

# Indonesia

## Sustaining Growth During Global Volatility



EDITOR  
Thomas Rumbaugh

INTERNATIONAL MONETARY FUND



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# Foreword

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The unprecedented global financial turmoil from 2007 to 2009 was a shock to the global economy and represented the deepest deterioration since the 1930s. Amidst this turmoil, Indonesia's economy has weathered the storm well. In 2009, Indonesia posted one of the region's highest growth rates with substantial improvements in major indicators. The prevalent opinion points toward the improvement of macroeconomic management where Indonesia has implemented a program of wide-ranging policy reforms, particularly since the 1997–98 Asian financial crisis.

The source of Indonesia's resilience includes a prudent monetary and fiscal policy, a sound banking system, a large stock of international reserves, and a more flexible exchange rate. These underlying strengths allowed Bank Indonesia and the government to respond with standard countercyclical monetary and fiscal policies to mitigate the adverse impact of the global financial crisis. This policy reaction contrasts sharply with past episodes such as the 1997–98 Asian crisis, when Indonesia responded procyclically by raising interest rates and tightening fiscal policies.

At this time, the immediate macroeconomic policy challenges have shifted to dealing with renewed capital inflows, booming asset prices, and an appreciating currency. Indonesia will face even larger challenges moving forward and will need to remain vigilant to the vulnerabilities arising from the global economy.

The substantial improvement in the quality of macroeconomic management and banking regulation that Indonesia has achieved in the midst of a volatile global environment are elaborated in this edited volume prepared by IMF staff, entitled *Indonesia: Sustaining Growth during Global Volatility*. Nevertheless, amid these achievements the book also highlights the most binding constraints that need to be addressed to sustain and increase economic growth as well as to further lower vulnerability going forward.

Overall, this book provides a deep and balanced perspective on the Indonesian economy that might help to further enrich the framework of macroeconomic management in Indonesia. We appreciate the thorough analysis of IMF staff on various issues regarding Indonesia's economy. This in-depth and balanced analysis benefited from candid discussions between the Indonesian authorities and IMF staff during the Article IV consultations. Their analysis has provided insight to our policy discussions which should contribute to improving Indonesia's economic performance. We sincerely hope that publication of this book will help other economies by recounting the valuable lessons learned from Indonesia's experience.

Dr. Darmin Nasution  
Governor  
Bank Indonesia

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# Preface

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Indonesia has made dramatic progress in establishing a vibrant and resilient emerging-market economy. Of all the countries affected by the 1997–98 Asian financial crisis, Indonesia arguably fared the worst. Output declined 13 percent in 1998, and the rupiah lost more than 80 percent of its value by June 1998. Unemployment, inflation, and poverty all soared. More than in any other country, this experience prompted deep-rooted institutional reforms. During the first 10 years after the crisis, conditions in Indonesia improved steadily, and included better macroeconomic performance and considerable advancements in the quality of institutions supported by a benign external environment. Rising from the ashes of the Asian financial crisis was a huge accomplishment. But how resilient would Indonesia prove to be when the global economy turned volatile?

In fact, Indonesia has continued its strong macroeconomic performance, sustained high growth, and reached the cusp of investment-grade status despite an unstable global environment. These achievements have taken place during a period of volatile global commodity prices, a global financial crisis, large changes in external demand, and high and capricious capital flows. Events of this magnitude can have substantial impacts on the banking system, corporate balance sheets, and the conduct of macroeconomic policy. Moreover, this has taken place against the backdrop of one of the most fundamental political transitions to democracy achieved by a developing emerging market.

When the 2008–09 global financial crisis erupted, spinning many advanced and emerging-market economies around the world into recession or outright financial crisis, many observers had Indonesia on their short list of vulnerable economies. And, as in other countries, the impact on Indonesia was substantial and swift. Falling commodity prices, liquidity problems in some banks, a default by a large conglomerate, and general global risk aversion led to a sharp deterioration in market conditions and to large capital outflows. Market liquidity dried up and the government was forced to suspend new debt issuance and mark-to-market valuations of banks' government bond holdings. The currency depreciated by 40 percent and the stock market declined by a similar amount. International reserves fell by \$10 billion to only \$50 billion within a few weeks. Perhaps it is not surprising that some market watchers were expecting a repeat of the events of 1997.

However, although growth dropped to 4 percent in 2009, the economy sailed through this period relatively smoothly, recording the third highest growth rate in the G-20 after China and India. Real economic growth has since recovered to the 6–6.5 percent range with the Indonesian government openly discussing programs to raise growth further. Credit rating agencies have upgraded Indonesia in several steps since late 2007, with one agency having elevated Indonesia to investment grade in December 2011.



What accounts for this improved macroeconomic performance? To be sure, many obstacles still must be overcome and challenges met to sustain and increase economic growth in Indonesia. These include deficiencies in infrastructure, inefficiencies in government bureaucracy, weaknesses in governance and the rule of law, and the fragility of political stability in a large and diverse democracy. However, continued improvements in the macroeconomic framework and policies are fundamental to the optimistic outlook. The purpose of this book is to present recent IMF research that documents the improvements in macroeconomic fundamentals while also clearly laying out critical issues that need to be addressed to sustain this successful performance and achieve the economic potential of a large, diverse, and resource-rich country. Among many contributing factors, two key reasons for improved macroeconomic performance stand out:

- *An established track record.* As described in recent IMF staff reports,<sup>1</sup> Indonesia has maintained strong macroeconomic policies. The country's prudent fiscal stance has resulted in substantial reductions in public debt ratios. The inflation-targeting framework, introduced in 2005, has helped contain inflationary pressures and kept inflation generally at single-digit rates, except when large, discrete, fuel price adjustments caused temporary spikes; but those spikes were accompanied by rising policy rates to prevent second-round effects. Financial regulation and supervision have ensured that banks maintained adequate capitalization and avoided large currency and derivative exposures. These reforms provided for strong initial conditions when the global economy veered off the tracks in 2008. Accordingly, Indonesian banks fared relatively well during this period of global financial market turmoil. Financial soundness indicators and stress tests performed in 2010 confirm that the banking system is resilient to a variety of shocks.
- *Commitment to strong policies.* The authorities' policy reaction to periods of turmoil has been an important factor in realizing positive outcomes. The authorities have consistently contained public financing needs by limiting the overall deficit to 1–1.5 percent of GDP. For example, they have taken politically difficult measures when needed to maintain a prudent fiscal stance in response to adverse shocks, as evidenced by the fuel price increases in 2005 and 2008. Monetary policy has remained flexible in the face of changing conditions and the need to strike a balance between supporting growth, lowering inflation, and maintaining confidence in the rupiah. Exchange rate policy remains committed to the floating regime while trying to moderate the impact of sharp movements in capital flows. In 2010, a comprehensive Financial Sector Assessment Program (FSAP) was completed, which confirmed the resiliency of the banking system and will provide a basis for further strengthening the financial sector.

This book is a compilation of selected papers prepared by IMF staff over the last several years as part of annual surveillance consultations with the government

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<sup>1</sup>IMF Country Report Nos. 09/230 and 10/284.

of Indonesia. The resulting chapters present the progress made by Indonesia in the areas of macroeconomic management and policy. Rather than just demonstrating progress in key macroeconomic indicators, the chapters delve into the ways that global volatility has affected Indonesia and how the authorities have adjusted to the policy challenges.

## **MACROECONOMIC MANAGEMENT: MONETARY POLICY AND INFLATION**

Indonesia has successfully reduced inflation rates to single digits in recent years. However, inflation overall remains higher and more volatile than in other countries in Asia and in other emerging markets, leading to higher nominal interest rates and higher risk premiums on government bonds. Lowering inflation further would help improve the functioning of credit markets, reduce borrowing costs, and lower overall macroeconomic vulnerabilities.

Chapter 1 looks in detail at why Indonesia has had higher and more volatile inflation than its regional peers. Using a variety of econometric techniques, the chapter finds evidence for strong inflation inertia, and also finds that periods of political instability and expansionary monetary policy are contributing causes of Indonesia's inflation differential vis-à-vis other countries. It also finds that structural factors—commonly mentioned as a cause of Indonesia's inflation—play no role in explaining Indonesia's inflation differential with other countries.

The adverse impacts of higher inflation and higher inflation volatility are confirmed in Chapter 2. The high inflation volatility in Indonesia creates greater uncertainty in forecasting inflation, resulting in a relatively higher inflation risk premium. Term premium estimates quantify the compensation investors require, in addition to what they require for expected inflation, for their relative inability to predict inflation.

Chapters 1 and 2, therefore, demonstrate that lowering inflation further and keeping it low and stable will prove beneficial. Given the strong inflation persistence, this goal requires applying a consistent monetary framework and establishing credibility, because anchoring inflation expectations is critical. Bank Indonesia's steps to establish a credible inflation-targeting regime are important measures that, if followed consistently and supported by effective communication, should lower inflation toward partner country levels. Although lowering inflation could have a short-term negative impact on growth, over a longer period, well-anchored expectations will lower the nominal cost of capital and support growth.

## **MACROECONOMIC MANAGEMENT: FISCAL SUSTAINABILITY**

From a macroeconomic perspective, management of the country's overall fiscal position and levels of public debt have been a strong point for Indonesia. The overall deficit in recent years has not exceeded 1.5 percent of GDP, and public

debt has declined steadily from close to 100 percent of GDP in 2000 to about 27 percent of GDP in 2011. In fact, Indonesia's public debt outlook going forward is stronger than that in most advanced economies and many other emerging markets. However, Indonesia, like many emerging markets, is often exposed to external shocks. How robust is the fiscal outlook to possible macroeconomic and oil price shocks?

Chapter 3 analyzes fiscal sustainability using a stochastic simulation framework. It finds that the authorities' medium-term fiscal framework, which focuses on fuel subsidy reduction and improvements in revenue administration, is extremely robust to both macroeconomic and oil price shocks. Even large shocks do not upset the fiscal position. The main issue going forward is to make sure that plans to reform fuel subsidies and improve revenue proceed. Delaying fuel subsidy reform could increase fiscal vulnerabilities in the context of rising fuel consumption, volatile oil prices, and possible oil production shocks.

## **MACROECONOMIC MANAGEMENT: COMPETITIVENESS AND INTERNATIONAL RESERVES**

With Indonesia's increasing integration into the global economy, the level and volatility of capital flows has been an important macroeconomic policy challenge. In general, large-scale capital inflows have been handled in a pragmatic fashion, using a combination of boosting international reserves to establish a cushion in the event of capital flow reversals, and allowing the exchange rate to adjust in line with market sentiment—for example, appreciating in the face of large-scale capital inflows.

Chapter 4 examines the value of the rupiah in the context of the country's recent export boom and sustained capital inflows. The appreciation of the rupiah has raised questions about the effect on the manufacturing sector (Dutch disease) and that sector's vulnerability to volatile commodity prices. The chapter finds that there is no evidence of significant Dutch disease in the manufacturing sector. Weak performance in some sectors does not seem to be linked to the recent commodity boom but instead is related to long-standing structural problems. Although Chapter 4 finds that reliance on commodity exports has increased, thus increasing export price vulnerability, the overall terms of trade have actually been stable because export and import prices tend to move together, thus mitigating potential vulnerability.

Indonesia has typically had relatively low foreign exchange reserves, at least compared with other emerging markets. However, a sharp increase in international reserves holdings has occurred recently, with holdings reaching \$120 billion as of end-June 2011, a trend common to other emerging markets. How do Indonesia's international reserves compare with various metrics of adequacy? Chapter 5 looks at this question and concludes that current reserves levels have reached the point where they are in line with (or slightly above) the level predicted by a simple model of optimal reserves, confirming yet another area in which policies have served to lower vulnerability. Therefore, the study concludes that further accumulation of

reserves will do little to further lower vulnerabilities. However, in line with other empirical evidence, reserves accumulation can still have a positive impact by reducing borrowing costs for both the government and the private sector.

## **CORPORATE SECTOR VULNERABILITIES**

Corporate governance is a key issue for reducing vulnerability. Chapter 6 assesses the impact of recent improvements in corporate governance. Governance problems played a major role during the 1997–98 Asian crisis as illustrated by overborrowing leading up to the crisis, followed by creditors' reluctance to lend when problems materialized. Creditors' concerns seem to have lingered until about 2005 but have since subsided. Going forward, higher levels of investment in Indonesia will be needed to accelerate growth, and this investment will be more likely to take place if the quality of investor protection is strengthened. For example, priority should be assigned to synchronizing governance regulations and practices with other emerging markets and improving protection for minority shareholders.

How has Indonesia's corporate sector fared during the recent global volatility? Spillovers from the 2007–09 global financial crisis had substantial adverse impacts on the income and balance sheet positions of corporate entities around the world. Increases in global risk aversion and sharp drops in commodity prices combined to raise corporate sector vulnerabilities. How did the corporate sector in Indonesia withstand this global "stress test"? Chapter 7 analyzes this issue and investigates the expected losses from corporate defaults going forward and the potential spillovers to the banking system using contingent claims analysis. The results confirm the resiliency of the corporate sector and find that losses from future corporate defaults are expected to be manageable. A number of issues are identified that could reduce risks further in the future if addressed, including improvements in overall corporate governance, credit resolution practices, and the effectiveness of the judiciary.

## **FINANCIAL STABILITY**

In 2010, the IMF and World Bank conducted a comprehensive review of Indonesia under the Financial Sector Assessment Program (FSAP). This review confirmed the great strides made by Indonesia during the decade beginning in 2000 in improving macroeconomic and financial stability. Chapter 8 summarizes the main recommendations and conclusions of the FSAP review. The substantial improvements in banking regulation and supervision are reflected in much stronger financial positions for the banks. Capital adequacy ratios as well as return on assets have been high, despite the impact of the slowdown in economic activity in 2009. The authorities have introduced the main components of a comprehensive financial safety net, including a lender-of-last-resort facility and deposit insurance. Finally, extensive stress tests showed the banking system to be robust.

The FSAP exercise's recommendations for future work emphasize three points. First, the prompt corrective action regime needs to be strengthened. Such a regime provides for mandated measures for banks having financial difficulties, which curtails supervisors' discretion and reduces political interference. Such a system also encourages banks to maintain high capital ratios and reduce risk exposures. Bank Indonesia is already moving in this direction with new regulations issued in January 2011. Second, the work on the financial safety net needs to be completed with the passage of the Financial Safety Net law to ensure that a legal framework is in place to support crisis prevention and resolution. Third, Bank Indonesia's financial autonomy could be strengthened by restructuring nontradable government bonds on the central bank's balance sheet into tradable bonds at market terms. This move would increase financial independence and promote capital market deepening.

Indonesia has developed into an important part of the regional and global economy, as well as an active participant in the G-20 and other international forums. Overall, this book documents the substantial improvements in the quality of macroeconomic policy that have been achieved, while also clearly laying out the agenda of measures that need to be taken to safeguard these gains and further lower vulnerabilities going forward.

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# Acknowledgments

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Sherrie Brown edited the manuscript and Patricia Loo managed the production process with their customary efficiency.

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# Abbreviations

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BI	Bank Indonesia
BIS	Bank for International Settlements
CCA	contingent claims analysis
CPI	consumer price index
CSFB	Credit Suisse First Boston
EMBI	Emerging Markets Bond Index
FSAP	Financial Sector Assessment Program (of the IMF)
FSN	financial safety net
GDP	gross domestic product
ICRG	International Country Risk Guide
LPS	Indonesia's deposit guarantee agency
M2	broad money
NEER	nominal effective exchange rate
NIEs	newly industrialized economies
NPL	nonperforming loan
OJK	Otoritas Jasa Keuangan (Indonesia's Financial Supervisory Authority)
PCA	prompt corrective action regime
SAR	Special Administrative Region (of China)
SBI	Bank Indonesia Certificate
SITC	Standard Industrial Trade Classification
SMEs	small and medium enterprises
WEO	World Economic Outlook (of the IMF)



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PART I

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# **Macroeconomic Management with Greater Global Integration**

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# Explaining Higher Inflation in Indonesia: A Regional Comparison

GEREMIA PALOMBA

Over the 20 years beginning in 1990, inflation in Indonesia has been consistently higher than elsewhere in the Asia region.<sup>1</sup> Indeed, inflation has often exceeded the 7–11 percent threshold above which it is estimated to adversely affect growth (Khan and Senhadji, 2000). At these rates, inflation may also make the poor significantly worse off by reducing real minimum wages and the income share of the lowest quintile (Easterly and Fischer, 2001). The higher inflation rate and its potential adverse effects raise the question: what is driving the Indonesian inflation differential vis-à-vis its neighbors?

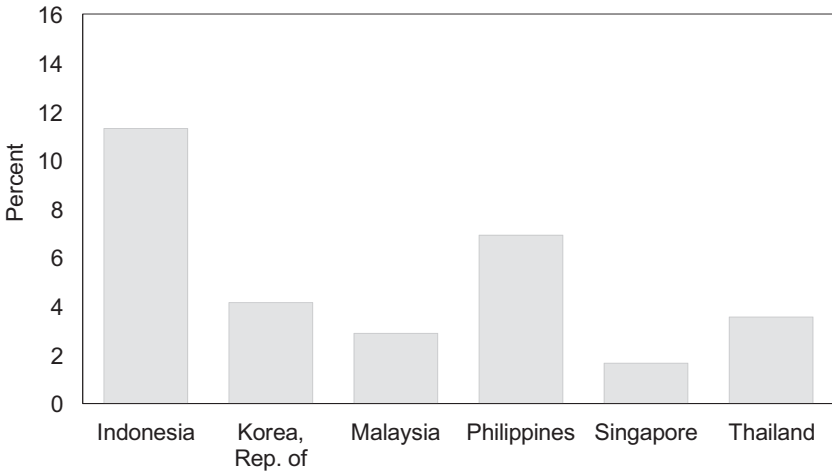
This chapter reviews a number of stylized facts comparing inflation in Indonesia with that in other Asian countries. It uses econometric techniques to assess various hypotheses attempting to explain the Indonesian inflation differential with respect to neighboring countries. Finally, it discusses the policy implications for reducing inflation in Indonesia to a level closer to the region's prevailing rates.

