programs.

- *Capital market development:* There has been progress in building capacity and infrastructure to develop and integrate the ASEAN capital markets. In Malaysia, Singapore, and Thailand, concrete measures have been put in place to harmonize disclosure requirements and broaden market links. The measures include a single gateway to all three exchanges that allows investors

in one country to buy shares in the other two markets through local stockbrokers, fully harmonized prospectus disclosure requirements that allow issuers to tap all three markets with a single set of prospectuses, and a mutual recognition framework that provides fund managers with a streamlined authorization process for the cross-border offering of funds.

- *Banking integration:* The ASEAN Banking Integration Framework has been adopted to achieve multilateral liberalization in the banking sector by 2020. Major banks in Malaysia and Singapore have been the most active in expanding regionally. Thai banks are also expanding, focusing more on the Greater Mekong region. Many bilateral agreements have been signed.
- *Capital account liberalization:* The strategic action plan encourages countries to allow greater flows of capital inside the region to facilitate cross-border investment and lending while imposing adequate safeguards.
- *Payment and settlement systems, and financial services liberalization:* Various initiatives are underway for harmonizing payment and settlement systems, with the aim of eventually facilitating payments across the region and removing restrictions on intraregional provision of financial services.

Substantial progress has been made in setting up regional institutions to enhance regional cooperation in capacity building, regional financing arrangements, and regional surveillance (Almekinders and others 2015).

- *Regional financing arrangements:* In recent years the regional safety net has been substantially enhanced. A multilateral currency swap arrangement among the ASEAN Plus Three countries (Chiang Mai Initiative Multilateralization, or CMIM) was established in March 2010, and a crisis prevention facility (the CMIM Precautionary Line) has been introduced.
- *Surveillance and monitoring system:* An independent regional macroeconomic surveillance unit—the ASEAN+3 Macroeconomic Research Office—has been in operation since 2011, and was converted to an international organization in 2016. The office seeks to strengthen cooperative relationships with major existing international financial organizations.

Managing Risks from Capital Flows

It is important to recognize that financial integration and greater exposure to international capital markets can also pose challenges and risks. Capital flows, including those intermediated through the banking system, can amplify domestic economic and financial cycles. Harnessing the benefit of financial integration hence requires strong policy frameworks and institutions to safeguard macroeconomic and financial stability.

Macroeconomic policies, including exchange rate flexibility, need to play a key role in the management of risks associated with capital flows. A flexible exchange rate can be a critical shock absorber in the event of capital inflow surges. Macroprudential policies, in support of sound macroeconomic policies and strong financial supervision and regulation, can increase countries' resilience to

external shocks associated with capital flows, helping contain the buildup of systemic vulnerabilities over time. Capital flow management measures can play a role under certain circumstances in responding to an inflow surge, provided they are temporary and not used to substitute for warranted macroeconomic adjustment (IMF 2012, 2017).

CONCLUSIONS

Financial integration of ASEAN economies should be pursued as a critical component of financial development. This chapter shows that regional financial integration in ASEAN economies not only fails to live up to their trade integration, it also lags financial integration with countries outside the region. When looking into the drivers of financial integration, the analysis finds that improving regulatory and institutional quality and reducing restrictions on capital flows can promote regional financial integration. The chapter also provides empirical evidence that regional financial integration helps ASEAN countries better weather global shocks, fosters economic rebalancing, and is associated with higher economic growth. However, the discussion also underscores the risks and challenges associated with financial integration.

When advancing financial integration, it is crucial to harness the gains while minimizing the risks. Close attention must be paid to financial stability. Opening up financial markets requires, first, stronger domestic financial systems and better macroeconomic fundamentals and, at the regional level, enhanced information sharing, stepped-up surveillance and crisis management, and a cross-country safety net. A gradual approach would therefore be appropriate for promoting regional financial integration.

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