## INDONESIAN INFLATION IN THE ASIAN CONTEXT

Inflation in Indonesia has been substantially higher than in the other countries of the region, both before and after the 1997–98 Asian financial crisis. Over the past two decades, the annual inflation rate in Indonesia has averaged about 11.3 percent, or about 8 percentage points higher than in neighboring countries, and has shown significantly higher variance (Figure 1.1 and Table 1.1). Although the magnitude of the inflation differential reflects, in part, the high inflation rates registered in Indonesia during the Asian financial crisis, the differential widened

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<sup>1</sup>The analysis in this chapter is based on a panel of quarterly data covering the period 1990:Q4–2010:Q4, and includes, in addition to Indonesia, five neighboring countries: the Republic of Korea, Malaysia, the Philippines, Singapore, and Thailand. The econometric analysis relies on quarterly data through 2005:Q4 to exclude the introduction of the inflation-targeting framework in Indonesia. A database from CEIC Data Company Ltd. as of 2006 is used for inflation data for the period 1990:Q4–2005:Q4 and CEIC updates as of 2011 for the period 2006:Q1–2010:Q4.



Source: CEIC Data Co. Ltd.

**Figure 1.1** Average Annual Inflation Rates in Selected Asian Countries, 1991–2010

in the period after the crisis because inflation in neighboring countries declined while remaining broadly unchanged in Indonesia (Figure 1.2).

Inflation in Indonesia has been higher across a wide range of products. The country has registered a positive inflation differential vis-à-vis the other countries in the sample across all the main components of the consumer price index (CPI). After the Asian financial crisis, the differential widened for most of the CPI components, although for food items the increase is mainly due to an outlier spike in 2008. Indeed, without this outlier, the inflation differential for food items decreased after the crisis, while widening for all the other categories, particularly housing, education, and transportation and communications (Figure 1.3), therefore challenging the commonly held belief that Indonesia's high inflation is the result of distortions in the agricultural sector and weak rural infrastructure.

## WHAT CAN EXPLAIN INFLATION IN INDONESIA AND IN NEIGHBORING COUNTRIES?

The results clearly show that no single CPI component can explain the Indonesian inflation differential with respect to other Asian countries; hence, other factors need to be explored.

### Theories Explaining Inflation Across Countries

The literature includes analyses of several factors to explain the sources of inflation and inflation differentials across countries. It is generally accepted that inflation is

- *A phenomenon with some degree of inertia resulting from, for example, the way expectations are formed.* Inflation expectations are in part adaptive or back-

TABLE 1.1

## Headline Inflation in Selected Asian Economies (1991–2010)

Period	Republic of						Differential
	Indonesia	Korea	Malaysia	Philippines	Singapore	Thailand	
(Annual average)							
1991–2005	12.5	4.5	3.0	7.5	1.4	3.8	9.0
1991–2010	11.3	4.2	2.9	6.9	1.7	3.6	7.8
Precrisis <sup>a</sup>	8.2	5.8	3.8	9.4	2.3	5.1	3.5
Postcrisis <sup>a</sup>	8.1	3.1	2.1	5.1	1.6	2.5	5.5
1991	9.4	9.3	4.4	18.7	3.4	5.7	2.5
1992	7.5	6.2	4.8	8.9	2.3	4.2	2.7
1993	9.7	4.8	3.6	7.6	2.3	3.3	5.7
1994	8.5	6.3	4.1	9.1	3.1	5.1	3.4
1995	9.4	4.5	3.5	6.9	1.7	5.8	5.4
1996	7.0	4.9	3.5	9.0	1.4	5.9	2.8
1997	6.2	4.4	2.6	5.9	2.0	5.6	2.4
1998	58.0	7.5	5.1	9.7	−0.3	8.1	...
1999	20.7	0.8	2.8	6.7	0.0	0.3	20.1
2000	3.8	2.3	1.6	4.3	1.3	1.6	1.8
2001	11.5	4.1	1.4	6.1	1.0	1.7	9.2
2002	11.8	2.8	1.8	3.0	−0.4	0.6	...
2003	6.8	3.5	1.1	3.5	0.5	1.8	5.1
2004	6.1	3.6	1.4	6.0	1.7	2.8	3.4
2005	10.5	2.8	3.0	7.6	0.5	4.5	7.8
2006	13.1	2.5	3.6	6.2	1.0	4.7	10.1
2007	6.3	2.5	2.0	2.8	2.1	2.2	4.0
2008	9.9	4.7	5.4	9.3	6.6	5.4	3.8
2009	4.8	2.8	0.6	3.2	0.6	−0.9	...
2010	5.1	3.0	1.7	3.8	2.8	3.3	2.3
(End-period, 12-month percentage change)							
1991–2005	13.3	4.2	2.9	7.1	1.3	3.7	9.9
1991–2010	11.6	4.0	2.9	6.5	1.7	3.5	8.3
Crisis, 1998	77.5	4.0	5.2	10.3	−1.4	4.3	72.0
Precrisis <sup>a</sup>	8.4	5.9	3.7	8.5	2.1	5.3	3.8
Postcrisis <sup>a</sup>	8.0	2.8	2.2	5.0	1.7	2.4	5.4
1991	9.9	9.3	4.3	13.1	2.9	4.6	4.1
1992	5.0	4.5	4.8	8.2	1.8	3.1	1.1
1993	10.2	5.8	3.4	8.4	2.6	4.4	5.7
1994	9.6	5.6	4.0	7.2	2.9	4.8	5.0
1995	9.0	4.8	3.1	8.6	0.8	7.4	5.2
1996	5.1	4.9	3.4	7.1	2.0	4.8	1.0
1997	10.3	6.6	2.7	7.3	2.0	7.6	5.7
1998	77.5	4.0	5.2	10.3	−1.4	4.3	...
1999	2.0	1.4	2.5	4.3	0.7	0.7	0.5
2000	9.3	0.0	1.3	6.7	2.1	1.4	...
2001	12.5	3.2	1.2	4.1	−0.6	0.8	...
2002	9.9	3.7	1.7	2.5	0.4	1.6	8.3
2003	5.2	3.4	1.2	3.9	0.7	1.8	3.3
2004	6.4	3.0	2.1	8.6	1.3	2.9	3.5
2005	17.1	2.6	3.2	6.6	1.3	5.8	13.8
2006	6.6	2.3	3.1	4.3	0.8	3.5	4.2
2007	5.8	3.6	2.4	3.9	3.7	3.1	2.5
2008	11.1	4.1	4.4	8.0	5.5	0.4	7.9
2009	2.8	2.8	1.1	4.3	−0.5	3.5	...
2010	7.0	3.5	2.2	3.0	4.6	3.0	3.8

(continued)

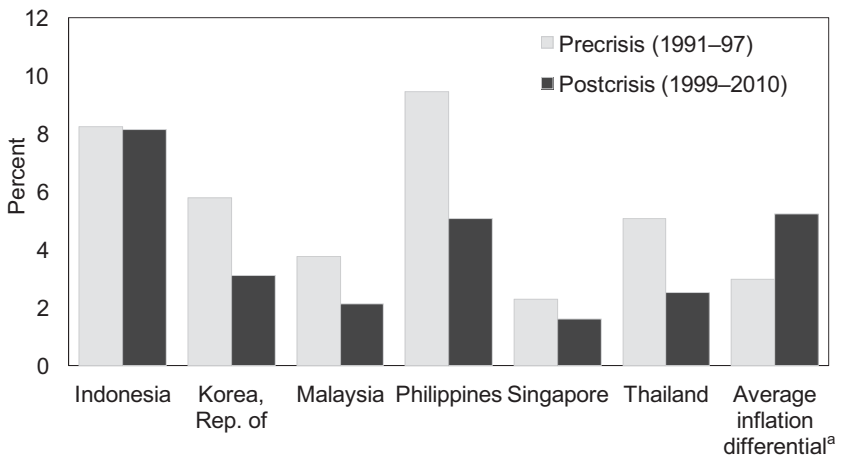
TABLE 1.1

Period	Republic of						Differential
	Indonesia	Korea	Malaysia	Philippines	Singapore	Thailand	
	(Annual standard deviation)						
1991–2005	4.7	0.6	0.4	1.2	0.5	0.9	4.0
1991–2010	3.9	0.6	0.6	1.1	0.6	1.0	3.2
Crisis, 1998–99	23.8	0.9	0.9	1.8	0.8	1.9	22.5
Precrisis <sup>a</sup>	1.2	0.6	0.4	1.3	0.4	0.9	0.6
Postcrisis <sup>a</sup>	2.1	0.5	0.6	1.0	0.8	0.9	1.3
1991	0.5	0.5	0.6	2.2	0.6	0.6	-0.2
1992	2.1	1.1	0.4	0.7	0.3	0.8	1.6
1993	0.7	0.5	0.6	0.6	0.2	0.6	0.3
1994	0.9	0.5	0.4	1.1	0.4	0.4	0.4
1995	0.7	0.6	0.3	1.3	0.6	0.9	0.0
1996	1.7	0.3	0.2	2.0	0.3	1.2	1.2
1997	1.9	0.8	0.5	0.9	0.3	1.5	1.2
1998	23.3	1.4	0.8	1.3	1.1	2.2	22.0
1999	24.2	0.4	1.0	2.3	0.5	1.6	23.3
2000	3.9	0.7	0.2	1.2	0.5	0.5	3.4
2001	1.6	0.8	0.2	1.0	0.9	0.6	1.0
2002	1.9	0.5	0.4	0.5	0.5	0.5	1.5
2003	1.0	0.4	0.3	0.4	0.4	0.3	0.6
2004	0.8	0.5	0.5	1.7	0.5	0.7	0.1
2005	4.5	0.4	0.4	0.7	0.5	1.4	3.9
2006	4.5	0.2	0.6	1.1	0.4	1.3	3.9
2007	0.3	0.6	0.6	0.6	1.8	0.6	-0.4
2008	0.1	0.2	0.3	0.4	0.1	0.8	-0.2
2009	2.7	0.9	2.6	2.6	1.7	2.3	0.8
2010	1.3	0.5	0.3	0.6	1.3	0.4	0.7

Source: IMF, International Financial Statistics database.

Note: The differential is defined as inflation in Indonesia minus the geometric average of inflation in the other countries. "... means that the differential is not calculated because of negative inflation in some of the comparator countries.

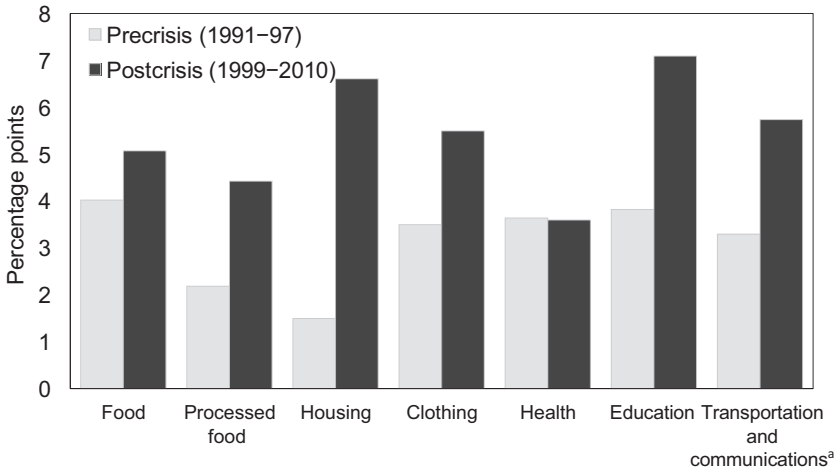
<sup>a</sup>Precrisis includes 1991–97. Postcrisis includes 2000–10, except for end-year inflation which also includes 1999.



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

<sup>a</sup>Differential between Indonesia and average inflation in neighboring countries (in percentage points).

Figure 1.2 Average Annual Inflation Rates in Selected Asian Countries



Source: IMF staff calculations.

Note: Other Asian countries include: Republic of Korea, Malaysia, the Philippines, Singapore, and Thailand.

<sup>a</sup>Only transportation for Republic of Korea and Singapore.

**Figure 1.3** Indonesia Inflation Differential Across CPI Components

ward looking, particularly in countries that, like Indonesia, have experienced long periods of high inflation (Mankiw, Reis, and Wolfers, 2003).

- *Closely related to country-specific shocks.* These include demand and supply shocks associated with, among other factors, the pace of economic activity (Coe and McDermott, 1997), the stance on monetary policy, and exchange rate fluctuations (Rajaguru and Siregar, 2002). High demand pressures, expansionary monetary policy (e.g., rapid growth in monetary aggregates), and significant currency depreciations have been found to be positively correlated to inflation across countries (Campillo and Miron, 1996; Anglingkusumo, 2005).
- *Dependent on the structural features of the economy.* For example, the degree of central bank independence, economic openness (Romer, 1993), the public debt burden (Campillo and Miron, 1996), and the type of exchange rate regime (Loungani and Swagel, 2001) are found to have an impact on the rate of inflation across countries. Central bank independence is generally found to reduce inflation, especially in less developed countries, because it helps to insulate monetary policy from political influences. Inflation is often found to be negatively associated with economic openness because openness increases the costs of unanticipated monetary expansion and allows for additional productivity gains and price competition (IMF, 2006). Fiscal imbalances may also lead to higher inflation either by triggering higher money growth or forcing currency depreciation.
- *Related to the degree of political stability and institutional development.* For example, frequent cabinet changes and weak institutions shorten the time horizon of governments and make difficult the pursuit of consistent and

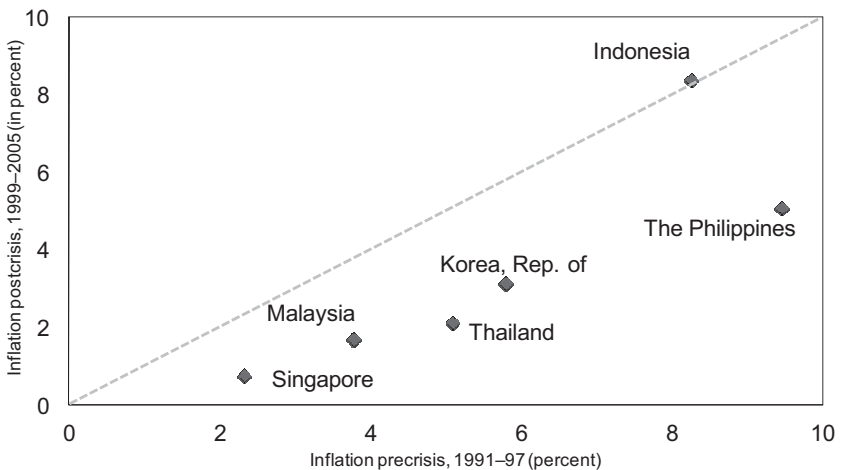


sound policies for maintaining low inflation. A number of political and institutional variables have been found to affect inflation, particularly in developing countries (Cukierman, Edwards, and Tabellini, 1991; Aisen and Veiga, 2005).

## Some Simple Facts That Explain Inflation in Indonesia and Neighboring Countries

Some factors explaining inflation seem to play a more important role in Indonesia than in neighboring countries.

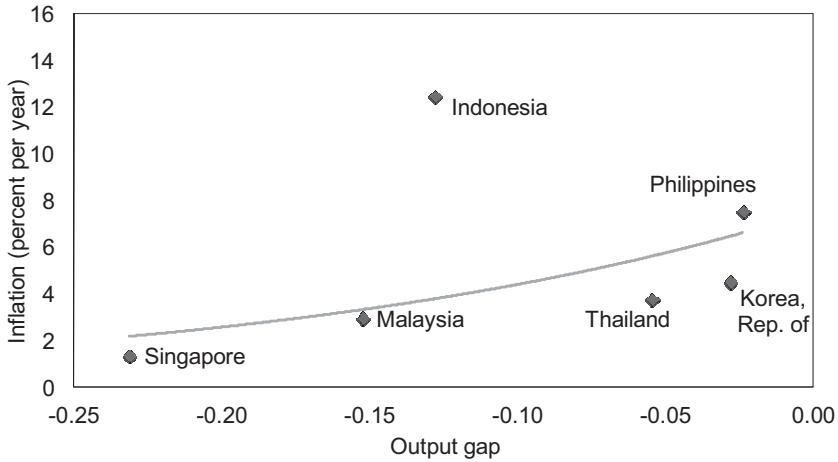
- Inflation inertia appears to be stronger in Indonesia than in the other countries in the sample. Countries that have had relatively high inflation rates in the past (e.g., in the precrisis period) have registered lower inflation rates in more recent years. In this respect, Indonesia seems to face stronger inflation inertia than the other countries as evidenced by the fact that inflation has been as high after the crisis as before the crisis (Figure 1.4).
- The positive relationship between inflation and the distance the economy is from full employment (the output gap) is stronger in Indonesia. As expected, smaller output gaps are associated with higher inflation rates across all the countries in the sample (Figure 1.5). Once again, Indonesia appears to be an outlier, with much higher inflation for a given output gap (Table 1.2).<sup>2</sup>
- Political and institutional factors affect inflation differently across countries. Political risks and government instability (measured by the International Country Risk Guide's [ICRG's] indexes) are positively correlated with infla-



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

**Figure 1.4** Pre- and Postcrisis Annual Average Inflation in Selected Asian Countries

<sup>2</sup>Results remain broadly unchanged if the average inflation rate calculation excludes the crisis period.



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

**Figure 1.5** Average Inflation Versus Average Output Gap in Selected Asian Countries, 1991–2005

tion across selected Asian countries. However, Indonesia is once again an outlier in the region, with high political risks associated with relatively higher inflation (Figures 1.6 and 1.7).<sup>3</sup>

In other respects, Indonesia is similar to other Asian countries. The influence of changes in monetary aggregates and exchange rates on inflation in Indonesia is broadly similar to that in neighboring countries (Figures 1.8 and 1.9). In Indonesia, monetary growth and currency depreciation (as measured by the

**TABLE 1.2**

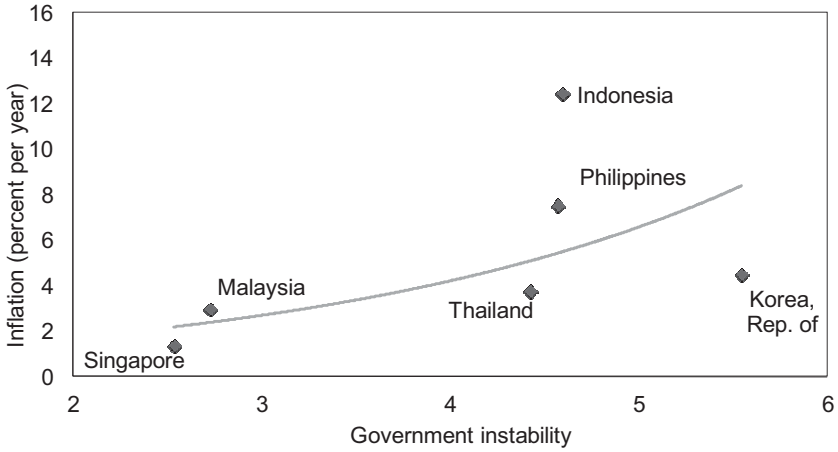
**Inflation Correlations in Selected Asian Countries and Indonesia, 1991–2005**

Variable	Asian Countries	Indonesia
Output gap	-0.16	-0.47
Political risks	0.43	0.39
Government stability	0.20	-0.12
M2 growth	0.62	0.79
NEER, percentage change	-0.58	-0.69

Source: IMF staff calculations.

Note: Asian countries include Indonesia, Republic of Korea, Malaysia, the Philippines, Singapore, and Thailand. M2 = money supply; NEER = nominal effective exchange rate.

<sup>3</sup>Indonesia would be less of an outlier if the average annual inflation rate calculation excluded the crisis period. Despite the similarity in the average level of political risk between Indonesia and Korea (and the lower average government instability in Indonesia), Indonesia has recently been falling behind Korea on both accounts. However, before the crisis, Indonesia had lower political risk and instability, thus showing a better average rating than Korea for the period as a whole.

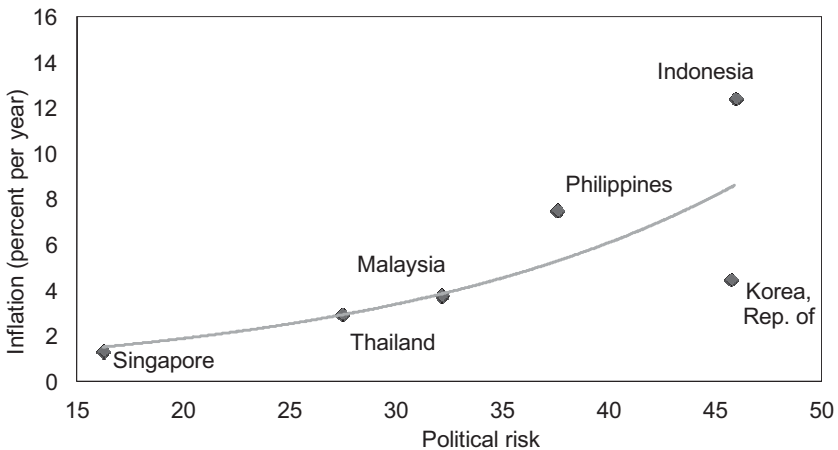


Source: Government stability derived from ICRG, as rebased.  
 Note: Higher government instability index denotes greater government instability.

**Figure 1.6** Average Inflation Versus Average Government Instability in Selected Asian Countries, 1991–2005

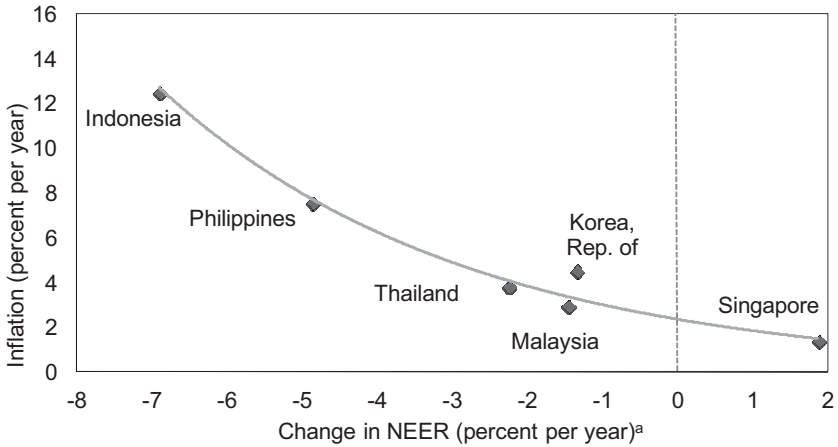
nominal effective exchange rate, or NEER) are on average higher, but the degree of correlation with inflation appears to be similar to that in other countries (Table 1.2). Notably, the more expansionary monetary policy and the higher average inflation rate in Indonesia suggest that the country’s inflation differential may be, in part, a monetary phenomenon.

Overall, inflation in Indonesia appears to differ from that in neighboring countries in the way it relates to certain structural factors while being similar in other respects. Therefore, an econometric analysis is needed both to clarify the



Source: Political risk derived from ICRG, as rebased.  
 Note: Higher political risk index indicates greater political risk.

**Figure 1.7** Average Inflation Versus Average Political Risk in Selected Asian Countries, 1991–2005



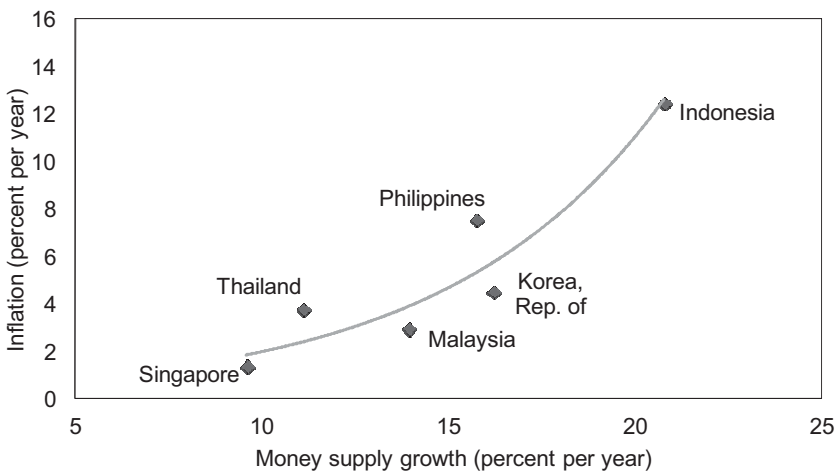
Sources: CEIC Data Co., Ltd.; and IMF, Information Notice System.  
 Note: <sup>a</sup>Lower number indicates currency depreciation.

**Figure 1.8** Average Inflation Versus Nominal Effective Exchange Rate in Selected Asian Countries, 1991–2005

differences and similarities of the inflation process in Indonesia and to explore the reasons underlying Indonesia's inflation differential vis-à-vis its neighbors.

## AN ECONOMETRIC ANALYSIS

In this section, an econometric analysis is used to explain why inflation in Indonesia has been higher than elsewhere in the region. The analysis is carried out in three steps. First, a cross-country empirical model identifying the main



Sources: CEIC Data Co., Ltd.; and IMF, International Financial Statistics.

**Figure 1.9** Average Inflation Versus Growth of Money Supply in Selected Asian Countries, 1991–2005

inflation determinants across the sample is estimated.<sup>4</sup> Second, a set of Indonesia-related slope dummies is employed to investigate whether the role of the inflation determinants in Indonesia differs from the average of the selected countries.<sup>5</sup> Finally, the causes of Indonesia's higher inflation are examined by looking at the combined effect of two elements: how inflation determinants have evolved in Indonesia compared with other countries in the sample and how they have affected inflation in Indonesia differently as compared with other countries (using the coefficients of the dummy variables). In this framework, the basic econometric model sets a benchmark against which to test different hypotheses about the reasons for higher inflation in Indonesia.

## Step 1. Explaining Cross-Country Inflation in Selected Asian Countries

A simple model explains inflation well in the selected Asian countries. Across the sample, the rate of inflation depends positively on past inflation, the output gap, growth in the money supply (as defined by "M2," meaning money in circulation and close substitutes), and currency depreciation (Table 1.3). Inflation also depends on institutional factors as measured, for example, by the ICRG's political risk index. In particular, government instability and the quality of national bureaucracies are the two institutional factors that make the strongest contribution

**TABLE 1.3**  
Determinants of Cross-Country Inflation in Asian Countries

Variable	Model (1)	Model (2)
Previous inflation	0.64***	0.6***
Output gap	0.12*	0.11**
M2 growth	0.03***	0.03***
NEER growth <sup>a</sup>	-0.20**	-0.20**
Political risk	0.10**	
Government instability		0.14***
Lack of bureaucracy quality		0.59*
Chi-square	0.66	0.00
Number of observations	348	348

Source: IMF staff estimates.

Notes: Difference GMM estimations using quarterly data 1990:Q4–2005:Q4. Independent variable: End-period inflation rate. Countries: Indonesia, Republic of Korea, Malaysia, the Philippines, Singapore, and Thailand.

\*denotes significance at 10 percent.

\*\*denotes significance at 5 percent.

\*\*\*denotes significance at 1 percent.

<sup>a</sup>Negative changes indicate depreciation.

<sup>4</sup>The basic model is a dynamic panel in which the explanatory variables include the lagged dependent variable. To address possible endogeneity problems, difference generalized method of moments (GMM) estimators are used (Arellano and Bond, 1991).

<sup>5</sup>The coefficients of the slope dummies measure the extent to which the impact of a given variable on inflation is different in Indonesia compared with the sample of selected countries.

to inflation.<sup>6</sup> Structural factors such as the degree of economic openness, the public debt burden, and the level of price regulation (as measured by an index from the Heritage Foundation) play no role in shaping inflation dynamics across the selected countries. (These results are not reported.)

## Step 2. What Is Special about Inflation in Indonesia?

Inflation in Indonesia is more persistent and more sensitive to country-specific shocks and political risks than it is in other Asian countries. The estimates of the slope dummies suggest that inflation in Indonesia is more sensitive to past inflation, the output gap, exchange rate fluctuations, and political risks than it is in the other countries of the sample. The estimated magnitude of these effects appears significant. For example, using a modified version of our basic model (Table 1.4, Model 3), an additional 1 percentage point in past inflation is associated with an increase in the inflation rate of about 0.65 percent in Indonesia, 0.2 percentage points higher than the sample average. This suggests that the historically high inflation rates in Indonesia have generated strong inflation inertia. At the same time, an additional 1 percentage point change in either the output gap or in the depreciation of the currency in Indonesia is associated with an increase in the inflation rate of about 0.36 percent, 0.3 percentage points higher than in other countries (Table 1.4, Models 4 and 6). Finally, a 1 percentage point increase in the overall political risk index increases inflation in Indonesia by 0.2 percentage points compared with an increase of 0.1 percentage points for the average of the sample (Table 1.4, Model 7). The results are robust to structural changes caused by the crisis as the model estimated for the whole sample is broadly similar to the model estimated for the postcrisis period.

Monetary policy has similar effects on inflation in Indonesia and other Asian countries. The coefficient of the Indonesia-related slope dummy for money growth is not significant (Table 1.4, Model 5). This suggests that an additional 1 percentage point increase in the growth of M2 is associated with an increase in inflation of a magnitude similar to that in neighboring countries.

## Step 3. Explaining the Indonesian Inflation Differential

The inflation differential between Indonesia and neighboring countries is largely explained by inflation inertia and political risks along with rapid monetary expansion and currency depreciation. In general terms, the inflation differential can be explained by a combination of two elements: how the different factors influencing inflation have evolved over time in each country and how differently these factors have affected inflation in Indonesia relative to other countries (in

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<sup>6</sup>The ICRG political risk variable aggregates 12 subcomponents, including government stability and bureaucracy quality. The indexes have been rebased so that the greater the political risks (instability, lack of quality of the bureaucracy, and so on), the higher are the indexes.

TABLE 1.4

Determinants of Cross-Country Inflation					
Variable	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)
Previous inflation	0.45***	0.67***	0.60***	0.53***	0.63***
Output gap	0.13*	0.08*	0.12**	0.09**	0.12**
M2 growth	0.03***	0.03***	0.02***	0.01***	0.03***
NEER growth <sup>a</sup>	-0.20***	-0.19**	-0.18**	-0.06***	-0.19**
Political risk	0.12***	0.10*	0.11***	0.90***	0.07**
Indonesia dummy					
Previous inflation	0.20**				
Output gap (Indonesia dummy)		0.28***			
M2 growth (Indonesia dummy)			0.07		
NEER growth (Indonesia dummy)				-0.30***	
Political risk (Indonesia dummy)					0.10***
Chi-square	0.00	0.00	0.00	0.00	0.00
Number of observations	348	348	348	348	348

Source: IMF staff estimates.

Notes: Difference GMM estimations using quarterly data 1990:Q4–2005:Q4. Independent variable: End-period inflation rate. Countries: Indonesia, Republic of Korea, Malaysia, the Philippines, Singapore, and Thailand.

\*denotes significance at 10 percent.

\*\*denotes significance at 5 percent.

\*\*\*denotes significance at 1 percent.

<sup>a</sup>Negative changes indicate depreciation.

this model, the coefficients of the Indonesia slope dummies). Looking at the combined effects of these two elements, inflation inertia and political risks explain, on average, about 75 percent of the Indonesian inflation differential with respect to selected Asian countries (Table 1.5).<sup>7</sup> Monetary policy and exchange rate depreciation are also seen to contribute to the inflation differential, although to a smaller extent (about 25 percent), with the additional money-generated

TABLE 1.5

Variable	Sources of the Average Indonesian Inflation Differential				Average additional inflation effect <sup>a</sup>	
	Coefficients of dummies	Mean variables		Percentage difference	Total (percentage points)	Proportion (percentage of total)
		Sample <sup>b</sup>	Indonesia			
Previous inflation	0.20	5.5	12.7	132.0	5.2	42.6
Output gap	0.28	-0.2	-0.1	-19.4	0.0	0.0
M2 growth <sup>c</sup>	0.07	12.9	20.4	57.5	1.1	9.0
NEER growth	-0.3	-2.5	-6.9	176.5	2.0	16.0
Political risk	0.10	31.8	45.8	44.0	4.0	32.4
Total					12.3	100.0

Source: IMF staff estimates.

<sup>a</sup>Effects calculated using different models and average values.

<sup>b</sup>Countries: Indonesia, Republic of Korea, Malaysia, the Philippines, Singapore, and Thailand.

<sup>c</sup>Coefficient not significant.

<sup>7</sup>These values are only indicative because they are obtained by using coefficients from different models.

inflation coming from the expansionary monetary policy in Indonesia compared with other countries. In contrast, the output gap has played little role in determining the Indonesian inflation differential because its stronger effect on inflation (significant and large slope dummy coefficient) has been largely offset by the lower average output gap in Indonesia compared with the other countries in the sample.

## CONCLUSIONS AND POLICY ISSUES

Over the past two decades, Indonesia has recorded persistently higher inflation than its neighbors have. This analysis suggests that the causes of the Indonesian inflation differential with respect to other countries in the region include various factors such as strong inflation inertia and political instability, combined with expansionary monetary policy and currency depreciation. Conversely, structural factors such as the degree of economic openness, the public debt burden, and the level of price regulation play no role in explaining differences in inflation across Asian countries.

In light of the entrenched nature of inflation in Indonesia, reducing it requires maintaining a consistent monetary framework and establishing the credibility of that framework. The strong persistence of inflation implies that the convergence process toward the lower regional inflation rates might be slow and costly to economic growth. To reduce this cost, and to accelerate the convergence process, Bank Indonesia has to build its credibility and thus affect the formation of inflation expectations. In this respect, Bank Indonesia's development and establishment of a strong and credible inflation-targeting framework could play an important role in reducing inflation to regional standards.

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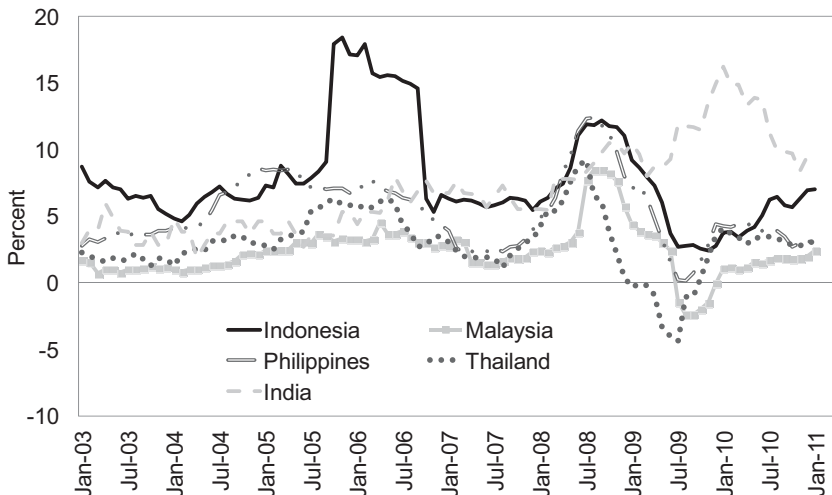
# Inflation Uncertainty and the Term Premium

Laura Lipscomb and Uma Ramakrishnan

Based on the term structure model for determining nominal bond yields, this chapter identifies the impact on the cost of borrowing of Indonesia's relatively higher inflation level and volatility relative to its peers. The higher inflation volatility in Indonesia creates greater uncertainty in forecasting inflation, resulting in a relatively higher inflation risk premium.

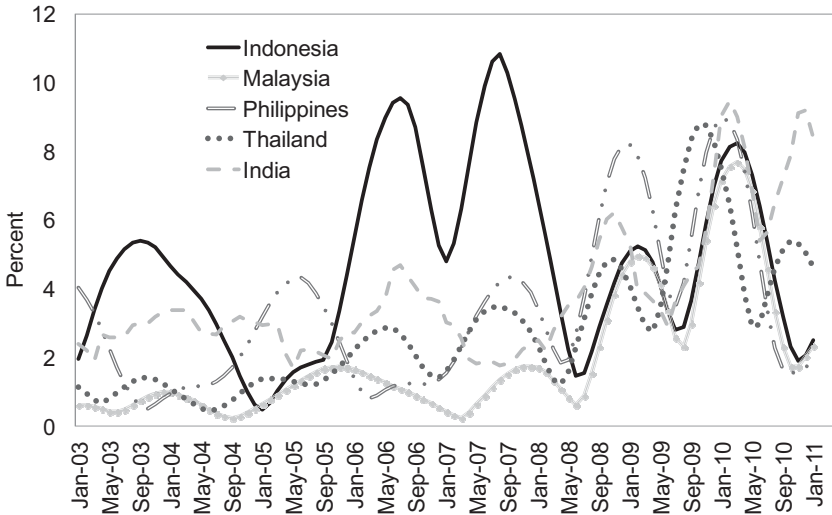
Indonesia's consumer price inflation level and volatility have been historically higher than some of its peer emerging-market economies.

- Annual inflation in Indonesia, as measured by the consumer price index (CPI), has averaged nearly 12 percent since 1997 and 8.5 percent since the formal adoption of the inflation-targeting framework in July 2005 (Figure 2.1). By comparison, inflation rates for some of Indonesia's Asian peers, such as Malaysia, Thailand, and the Philippines, have averaged about 3–6 percent since July 2005.



Source: IMF staff estimates.

**Figure 2.1** Consumer Price Inflation (Year-on-year)



Source: IMF staff estimates.  
 Note: Twelve-month rolling volatility based on annual average inflation.

**Figure 2.2** Consumer Price Inflation Volatility

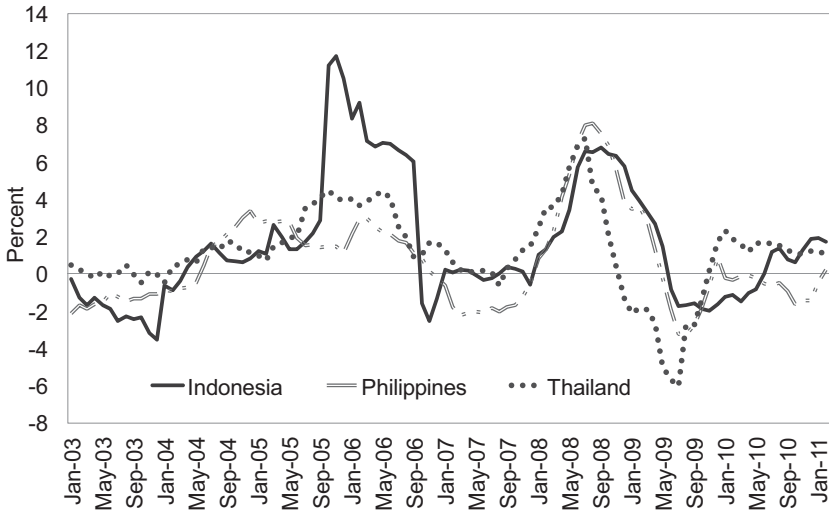
- Average inflation volatility in Indonesia has also been significantly higher than that of its peers (Figure 2.2). The spikes in Indonesia’s inflation volatility are correlated with administrative price adjustments (Table 2.1). Even core inflation in Indonesia has been highly volatile, as second-round effects from administered energy price increases pass through to the broader economy (correlation coefficient between core and energy inflation = 0.75). Deviations of the inflation outcome relative to annual inflation targets—which have typically been adjusted in anticipation of administrative price increases—are higher on average than those of the comparator group (Figure 2.3).

The historical volatility of Indonesia’s inflation appears to contribute to uncertainty about estimates of its future inflation. The dispersion of CPI survey forecasts can be used as a proxy for uncertainty about these forecasts (among others, Durham, 2006; and Wright, 2009). Based on data from Consensus Forecasts, the 12-month moving average standard deviation of forecasts for Indonesia’s

**TABLE 2.1**  
 Administrative Price Adjustments (percent)

Fuel type	February 2005	October 2005	June 2008	December 2008	January 2009
Gasoline	32.6	87.5	33.3	-12.5	-14.3
Kerosene	0.0	185.7	25.0	0.0	0.0
Auto diesel	27.3	104.8	27.9	-6.4	-6.8

Source: IMF staff estimates.



Source: IMF staff estimates.

Note: Malaysia and India do not follow an inflation target.

**Figure 2.3** Annual Inflation Deviation from Inflation Target

year-ahead CPI historically has been much higher than those for Malaysia and Thailand (Figure 2.4).<sup>1</sup>

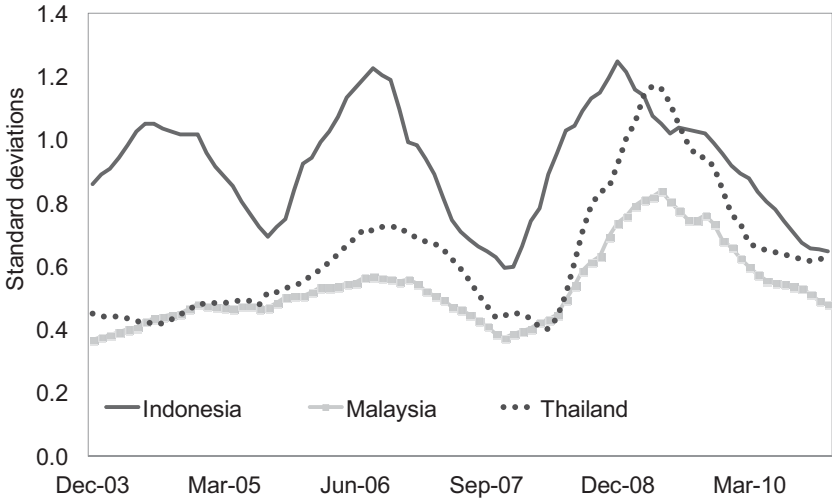
Both theoretical and empirical evidence show that high volatility and unpredictability of inflation creates economic costs. Studies have identified a negative relationship between both the inflation level and its volatility relative to income growth (see, for example, Judson and Orphanides, 1999). Among the channels through which high and volatile inflation creates economic costs is a higher cost of capital.<sup>2</sup> Indeed, Indonesia's domestic (and international) borrowing costs have been higher than those of comparable emerging-market economies (Figure 2.5).<sup>3</sup>

Against this background, this chapter examines the term premium on Indonesia's domestic government yields relative to that of peers to illustrate the impact of inflation uncertainty on borrowing costs. The term premium—that is, the nominal premium sought by investors to compensate for delaying consumption (real term premium) and for inflation uncertainty (inflation risk premium) as explained in more detail in the next section—is calculated using two

<sup>1</sup>Dispersion for the Philippines is not shown owing to lack of a long enough time series in Consensus Forecasts.

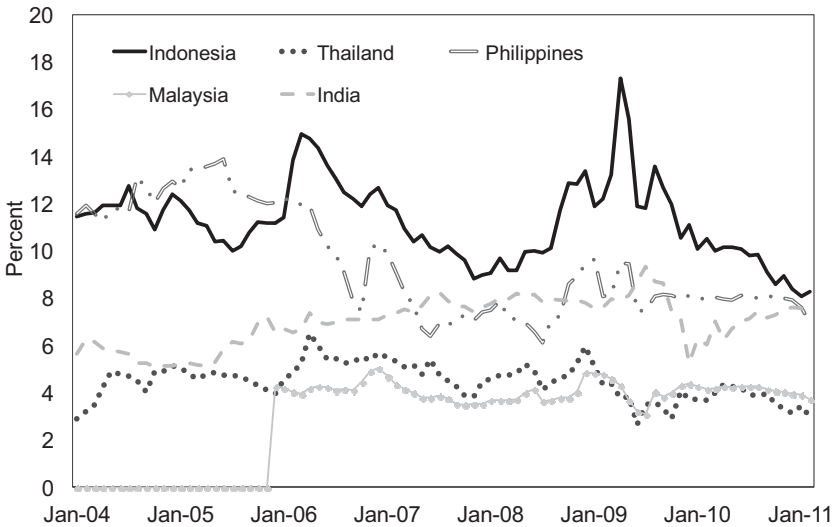
<sup>2</sup>Although high levels of inflation and volatility can be welfare reducing, low inflation and price stability are not sufficient conditions to achieve higher growth, especially if the supporting economic and institutional environment is weak (see Acemoglu and others, 2003).

<sup>3</sup>See Goyal and Ruiz-Arranz (2009) for factors determining Indonesia's sovereign external spreads relative to its peers.



Source: IMF staff estimates.

**Figure 2.4** Standard Deviation of Year-Ahead CPI Forecasts (12-month rolling average)



Source: IMF staff estimates.

**Figure 2.5** Ten-Year Government Local Currency Debt Yield

methodologies for Indonesia relative to other countries. The analysis finds Indonesia’s distant-horizon forward rates (which abstract from the near-term monetary policy stance) are consistently above those of its peers. The findings suggest that Indonesia’s term premium is on average higher than those of its peers, as would be expected as a result of higher inflation uncertainty. The results provide useful information for policymakers given that enhanced monetary policy credibility has been found to lower term premiums on developed-country government yield curves and, by extension, borrowing costs to the wider economy.

## LITERATURE AND FRAMEWORK

A domestic economy's benchmark borrowing cost is usually determined by government borrowing rates. Government bond yields comprise an average expected future real short-term interest rate over the length of the bond, expected inflation over the length of the bond, and a nominal term premium. The nominal term premium is made up of a real term premium and an inflation risk premium. The real term premium is what investors demand for tying up their funds and delaying consumption. The inflation risk premium is what they demand as additional compensation for uncertainty about expected inflation.

### Literature

Recent studies have used developed-country yield curves to estimate term premiums and explain downward shifts in long-term borrowing costs. These studies have grown out of the “conundrum” question as to why long-term interest rates in the United States and euro area countries underwent a sustained decline in the middle of the last decade. Kim and Wright (2005) show that much of the decline in long-term U.S. Treasury yields to 2004 can be explained by a decline in term premiums. Among the factors they suggest as possibly leading to a drop in the term premium are increased attractiveness of longer-maturity obligations resulting from better anchored inflation expectations and a decline in the volatility of real activity, foreign official reserve purchases of developed-country government debt, regulations that encourage pension funds to better match assets and liabilities, reduced home bias of foreign investors, and demographic trends. Likewise, in a cross-country study of developed-country yields, Wright (2009) finds that those countries that reduced inflation uncertainty saw a decline in term premiums.

These studies, however, note the difficulty of isolating the factor—either the real term premium or the inflation risk premium—driving down the nominal term premium. For countries that issue inflation-indexed bonds, it is theoretically possible to isolate the inflation risk premium from the term premium, although the relative liquidity of nominal versus inflation-indexed notes is a major factor distorting estimates. The difference between the distant-horizon forward rate derived from yields on a nominal government bond curve and a similarly derived forward real rate from the inflation-indexed government bond curve comprises expected inflation, a (forward) inflation risk premium, minus a liquidity premium that investors charge to purchase less-liquid inflation-indexed securities.<sup>4</sup> Using well-developed surveys of inflation expectations for these countries, it would be possible to identify the value of the inflation risk premium minus the liquidity premium. However, given the lack of inflation-indexed bonds in a majority of emerging markets, so far such studies are limited.

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<sup>4</sup>See Durham (2006) and Hordahl (2008) and references therein for a review of previous studies.

## Framework

The analysis in this chapter is based on a term structure model for determining nominal bond yields. The basic relationship is defined as follows: the nominal forward interest rate ( $i$ ) derived from government bond yields equals the sum of the expected short-term real rate ( $r^e$ ), expected inflation ( $\pi^e$ ), real term premium ( $r^{TP}$ ), and inflation risk premium ( $\pi^{RP}$ ). The sum of real term premium and inflation risk premium ( $r^{TP} + \pi^{RP}$ ) equals the nominal term premium. Thus, for a 1-year forward rate:

$$i = (r^e + \pi^e) + (r^{TP} + \pi^{RP}) \quad (2.1)$$

As discussed above, the real term premium compensates investors for delaying consumption for one additional year, and the inflation risk premium is the additional premium investors demand to compensate them for inflation uncertainty.

Rearranging equation (2.1) gives a simple measure of the term premium:

$$(r^{TP} + \pi^{RP}) = (\textit{nominal forward rate} - \textit{expected real short rate}) - \pi^e \quad (2.2)$$

The term premium is estimated as the  $n$ -year forward rate less the expected future short rate less expected inflation. The advantage of using distant-horizon forward rates is that they abstract from the current monetary policy stance and near-term monetary policy expectations.

For the countries in the study, a number of data approximations were made to estimate the term premium.<sup>5</sup> Accordingly, two methodologies are applied to extract term premium estimates from nominal bond yields. In both methodologies, distant-horizon nominal forward rates are calculated using local currency government debt yields. Given data limitations, the findings are best interpreted as a relative measure—that is, the level of Indonesia’s term premium relative to other comparators—rather than an absolute estimate of the term premium for each country (see also footnote 7).

- *Methodology I:* The term premium identified in equation (2.2) is estimated using monthly data as follows.
  - The distant-horizon forward rate is calculated as the 1-year rate, 9 years forward, and is called the “1-year forward rate” for simplicity. It is calculated using 9- and 10-year government debt yields.<sup>6</sup> The forward rate formula is

$$f_{m,n} = \frac{D_n \times Y_n - D_m \times Y_m}{D_n - D_m}, \quad (2.3)$$

<sup>5</sup>In addition to Indonesia, this analysis estimates term premiums for Malaysia, India, the Philippines, Thailand, and Mexico. Methodology I is not applied to India because of the absence of bond yield data of contiguous maturities necessary to estimate a 1-year forward yield.

<sup>6</sup>Generic government yield time series are used as constructed by Bloomberg (i.e., each benchmark 10-year bond yield rolls into the new issue).

where  $f_{m,n}$  is the forward rate between  $m$ - and  $n$ -period bonds,  $D_n$  is the duration of the  $n$ -period bond,  $D_m$  is the duration of the  $m$ -period bond,  $Y_n$  is the yield on the  $n$ -period bond, and  $Y_m$  is the yield on the  $m$ -period bond.<sup>7</sup> For this study, the maturities used were  $n = 10$  years and  $m = 9$  years.<sup>8</sup> As already noted, a distant-horizon 1-year forward rate, rather than a 1-year government bond yield, is used because distant-horizon rates abstract from the short-term monetary policy stance relative to the cyclical position. If the bond yield under consideration were to include short-term monetary policy expectations, isolating the term premium would be rendered even more difficult.<sup>9</sup>

- The short-term expected real interest rate is proxied by a time-invariant rate that reflects the underlying real interest rate in the economy. To calculate this rate, the 1-month central bank bill rate and actual annual core inflation are used.<sup>10,11</sup> The monthly real rate is then averaged for the period January 2001 to December 2010.<sup>12</sup>
- As a proxy for expected inflation, it is assumed that investors have perfect foresight; that is, expected inflation was assumed to equal the 12-month-ahead actual core inflation.
- *Methodology II:* This method offers an alternative estimate of Indonesia's term premium relative to its peers. For this method, it is assumed that the

<sup>7</sup>In the absence of zero-coupon yields, it is assumed that duration equals maturity, that is,  $D(n) = n$  and  $D(m) = m$ , for the 9- and 10-year bonds. A test was done using precise duration calculations for several data points and the magnitude of the difference in the forward rates was small. Because this simplification is applied across all the countries in the study, the comparative findings have greater meaning than absolute estimates of the term premium. For a detailed derivation of this formula, see Campbell, Lo, and MacKinlay (1997).

<sup>8</sup>In the absence of a complete data series on the 9- and 10-year government yields for the Philippines, the implied forward rate is calculated on the 4- and 5-year government yields.

<sup>9</sup>For example, the 1-year government bond yield will comprise the actual current short-term rate (say 1-month) and average expected short-term rates out to one year plus a term premium. The 1-month rate will be determined almost entirely by the current monetary stance, and expected future short-term interest rates will be determined almost entirely by expected monetary policy moves. The distant-horizon forward rate abstracts from monetary policy expectations and comprises a real return to capital (the time-invariant real rate used here), expected inflation, and a term premium.

<sup>10</sup>Using headline inflation is likely to bias inflation expectations upward and real rates downward because of the large spikes arising from the administered price changes. Using core inflation corrects this problem. Moreover, because the analysis uses distant-horizon forward rates, future changes in core inflation are a better approximation of expected inflation over time.

<sup>11</sup>A time-variant real rate was not used because sporadic negative real rates during periods of high inflation distort the underlying long-term economic real interest rate. In addition, the real return to capital adjusts slowly based on the capital-to-labor ratio and thus a long-term average is more appropriate than are monthly observations.

<sup>12</sup>In line with the explanation in footnote 14, the sporadic negative real rates are removed because they would otherwise bias the real rate downward.



expected real short-term interest rate is the same across comparator countries.<sup>13</sup> Thus, the following equation gives the *difference* in the five-year term premiums between Indonesia and a comparator country. The equation does not give the *level* of term premium for each country.

$$(\text{Yield}^{\text{IDN}} - \Pi^{\text{e IDN}}) - (\text{Yield}^{\text{Country Y}} - \Pi^{\text{e Country Y}}), \quad (2.4)$$

where  $\text{Yield}^{\text{IDN}}$  is the nominal five-year rate five years forward (or the five-year forward rate, to simplify) for Indonesia,  $\text{Yield}^{\text{Country Y}}$  is the five-year forward rate for the comparator country, and  $E(\Pi)$  is expected inflation 5 to 10 years ahead as reported in Consensus Forecast survey results.<sup>14</sup> The sample period runs from 2003 to early 2011.

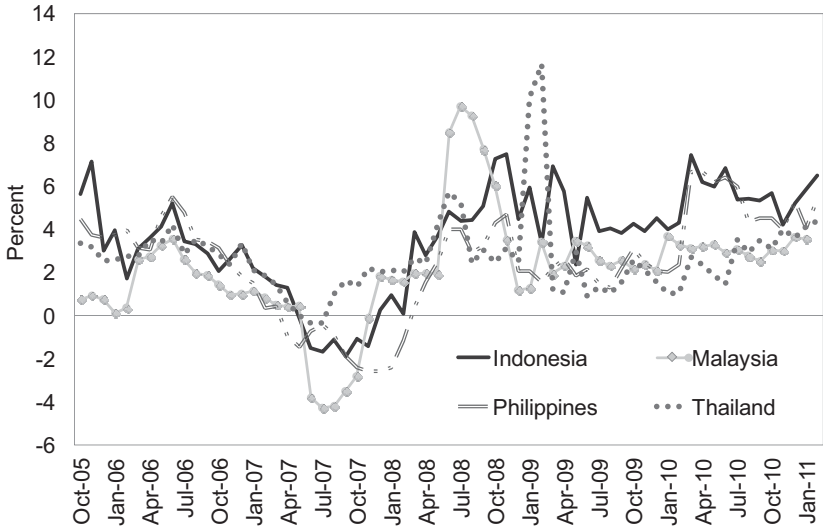
## RESULTS

Analysis of forward rates based on Methodology I illustrates that Indonesia has a relatively higher term premium than its peers. For the period June 2005 to February 2011, Indonesia's term premium has, on average, been higher than those for Malaysia, the Philippines, and Thailand. Focusing on broad trends, although the term premiums for all the countries, including Indonesia, were trending down until about late 2007, Indonesia's term premium subsequently rose substantially more than those of other countries and has stayed at a somewhat elevated level relative to the comparator group (Figure 2.6). Despite an increase in inflation volatility for all the sampled countries after the second half of 2008—when they were struck by the global food and fuel price shock of 2008 and the financial crisis in 2009—implying generally uniform shocks to all countries, Indonesia's term premium increase has remained persistently higher, with the exception of a brief period in the second half of 2010 when Indonesia's forward rates were briefly lower than those of some of its peers.<sup>15</sup> A simple regression of the term premium on core inflation volatility, with controls for seasonal movements, indicates that nearly two-thirds of the change in term premium during the selected time period arises from inflation volatility, suggesting that a higher inflation risk premium could be driving Indonesia's higher term premiums.

<sup>13</sup>Such an assumption is suitable for emerging-market countries at broadly similar stages of economic and market development.

<sup>14</sup>The benefit of using long-term inflation expectations (e.g., average expected inflation 5–10 years ahead) is that these abstract from near-term factors that impact inflation expectations, such as administered price increases and commodity price pass throughs. Instead, long-term inflation expectations get to the level of inflation expected to be targeted or managed by monetary policy on average, over time. Five-year forward rates are used instead of 1-year forward rates in Methodology II because the 5-year forward rate matches up with the 5–10 years ahead annual inflation expectations as reported by Consensus Forecasts. Forward rates are calculated as described in Methodology I.

<sup>15</sup>This was also when the second-round inflationary effects related to Indonesia's 2008 administrative price increase took hold.



Source: IMF staff estimates.

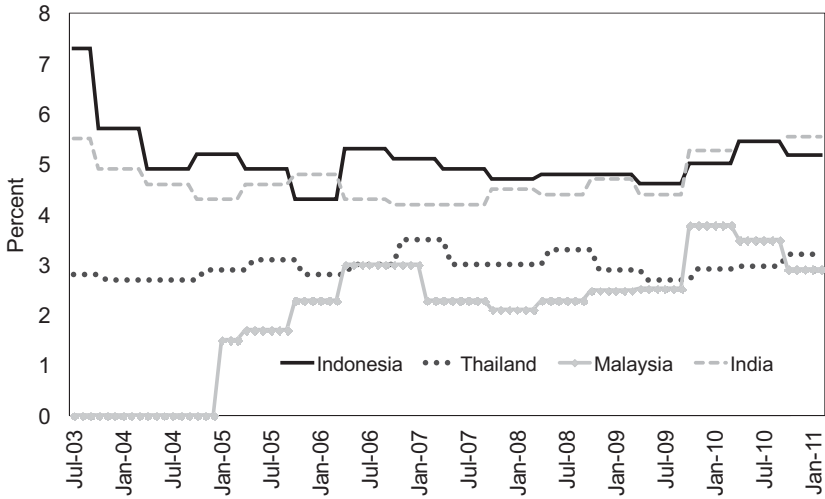
**Figure 2.6** Term Premiums by Country

Analysis of forward rates based on Methodology II also suggests that, on average, Indonesia has a higher term premium than its peer countries. Through the period examined, Indonesia almost always had higher long-term inflation expectations than the peer group (Figure 2.7). Indonesia also had higher forward rates than comparator countries (Figure 2.8).

The results from Methodology II also illustrate the extent to which higher expected inflation rates alone do not explain Indonesia's higher forward rates. The additional returns that investors perpetually require in Indonesia in excess of the higher expected inflation ( $\Pi^e_{IDN}$ ) relative to each peer country ( $\Pi^e_{Country Y}$ ) are reflected in Indonesia's higher term premium relative to comparator countries, with the exception of a few months in 2010 when Indonesia's relative term premium was lower than that in the Philippines (Figure 2.9).

## POLICY IMPLICATIONS

Indonesia's perpetually higher term premium illustrates the cost to the government, and by extension to the wider economy, of investor uncertainty about inflation risk. The higher term premium does not arise simply because investors expect higher inflation in Indonesia (estimating the term premium already accounts for the higher expected inflation using the actual 12-month-ahead inflation in Methodology I, and survey expectations in Methodology II). Term premium estimates quantify the compensation investors require, on top of their

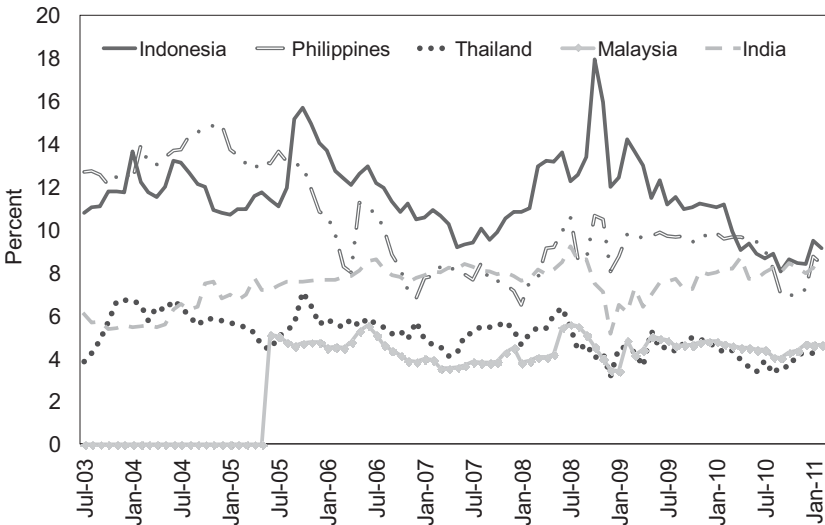


Source: Consensus Forecasts.

**Figure 2.7** Long-Term Inflation Expectations: Annual Average of Expected Inflation 5-10 Years Ahead

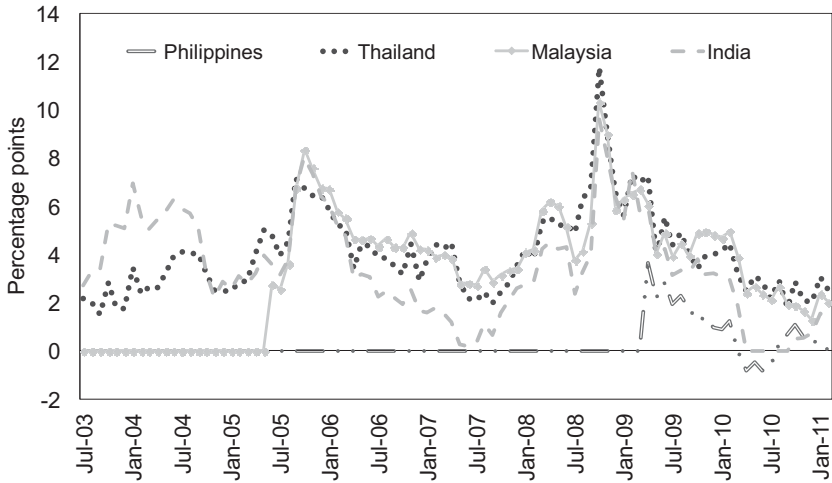
expectations for inflation, for their relative inability to predict inflation, which poses an additional risk to their real returns.

The term premium imbedded in the yield curve could be useful for judging the extent to which monetary policy is anchoring inflation expectations. Large and persistent inflation fluctuations increase investor uncertainty about future inflation, and investors thus demand a higher premium as compensation for this



Source: IMF staff estimates.

**Figure 2.8** Five-Year Forward Rates



Source: IMF staff estimates.

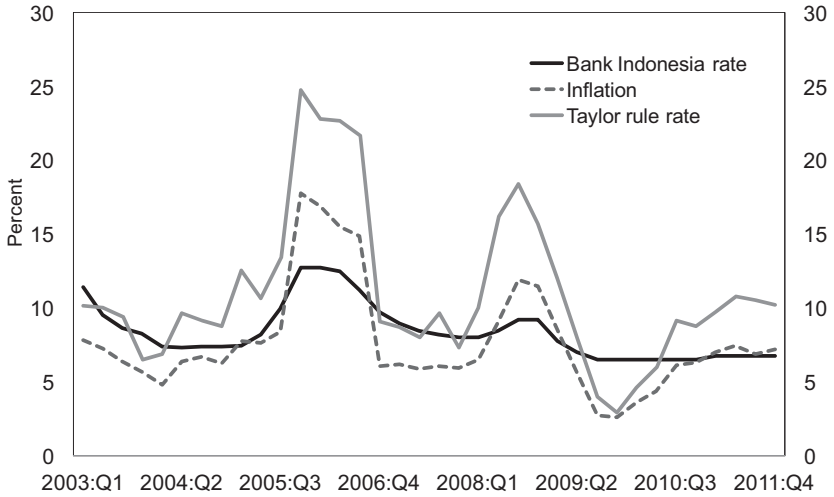
**Figure 2.9** Indonesia's Relative 5- to 10-Year Nominal Term Premium (Difference between Indonesia and other countries)

risk. If a government is paying a large term premium because of a high inflation risk premium, financing costs could be lowered by issuing inflation-indexed bonds.<sup>16</sup>

- The relatively higher inflation volatility for Indonesia and larger deviation of actual inflation from forecasts compared with other countries suggest that investors have a higher degree of inflation uncertainty for Indonesia. In addition, the dispersion of survey forecasts indicates that survey participants are more uncertain about their forecasts of inflation in Indonesia than they are for the comparator countries.
- An explanation for higher inflation uncertainty in Indonesia is that monetary policy has not anchored inflation expectations as successfully as monetary policy in the peer group has. More specifically, ahead of the inflation bout in 2005–06—when one round of administrative price adjustments occurred—policy rates were low compared with Taylor rule estimates (Figure 2.10).<sup>17</sup> This stance may have exacerbated the subsequent inflation

<sup>16</sup>The caveats are, however, that governments will have to pay out relatively more on inflation-indexed bonds if actual inflation ends up higher than inflation expectations imbedded in nominal bond yields; also, the liquidity premium demanded by investors to buy less-liquid inflation-indexed bonds may erode savings from eliminating the inflation risk premium. Of course, issuing a greater proportion of short-term debt would lessen the term premium the government pays, but doing so would raise roll-over risks, reduce liquidity in remaining longer-dated issues, and eliminate an important benchmark for private sector long-term borrowing.

<sup>17</sup>Taylor rule estimates are derived using potential output measures based on the Hodrick-Prescott filtering technique, and Bank Indonesia's annual inflation targets. The Taylor rule provides a framework for evaluating the stance of monetary policy and the level of the nominal interest rate (see Taylor, 1993).



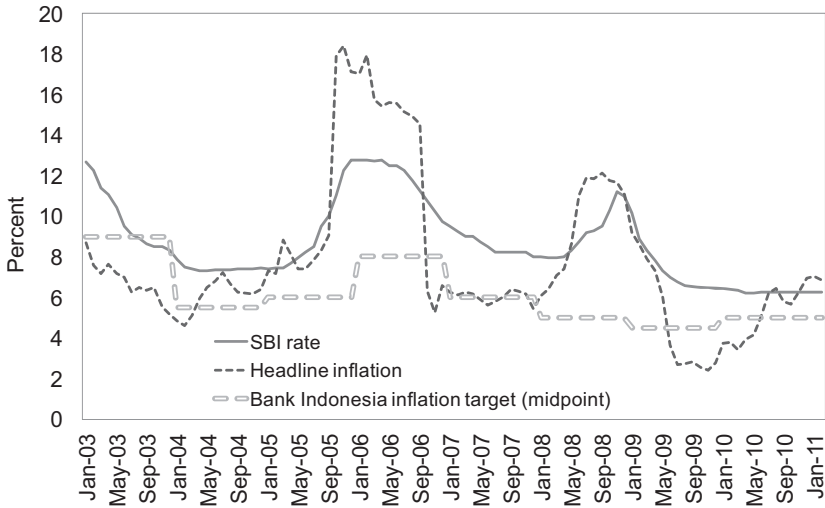
Source: IMF staff estimates.

**Figure 2.10** Indonesia: Monetary Policy Stance

pressures rising from the administrative price hikes, leading to a large miss relative to the inflation target. In 2008, although policy accommodation was likely appropriate given external conditions, another large miss of inflation relative to target occurred, when an administrative price hike happened in tandem with the global food and fuel price shock (Figure 2.11). Notwithstanding the limitations of the estimated Taylor rule, these two episodes, combined with ongoing political discussions about the timing and extent of future administrative price hikes, could be contributing to higher perceived inflation risks. Even during periods of low global and domestic inflation, Indonesia's term premium remains higher than that in comparator countries. This difference is likely related to investors' continued uncertainty about the likelihood that an appropriate level of inflation will be realized on average over time.

How can inflation expectations be anchored and the inflation risk premium lowered?

- As discussed in the literature, countries that established higher levels of monetary policy credibility saw a decline in the term premium on their domestic government debt. A relatively aggressive monetary policy response to emerging inflation pressures has a near-term cost to the economy because it dampens growth. However, in the long run, well-anchored inflation expectations will help depress the nominal cost of capital by lowering both expected inflation and the inflation risk premium, supporting long-term growth. Greater monetary policy credibility will be established with a track record of meeting inflation targets.
- In addition, effective communication with market participants about how inflation targets will be set and met is also necessary to better anchor expecta-



Source: IMF staff estimates.

Note: SBI = Bank Indonesia certificate.

**Figure 2.11** Inflation and Interest Rate

tions. In particular, Bank Indonesia (BI) could improve its signaling of adjustments to the monetary stance, thus clarifying the monetary policy reaction function. Communicating that BI is committed to meeting the middle of the inflation target band on average, over time, would be effective in dampening expected inflation volatility and the inflation risk premium. Targeting progressively lower levels of inflation going forward, in line with its trade partners, could help lower volatility and reduce Indonesia's borrowing costs.

- Gaining policy credibility also requires that monetary operations be consistent with the announced monetary stance. Consistency and transparency of monetary operations in line with the announced stance are necessary to achieve policy credibility.<sup>18</sup> In this regard, the measures announced in 2010 for liquidity management and interbank market development are steps in the right direction to help improve monetary operations.<sup>19</sup>

<sup>18</sup>Poirson (2008) delves into these issues in the discussion of monetary policy communication for India.

<sup>19</sup>On June 16, 2010, BI announced measures that include a 1-month minimum holding period on Bank Indonesia certificates (SBIs); lengthening of SBI maturity, including the introduction of 9- and 12-month bills; widening of the interest rate corridor by 100 basis points to 200 basis points; a 1-month term deposit facility; and an initiative to facilitate triparty repo trading.

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# Maintaining Fiscal Sustainability Under Uncertainty

NINA BUDINA

Indonesia's public debt outlook is stronger than in many advanced and emerging economies. Nevertheless, Indonesia, like other emerging economies with relatively low debt levels, is still exposed to shocks. This chapter presents considerations for setting up a fiscal strategy in Indonesia aimed at maintaining sustainability while managing uncertainties and risks. Stochastic simulations confirm that a medium-term fiscal consolidation strategy, based on subsidy reduction and revenue administration reforms in line with the authorities' framework, is robust to macroeconomic and oil price shocks. However, delaying subsidy reform could increase fiscal vulnerabilities in the context of rising fuel consumption, volatile oil prices, and oil production shocks.

## INTRODUCTION

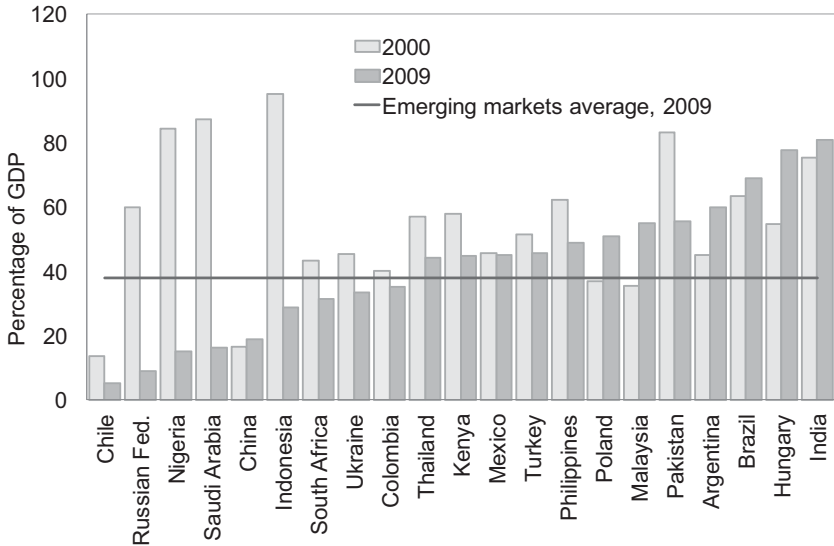
Indonesia's public-debt-to-GDP ratio has been on a declining trend since 2000 and fell to 29 percent in 2009, well below the average for emerging and advanced countries (Figure 3.1). Prudent fiscal management resulting in sustained primary fiscal surpluses (1.6 percent of GDP per year on average since 2000), combined with favorable debt dynamics, supported a continuous reduction in the debt ratio, which in 2009 stood at about a third of its 2000 level. Foreign currency debt has also been reduced to less than half of total debt because the improved fiscal position facilitated domestic capital market access. The authorities' medium-term fiscal strategy targets further gradual fiscal consolidation and reductions in public debt. This strategy is based on improvements in tax administration and other efforts to broaden the tax base, with a reorientation of spending toward development of infrastructure and a phase out of energy subsidies.

Maintaining low levels of public debt is a prudent strategy—the 2007–09 global economic and financial crisis has shown that even emerging economies with relatively low debt levels, like Indonesia, are still exposed to shocks and have low debt tolerance.<sup>1</sup>

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<sup>1</sup>Reinhart, Rogoff, and Savastano (2003) argued that “safe” external debt levels for emerging-market countries with histories of default and inflation are relatively low (as low as 15 percent of GNP in some countries).





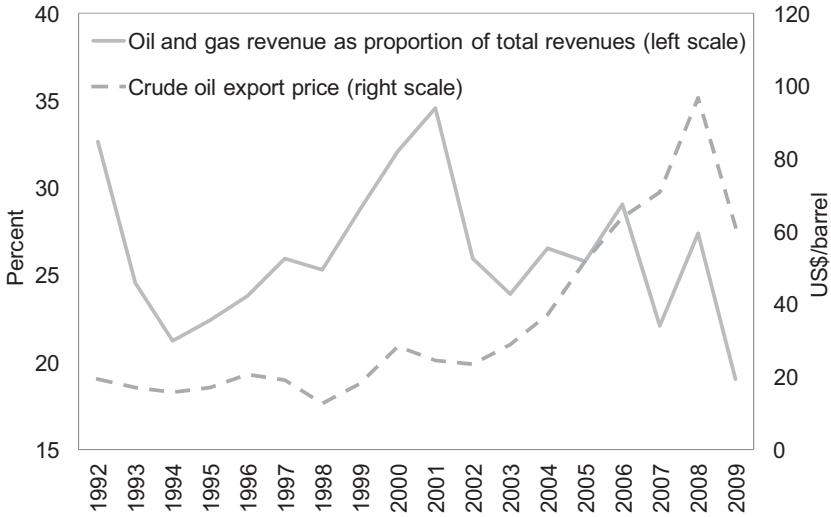
Sources: IMF, World Economic Outlook database; and IMF, 2010.

**Figure 3.1** General Government Gross Debt

- Maintaining a relatively low debt level can help manage risks from increased capital flow volatility.<sup>2</sup> For example, an increase in global risk aversion can trigger a sudden reversal of capital flows (as happened in late 2008), possibly dampening growth, and leading to spikes in borrowing costs and high exchange rate volatility. Recent econometric evidence suggests that higher debt levels in advanced countries are likely to be accompanied by higher long-term real interest rates, which could adversely affect emerging markets' financing conditions (see IMF, 2010).<sup>3</sup>
- Maintaining low debt levels can also help manage risks from volatile oil and gas revenues. Fluctuating between 35 percent and 20 percent of total revenues, oil and gas revenue remains a significant, but volatile, source of income in Indonesia (Figure 3.2): the standard deviation of the real annual growth rate was more than five times the average annual real growth rate over 2000–09, well above oil price volatility. Recent turmoil in commodity markets has highlighted the relatively high uncertainty and volatility surrounding crude oil prices and oil-related revenues. But this high degree of uncertainty also affects relative prices and therefore can act like a tax on investment, leading to lower investment and growth (see Van Wijnbergen, 1985). This is

<sup>2</sup>Reinhart and Rogoff (2008) used a new data set to illustrate vulnerabilities of emerging markets, in particular, the fact that sovereign debt defaults are sensitive to global capital flow cycles.

<sup>3</sup>High debt ratios could increase long-term real interest rates by almost 2 percentage points, negatively affecting emerging markets' financing conditions. In addition, high debt ratios are also likely to negatively affect potential growth in advanced economies, with possible consequences for emerging markets.



Sources: Indonesia, Ministry of Finance (various years); CEIC Data Co., Ltd.; and IMF staff estimates.

**Figure 3.2** Oil and Gas Revenue Volatility

particularly important in countries with relatively underdeveloped financial sectors, where risk sharing and obtaining bank financing during periods of illiquidity may be difficult to arrange.<sup>4</sup>

- Maintaining low debt levels can help lower the risks caused by the provision of sizeable fuel subsidies, which are highly volatile and procyclically linked to oil prices. Fuel price subsidies—comprising a third of total government spending on average over the last decade—lower fiscal policy effectiveness because they are inefficient, inequitable, environmentally unfriendly, and can crowd out other productive spending.<sup>5</sup> The volatility of spending on fuel subsidies is also far greater than oil price volatility alone. The standard deviation of the annual real growth rate of fuel subsidy spending was more than four times the annual average real growth rate during 2000–09. Most recently, spending on subsidies is projected to increase by 74 percent in 2011, more than twice the increase in the price of crude oil for the same year (which increased 36 percent in current dollar terms). Furthermore, maintaining fuel subsidies also implies that spending will increase automatically during oil price booms; for example, maintaining subsidies despite significant price increases in 2011 resulted in fiscal impulse that was twice as large as the non-oil fiscal impulse, net of oil revenues and subsidies.

<sup>4</sup>Recent literature highlights the potentially negative impact of natural resource revenue volatility on growth in countries highly dependent on natural resources (van der Ploeg and Poelhekke, 2009). Aghion and others (2006) have shown empirically that high volatility slows down productivity growth by a substantial margin in countries with relatively underdeveloped financial sectors.

<sup>5</sup>See Agustina and others (2008); Coody and others (2010); and IMF (2010, Annex 5).

Assessing risks from these types of shocks is important when designing a medium-term fiscal strategy aiming at maintaining sustainability and managing risks. Increased volatility in macroeconomic variables has the potential to increase uncertainty about projected public debt dynamics. In addition, the experience of many oil-exporting countries shows that high dependence on volatile natural resource revenues can lead to debt problems if markets become inaccessible in downturns. Fiscal policy can help smooth rather than exacerbate oil price and revenue volatility, thereby minimizing its potential negative impact on growth. This chapter shows that anchoring fiscal policy in a medium-term fiscal framework to ensure consistency of annual targets with fiscal sustainability is important, but needs to be supported by fuel subsidy reform to lower fiscal vulnerability.

## **A FRAMEWORK FOR ASSESSING SUSTAINABILITY UNDER UNCERTAINTY**

Risks from potential shocks were analyzed using a framework for assessing fiscal sustainability under uncertainty. The framework also incorporates oil and gas revenue volatility. This framework uses a stochastic simulation approach that derives the probability distribution of future debt stocks based on stochastic simulations of key risk variables (Box 3.1). The framework can also be expanded to include an endogenous fiscal policy reaction rule, whereby there is a partial adjustment of the primary balance to deviations from the baseline.<sup>6</sup>

This framework can be used to assess the impact of oil and gas revenue volatility on the fiscal accounts. The model uses simulation methods to forecast the distribution and evolution of (net) public debt to assets explicitly accounting for oil and gas revenue volatility and expenditure policy. Projections of the oil and gas revenue stochastic profile can, in turn, be critical in formulating spending plans using oil income. For example, fiscal policy in countries with limited proven oil reserves (e.g., Mexico) should be very different from the fiscal strategy in countries with vast oil and gas reserves (e.g., the Russian Federation and Kazakhstan) where price volatility is a more important challenge.

## **A RISK ASSESSMENT OF THE MEDIUM-TERM FISCAL STRATEGY**

This section uses the stochastic simulation approach to assess risks surrounding public debt projections under the authorities' medium-term fiscal strategy. The analysis is undertaken in various stages, with the aim of assessing the sustainability of Indonesia's public finance outlook to shocks in oil revenues and fuel subsidies. The first subsection checks the short- to medium-term robustness of the baseline fiscal strategy to oil price risks and other macroeconomic risks. The second subsection

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<sup>6</sup>For a detailed discussion and estimation of such a reaction function for the United States, see Bohn (1998) and Celasun, Debrun, and Ostry (2006) for a panel of emerging markets.

## BOX 3.1

**The Framework**

The first step in such an approach is to create a baseline scenario of the likely future time path of the public debt, using the flow budget constraint equation. This equation updates future debt as a share of GDP based on macroeconomic projections of key determinants of public debt dynamics: (a) non-oil primary deficit (net of seigniorage); (b) oil and gas fiscal revenues, which involve projections of the oil and gas extraction profile, prices, and taxation regimes; (c) growth-adjusted real interest payments on public debt; (d) capital gains or losses on net external debt caused by changes in the real exchange rate; and (e) other factors that can lead to debt accumulation. The framework is expressed as

$$\dot{d} = (nopd) - Roil + (r - g)d + \hat{e}\alpha d + OF, \quad (3.1.1)$$

where  $\dot{d}$  is the (net) public-debt-to-GDP ratio,  $nopd$  is the non-oil primary deficit as a share of GDP (net of revenue from seigniorage),  $g$  is the real GDP growth rate,  $r$  is the real interest rate on public debt,  $\hat{e}$  is the change in the bilateral real exchange rate (local currency unit per US\$1) where  $\hat{e} > 0$  denotes a real exchange rate depreciation, and  $Roil$  denotes oil and gas fiscal revenues. Other factors ( $OF$ ) could include off-budget liabilities leading to debt increases—for example, implicit contingent liabilities (bank bail-outs) and called guarantees.

The framework incorporates two different approaches to analyzing uncertainty. To deal with vulnerability to specific shocks and assess robustness to extreme events, the framework provides a variety of *stress tests* (IMF, 2003). To get a broader view of the riskiness of the basic projections, the framework incorporates *stochastic simulation methods*, using empirical information about the distribution of the input variables (Burnside, 2005; Budina and van Wijnbergen, 2008; and IMF, 2008).

The *stochastic simulation approach* to fiscal sustainability involves simulating the entire distribution of future debt stocks, based on stochastic realizations of key debt determinants (real growth rate, real interest rate, real exchange rate), and accounting for their variances and covariance structure. Using estimated parameters of the joint distribution of debt determinants, the distribution of these variables can be simulated jointly using Monte Carlo methods. This implies that for  $n$  variables and a horizon of  $T$  years,  $n \times T$  random numbers are generated repeatedly until the generated and empirical distribution are sufficiently close (by default 5,000 runs are generated). For each run, the model is applied to derive the full path of debt stocks and transform the generated random numbers in such a way that the resulting distribution conforms to the value at risk (VAR) estimates of the true distribution of the input variables. The default uses multivariate normal, but other distributions can be incorporated, too. The probability density of the outcomes of the debt ratio in each year can be plotted from the stochastic simulations, generating a so-called fan chart for the debt-to-GDP ratio.

Sources: Celasun, Debrun, and Ostry (2006); Bandiera, Budina, and van Wijnbergen (2008); and Budina and van Wijnbergen (2008).

expands the analysis by checking the robustness of this strategy to oil and gas production shocks in a longer-term horizon and shows how an endogenous fiscal policy reaction rule can lower the uncertainty surrounding baseline debt projections. The last subsection illustrates the risks associated with delaying fuel subsidy reform.

## Assessing Fiscal Sustainability and Medium-Term Risks

The robustness of the baseline fiscal strategy to shocks from a medium-term perspective was assessed. The baseline fiscal strategy is consistent with the authorities' medium-term framework and assumes gradual fiscal consolidation, supported by revenue administration reforms and the elimination of fuel subsidies.

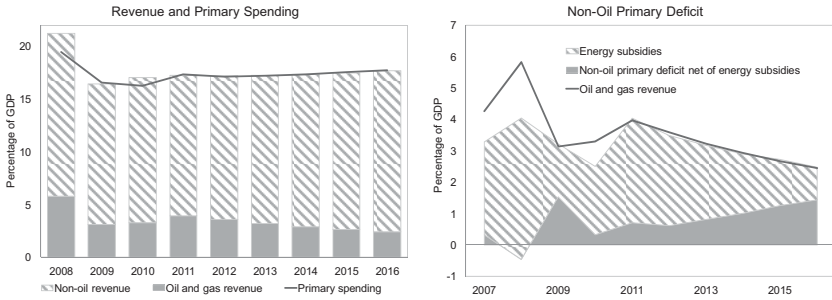
The evolution of debt was forecast using the identity equation (Equation 3.1.1, Box 3.1) that relates debt in year  $t$  to debt in the previous year, the non-oil primary balance and the projected oil and gas fiscal revenues in year  $t$ , and other stock-flow adjustments in year  $t$  and existing macroeconomic projections summarized in Table 3.1. The non-oil primary balance declines in line with oil revenue, implying that the overall primary fiscal position will be in balance. The exchange rate is projected to be broadly constant, thus not contributing substantially to the change in the public sector debt ratio. The decline in the public debt ratio is driven mostly by the favorable interest-growth differential.

The medium-term fiscal strategy should strike a balance between further public debt consolidation and the need to reorient fiscal priorities to support growth. Given low and declining public debt (below 27 percent of GDP in 2010) maintaining an overall fiscal deficit of about 1.5 percent of GDP while implementing fuel subsidy reform will create fiscal space for additional capital spending on needed infrastructure areas (e.g., transport, ports, and water systems), and ensure fiscal sustainability. This strategy—based on subsidy reduction, tax administration reforms, and continued strong economic growth—will support a further decline in the public debt to 21 percent of GDP by 2016. Such a strategy will ensure that a nearly balanced primary fiscal position is maintained, while accommodating extra resources for development spending (Figure 3.3). Moreover, to

**TABLE 3.1**  
Key Macroeconomic Indicators, 2009–16

Indicator	2009	2010	2011	2012	2013	2014	2015	2016
Real GDP growth rate (in percent)	4.5	6.1	6.2	6.5	6.7	7.0	7.0	7.0
Exchange rate, period average (rupiah/US\$)	10,407	9,088	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Average inflation rate (percent)	4.8	5.1	7.1	5.8	5.3	4.2	3.5	3.0
Indonesia crude oil price (US\$/barrel)	61	79	107	108	105	104	105	106
Oil production (thousands of barrels/day)	960	954	949	990	1,010	1,010	1,010	1,010
Nominal GDP (trillions of rupiah)	5,613	6,423	7,309	8,240	9,258	10,322	11,433	12,602

Sources: IMF, World Economic Outlook database; and IMF staff estimates.



Sources: Indonesia, Ministry of Finance (various years); and IMF staff estimates.

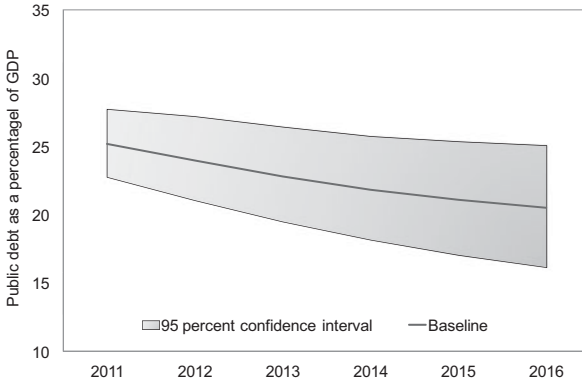
**Figure 3.3** Medium-Term Fiscal Strategy: Revenue, Spending, and Non-Oil Primary Deficit

the extent that high-rate-of-return capital and infrastructure projects can be designed and implemented, even higher capital spending could be accommodated, provided that absorptive capacity improves significantly.

Such a fiscal strategy is sustainable and robust to macroeconomic and oil price shocks. The public debt ratio is likely to fall further, to about 25 percent of GDP in 2011, because rupiah appreciation and strong economic growth will more than offset the impact of the small primary deficit. A further decline in the public debt ratio to 21 percent of GDP by 2016 is likely, assuming a balanced primary fiscal position is maintained, supported by structural reforms to enhance economic growth and reduce fuel subsidies. Overall, risks from macroeconomic and oil price shocks under such a strategy appear limited. The framework runs Monte Carlo simulations using historical variances of five variables (changes in the real exchange rate, real borrowing costs for external debt and for domestic debt, growth rate, and the price of oil). The simulations indicate that the maximum likely debt ratio will be less than 30 percent of GDP throughout the projection period (Figure 3.4). An important part of this scenario is the assumption that oil and gas production levels remain stable and fuel prices increase gradually to curtail fuel subsidies.

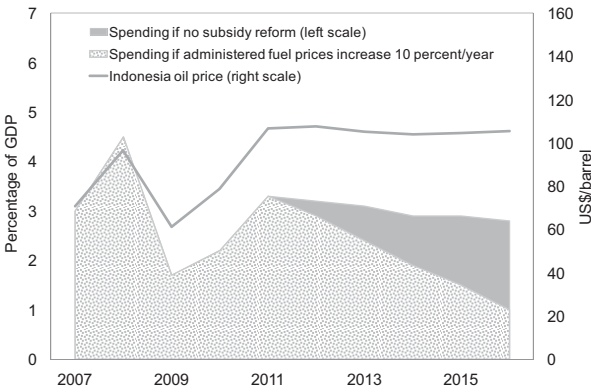
However, failure to implement domestic fuel price adjustments could put pressure on fiscal deficits. Maintaining administrative fuel prices at their 2011 levels, given continuous strong energy demand growth, is estimated to keep subsidies at close to 3 percent of GDP per year over the medium term. Assuming that other spending remains as in the baseline scenario, and that oil production stagnates at its 2011 level, the overall deficit is estimated to increase gradually from 1.5 percent to more than 3 percent of GDP by 2016 (Figures 3.5 and 3.6). The fiscal impact could be even larger in the context of further price increases, faster energy demand growth, and lower oil production. Partial estimates show that for every \$10 per barrel increase in the crude oil price, the 2011 deficit will increase by 0.2 percent of GDP, factoring in lower oil production estimates than budget estimates, rapidly growing demand for subsidized fuel products, and the decision in 2011 to postpone fuel subsidy reform.<sup>7</sup> Nevertheless, the impact of

<sup>7</sup>The impact of an oil price increase on the budget requires estimating the sensitivity of all related revenues and expenditures. See IMF (2007) for details on these sensitivity estimates.



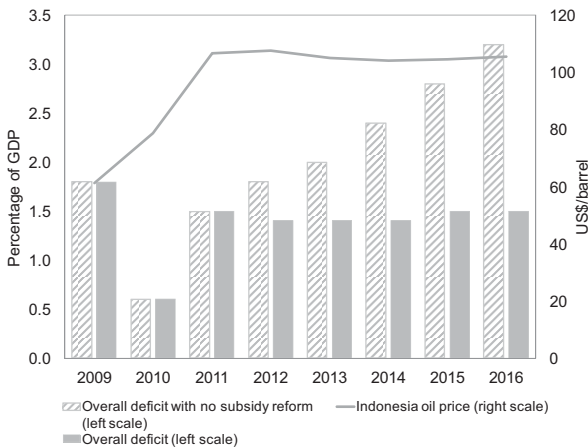
Source: IMF staff estimates.

**Figure 3.4** Fan Chart of Public-Debt-to-GDP Ratio



Source: IMF staff estimates.

**Figure 3.5** Spending on Energy Subsidies



Source: IMF staff estimates.

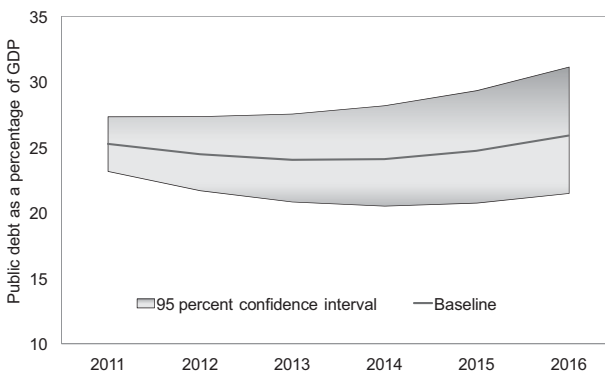
**Figure 3.6** Overall Deficit

postponing subsidy reform on public debt over the medium term is still manageable given the relatively strong initial debt position and the favorable automatic debt dynamics suggested by strong economic growth and favorable interest rates. In this case, public debt would remain at 25 percent, while the maximum likely debt ratio increases to more than 30 percent (Figure 3.7). However, higher deficits may increase short-term fiscal vulnerability to the extent that gross financing needs will increase, increasing the vulnerability to changing market sentiments. Postponing subsidy reform would have a much more significant impact on fiscal sustainability in the longer term, when fuel consumption outpaces oil and gas production significantly (see next sections).

### Assessing Fiscal Risks from an Oil or Gas Production Shock

This section extends the projection period to assess fiscal risks from an oil or gas production shock (e.g., running out of oil reserves), in addition to other stochastic shocks explored in the previous section. The analysis also shows the way in which an endogenous fiscal policy reaction rule could be used to manage uncertainty surrounding baseline debt projections.

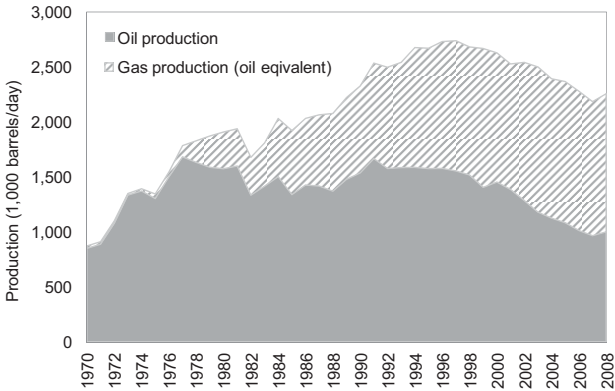
Oil and gas wealth in Indonesia is significant, but much uncertainty surrounds future oil and gas production. Oil and gas production capacity expanded greatly during 1970–2000. However, oil production has declined rapidly since 2000 although gas production remained relatively constant. The decline in oil production could be related to insufficient investment in the sector (Figure 3.8) (Agustina and others, 2008). Proven oil reserves have declined sharply since the 1980s—from 11 billion barrels to 3.7 billion barrels as of end-2008—but have gone up recently to 4.4 billion barrels as a result of new oil discoveries. This level of reserves can sustain slightly more than a decade of production at current levels. Possible reserves could add another decade of current production levels. Proven gas reserves (3.18 billion cubic meters) can sustain 45 years of current gas production, while possible reserves could lengthen the gas production period further



Source: IMF staff estimates.

**Figure 3.7** Fan Chart of Public-Debt-to-GDP Ratio without Subsidy Reform



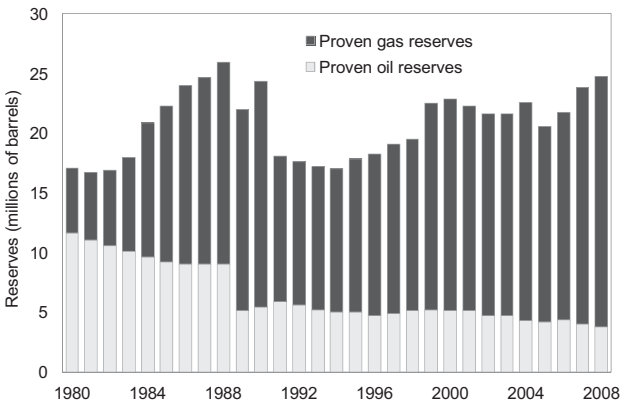


Source: BP p.l.c., 2009.

**Figure 3.8** Oil and Gas Production

(Figure 3.9).<sup>8</sup> However, at current production levels, fiscal revenue from gas is a relatively small fraction of total oil and gas revenue, which means that when oil reserves are exhausted, a large expansion in gas capacity may be needed to maintain similar levels of oil and gas revenues. Although substantial expansion of gas capacity is possible, significant investment requirements and long lead times create considerable uncertainty about the gas extraction profile.

The uncertainty surrounding the future oil and gas production profile adds to the challenge of managing oil and gas revenue volatility. This scenario checks the robustness of the baseline fiscal strategy to a large oil production shock resulting from oil reserves depletion that is not compensated for by higher gas production.

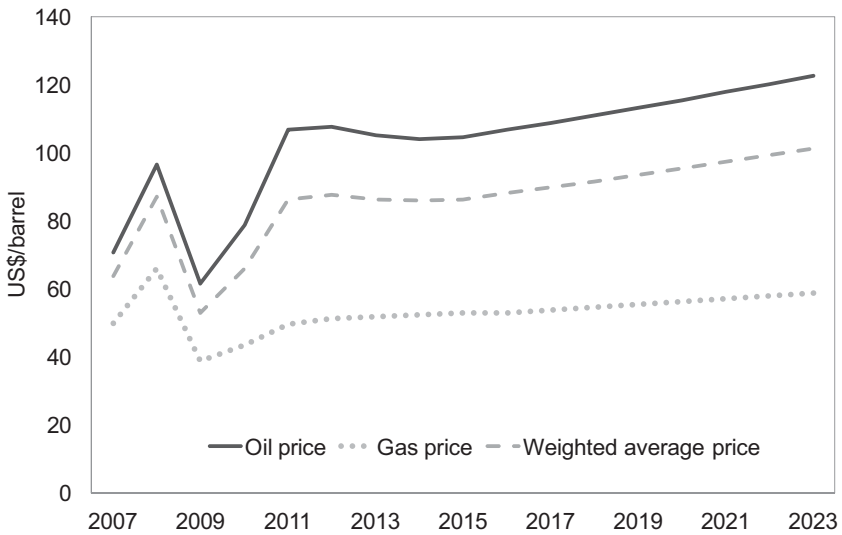


Source: BP p.l.c., 2009.

**Figure 3.9** Proven Oil and Gas Reserves

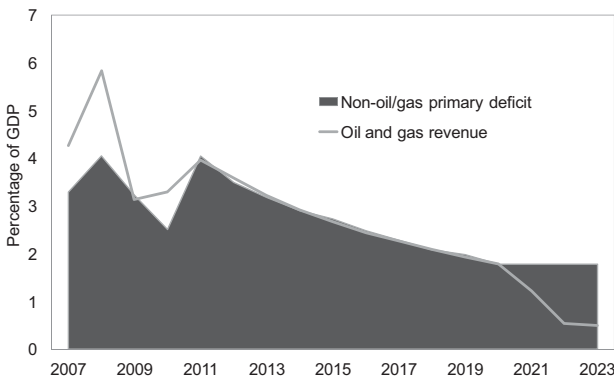
<sup>8</sup>See BP p.l.c. (2009). Proven and possible gas reserves may be higher (see Embassy of the United States of America, 2008).

Oil and gas price projections are the same as in the baseline, assuming constant real oil prices beyond 2015 (Figure 3.10). Based on these assumptions, oil and gas fiscal revenues drop sharply in 2021 as a result of the oil production shock. (Assuming no new oil discoveries are made, oil reserves are projected to be depleted by 2020.) The simulations are built around the baseline strategy for 2010–15 but assume full elimination of energy subsidies and progress toward revenue administration reforms. These reforms will support a gradual adjustment of the ratio of the non-oil primary deficit to GDP (Figure 3.11), in line with declining oil and gas revenues.



Sources: Ministry of Finance (various years); IMF, World Economic Outlook database; and IMF staff estimates.

**Figure 3.10** Oil and Gas Price Trends



Sources: Ministry of Finance (various years); and IMF staff estimates.

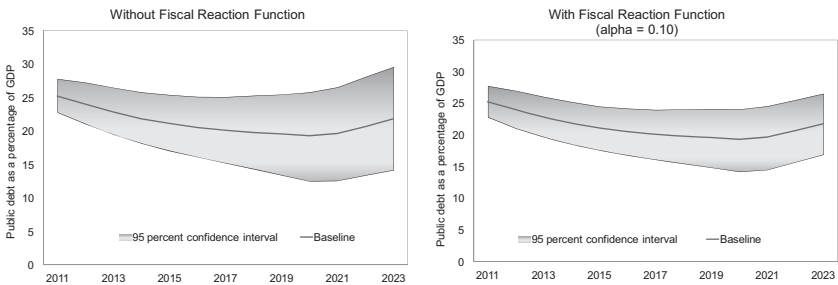
**Figure 3.11** Projected Oil and Gas Fiscal Revenue and Primary Balance

The baseline fiscal strategy is likely to be sustainable even after such a large shock to oil and gas production. Continuous adjustment in the non-oil primary deficit caused by a gradual reduction of subsidies and revenue administration efforts will prevent sizeable accumulation of public debt with the maximum likely debt ratio at 30 percent of GDP (Figure 3.12).

Using an endogenous fiscal reaction rule can help manage uncertainty around the baseline debt projections by lowering the maximum likely debt ratio. The impact of exogenous shocks will be smaller if the government can commit to taking deliberate corrective actions as its debt stock rises. An endogenous fiscal policy reaction rule adjusting the primary balance to deviations from the baseline debt level could be used to lower risks. An application of the stochastic analysis with such an endogenous fiscal reaction rule narrows the confidence interval around baseline debt projections—the maximum likely debt ratio drops to about 25 percent of GDP (compared with about 30 percent without such a rule).

### Assessing Fiscal Risks of Delaying Fuel Subsidy Reform

In addition to production uncertainties as discussed above, this section considers risks from delaying fuel subsidy reform in the context of increasing demand for fuel products.<sup>9</sup> This scenario checks the robustness of a fiscal strategy that is similar to the baseline, but in the absence of fuel subsidy reform. Subsidies are modeled as a product of a tax-inclusive fuel price gap and fuel consumption. Furthermore, the demand for subsidized fuel is assumed to grow faster than real income, outpacing oil and gas production in 2019.<sup>10</sup> Under these assumptions, fuel subsidies are likely to surpass the revenue from oil and gas in 2019. The non-oil primary deficit including subsidies is estimated to surpass 4 percent of GDP, while oil and gas revenue is projected to decline from 4 percent to about 1 percent (relative to GDP) over the projection period (Figure 3.13). This implies that



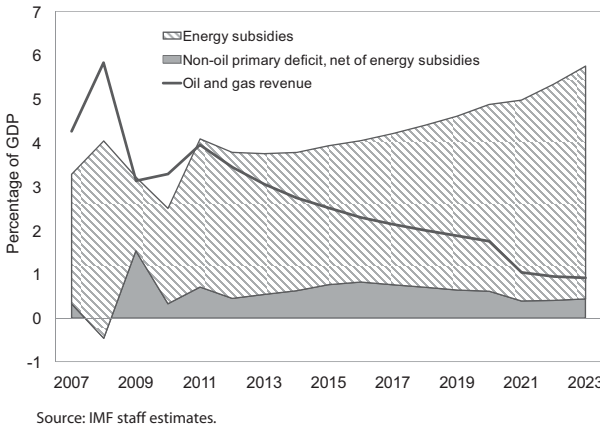
Source: IMF staff estimates.

Note: Alpha represents degree of fiscal reaction.

**Figure 3.12** Fan Chart for Public-Debt-to-GDP Ratio—The Impact of Fiscal Reaction Rules

<sup>9</sup>For estimates of fuel subsidies around the world, see Coady and others (2010).

<sup>10</sup>Fuel consumption is benchmarked to grow faster than real income, in line with the relatively high income elasticity estimate found in Agustina and others (2008).



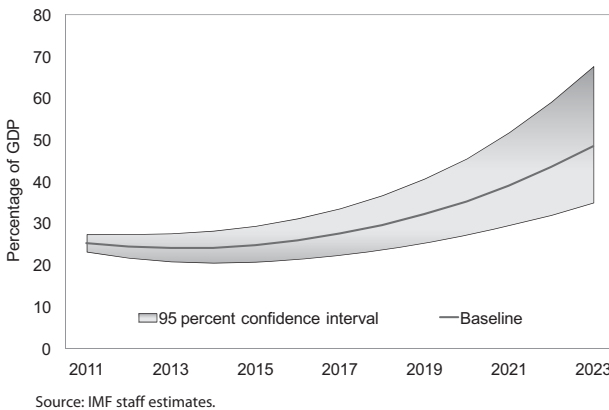
**Figure 3.13** Fiscal Strategy Without Subsidy Reform

beyond 2011, primary deficits will steadily increase, with a big jump in 2020 and beyond if oil reserves run out.

Not surprisingly, simulations reveal that such an alternative scenario would yield an increasing accumulation of debt. Rising primary deficits lead to increasing debt accumulation in every year after 2014, with public debt reaching 47 percent of GDP in 2023. Risks to public debt are large—the maximum possible debt ratio reaches around 70 percent of GDP within the 95 percent confidence interval (Figure 3.14). Thus, a delay in fuel subsidy reform, in combination with shocks to oil and gas revenue, can increase vulnerabilities and risks.

## CONCLUSIONS

Indonesia’s fiscal and debt outlook has been remarkably resilient to the recent global financial crisis. Public finance improvements, combined with relatively



**Figure 3.14** Fan Chart for Public-Debt-to-GDP Ratio without Subsidy Reform

modest fiscal stimulus and strong economic growth, have supported a continuous decline in public debt and lowered the economy's dependence on short-term foreign financing. The benefits of this situation during the global financial turmoil of 2008–10 are obvious. Nevertheless, risks to the public debt outlook still exist, and managing these risks could enhance policy credibility further.

This analysis used a stochastic simulation approach to assess risks to the public debt outlook. Specifically, this framework derives the probability distribution of future debt stocks based on stochastic simulations of key risk variables. An endogenous fiscal policy reaction function, which adjusts the primary balance to deviations from baseline level debt stocks, can also be used with stochastic simulations. Finally, the impact of oil and gas revenue volatility and the risks from delaying subsidy reform are also assessed.

The authorities' strategy of gradual fiscal consolidation is sustainable and likely to reduce public debt further in the medium term. Such a strategy implies a gradual adjustment of the non-oil primary deficit in line with the declining ratio of oil and gas revenue to GDP. This adjustment strategy is supported by revenue enhancements and fuel subsidy reform.

Risk assessment revealed that

- Risks to the debt outlook from macroeconomic and oil price shocks appear manageable in the medium term because the maximum likely debt level under stochastic shocks is relatively moderate. The fiscal strategy is robust to macroeconomic and oil price shocks, if supported by revenue administration reform and fuel subsidy reform.
- Over the longer term, lack of investment could result in stagnating gas production, declining oil production, and an associated revenue drop. Fiscal risks are still manageable in this scenario but uncertainties are higher. Having an endogenous fiscal policy reaction would lower risks.
- These robust outcomes are only possible when the fiscal strategy is supported by fuel subsidy reform. Fiscal risks from delaying such reform create fiscal vulnerability in the context of rapid growth in fuel consumption, combined with a negative oil or gas revenue shock from stagnating or even declining oil or gas production.

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# Volatility in External Demand: Indonesia's Commodity Boom and Overall Competitiveness

GUSTAVO ADLER\*

Indonesia experienced a remarkable export boom in the years preceding the 2008–09 global economic and financial crisis, driven mainly by surging commodity exports. While helping to sustain high economic growth, the commodity boom and its accompanying real exchange rate appreciation have raised questions about the effect on the manufacturing sector (Dutch disease) and the country's growing vulnerability to volatile commodity prices. This chapter takes an in-depth look into recent trade patterns to assess the extent of such concerns. The analysis finds that (a) there is no strong evidence of Dutch disease; (b) so far, weak performance in some sectors does not appear to be linked to the commodity boom; and (c) although further reliance on commodities has increased Indonesia's vulnerability to export price volatility, the terms of trade have actually been relatively stable because import and export prices move together markedly, mitigating such potential vulnerability.

## BACKGROUND

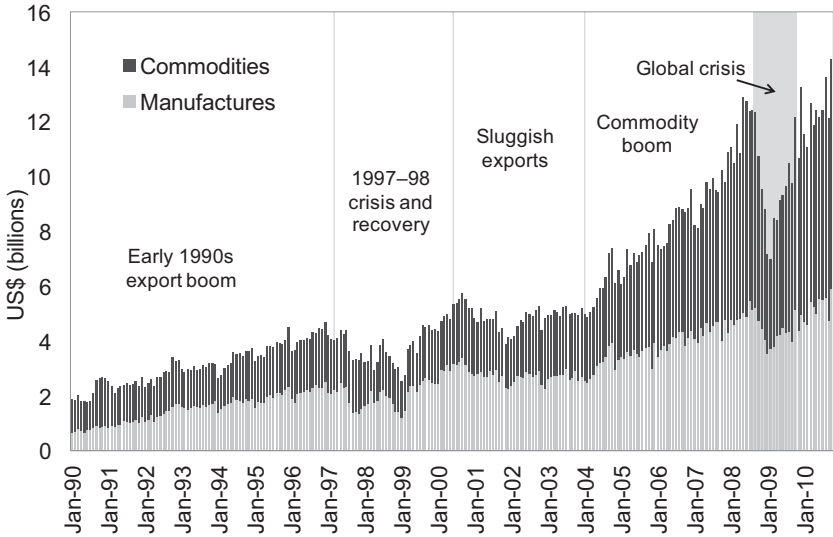
Indonesia went through an impressive period of export growth in the five years preceding the 2008–09 global crisis. Following a period of stagnation in the early 2000s, exports accelerated sharply, increasing by about 120 percent from 2003 to 2008 (until the global financial crisis). This remarkable growth was noticeably stronger than the already impressive performance seen in the early 1990s. After being interrupted by the collapse in trade in late 2008 and early 2009, the export boom seems to have resumed despite a still modest recovery in global activity, with exports rebounding to near precrisis levels by late 2009 (Figure 4.1).

Much of this extraordinary export performance reflected a surging commodity sector (Figure 4.2). Commodity exports grew by 180 percent during this period (2003–10)—notably faster than manufacturing (75 percent). This is significantly different from the export boom of the early 1990s, which was driven solely by rapidly growing manufacturing exports. Both renewable resource commodities (primarily vegetable oils and rubber) and nonrenewable resource commodities

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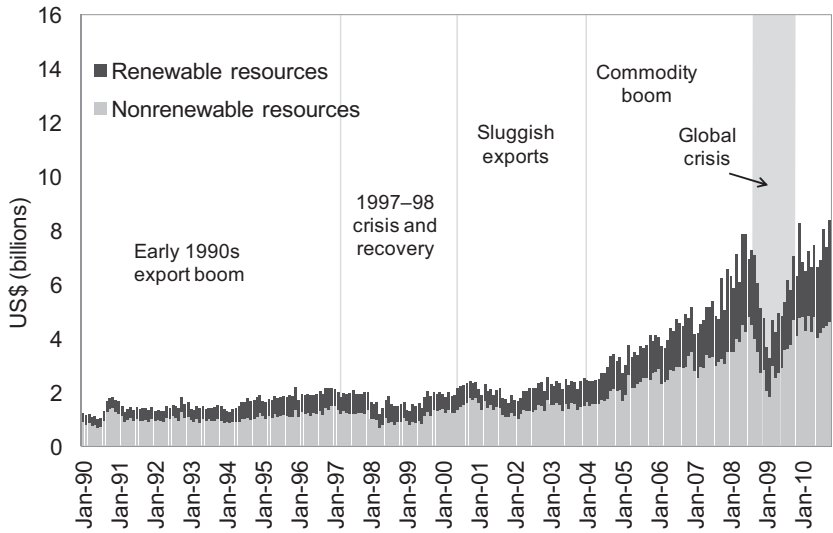
\*Research assistance in the preparation of this chapter was provided by Agnes Isnawangsih.





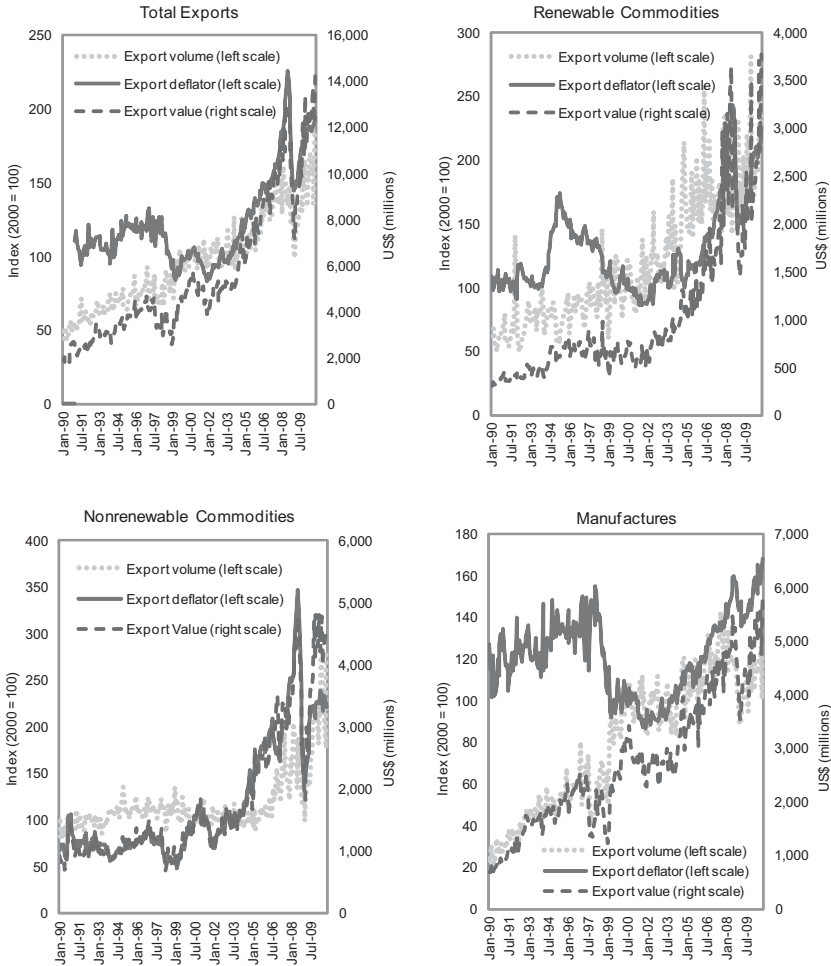
Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

Figure 4.1 Exports of Goods



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

Figure 4.2 Commodity Exports



Sources: CEIC Data Co., Ltd.; and staff estimates.

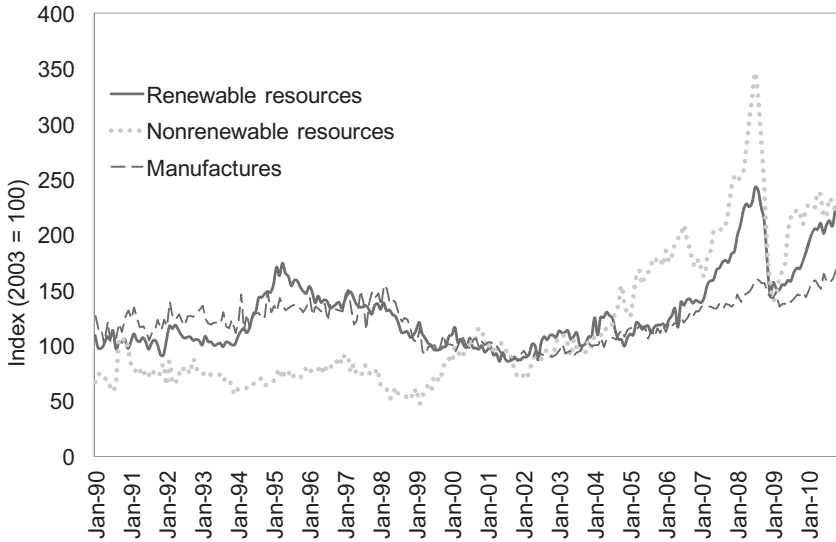
**Figure 4.3** Export Performance by Main Products, 1990–2010

(mainly oil and gas) contributed to the sharp increase in exports, although the former resulted from a combination of rapidly increasing volumes and prices, while the latter reflected a sharp increase in prices.<sup>1,2</sup> Manufacturing exports, meanwhile, displayed decent but significantly lower volume growth (Figure 4.3).

The increase in both renewable and nonrenewable resource commodity prices (Figure 4.4) was accompanied by sharply accelerating demand from neighboring

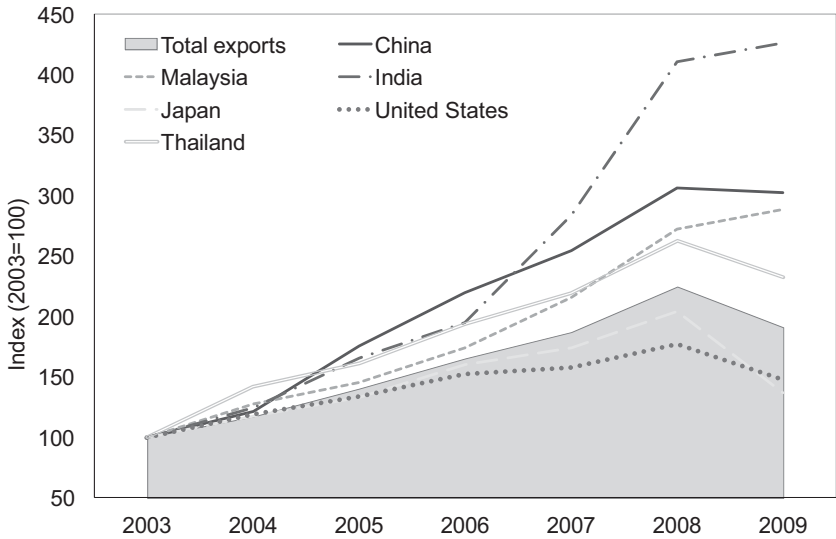
<sup>1</sup>Commodities labeled as renewable resources refer mainly to agriculture-, animal-, and fishery and forestry-related activities; nonrenewable resource commodities refer mainly to mining activities.

<sup>2</sup>Volume and deflators are estimated by IMF staff, based on official value and volume data for export and import groups corresponding to Standard Industrial Trade Classification (SITC) 2-digit-level disaggregation because aggregate official statistics on volumes do not weight subgroups by their economic values.



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

**Figure 4.4** Deflators of Main Export Products, 1990–2010



Sources: IMF, Direction of Trade Statistics; and IMF staff calculations.

**Figure 4.5** Indonesia Exports to Main Destinations

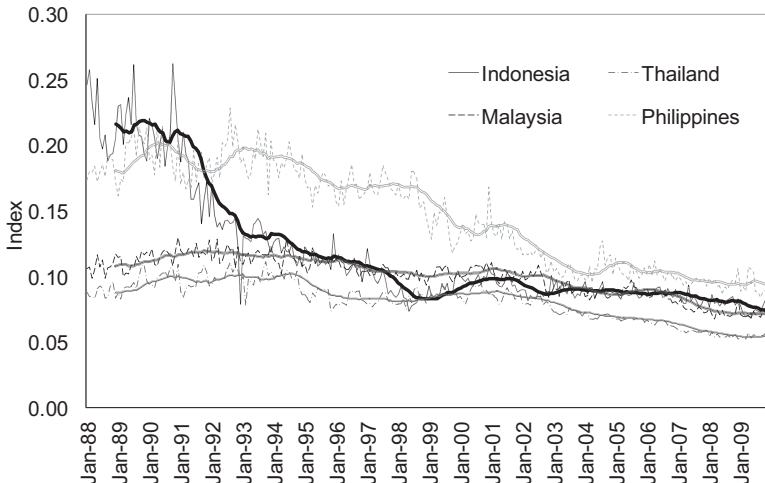
countries. Most noticeable was the quadrupling of exports to India, the tripling of exports to China and, because of its already high starting level, the doubling of exports to Japan (Figure 4.5). As a result, exposure to neighboring emerging-market countries increased markedly while the overall exposure to the region remained broadly stable. (Box 4.1 discusses recent trends and potential vulnerabilities related to the composition of trading partner countries.)

## BOX 4.1

**Trading Partner Diversification**

The composition of Indonesia's trading partner countries has changed markedly in recent years, shifting toward rapidly growing emerging and developing economies. The overall exposure (export share) to advanced countries fell from 73 percent in 2003 (and an average of 81 percent during the 1990s) to 65 percent in 2008. Although this has helped diversify export destinations somewhat and increase market share in rapidly growing economies, partner concentration has remained relatively high, with five countries accounting for more than 50 percent of total exports. A group of 10 countries has retained about 75 percent of export share for more than a decade, although China, India, and Malaysia have gained ground at the expense of Japan and the United States. The result has been a sustained downward trend in Indonesia's Herfindahl index of trading partner concentration (Box Figure 4.1.1). Despite the sharp acceleration in demand from neighboring countries, exposure to the region as a whole has increased only marginally, from 60 percent of total exports in 2003 to 62 percent in 2008, as increases in the share of exports to China, India, and Malaysia have been offset by a declining share to Japan (Box Figure 4.1.2).

This shift has been accompanied by heightened vulnerability to foreign demand shocks, reflecting primarily increased co-movement across trading partners (Box Figure 4.1.3). A measure of foreign demand volatility was constructed as a weighted average of trading partners' domestic demand volatility, with weights given by the trading partner's share in Indonesia's exports.<sup>a</sup> This index, depicted below, points to a sharp increase in foreign

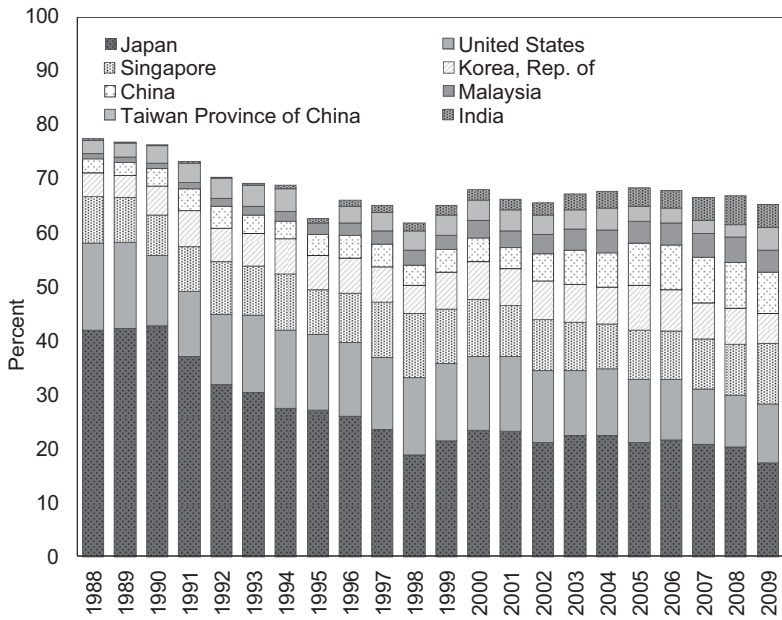


Sources: IMF, *Direction of Trade Statistics*; and IMF staff calculations.

**Box Figure 4.1.1** Herfindahl Index on Export Markets

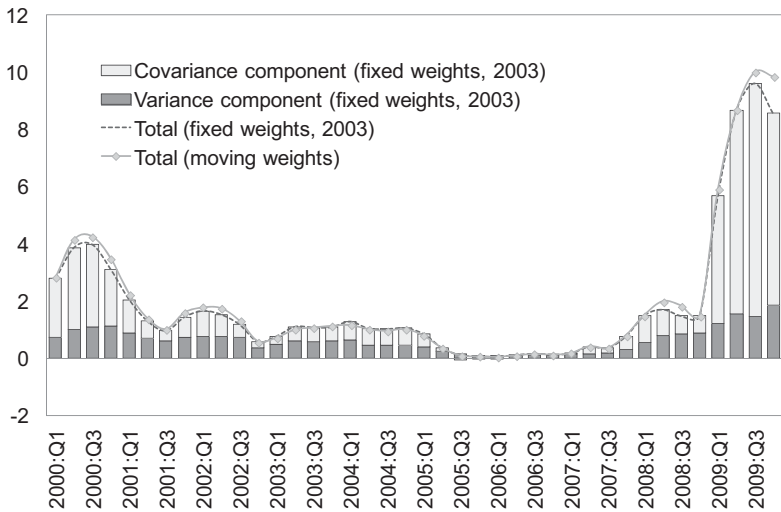
<sup>a</sup>The index is computed as  $\sigma^{\theta} = \sum_i \text{var}(d_i)w_i^2 + 2 \sum_{i < j} \text{covar}(d_i, d_j)w_i w_j$ , where  $d_i$  denotes domestic demand in country  $i$ ,  $w_i$  is country  $i$ 's share in Indonesia's total exports, and  $\sigma^{\theta}$  is the variance of overall foreign demand ( $D$ ). Weights are fixed or moving depending on the desired information. The variance is measured on a seasonally adjusted and (Hodrick-Prescott filter) detrended series of domestic demand.

**BOX 4.1 (cont.)**



Sources: IMF, *Direction of Trade Statistics*; and IMF staff calculations.

**Box Figure 4.1.2** Shares of Main Export Destinations

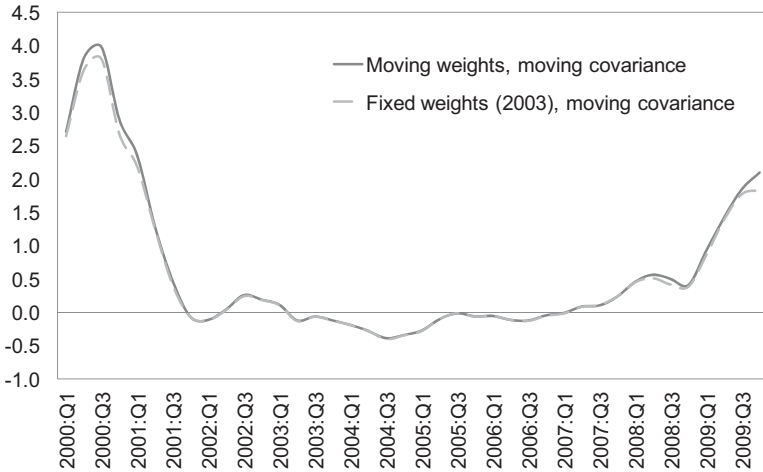


Source: IMF staff estimates.

**Box Figure 4.1.3** Volatility of Foreign Demand, 2000–10

**BOX 4.1 (cont.)**

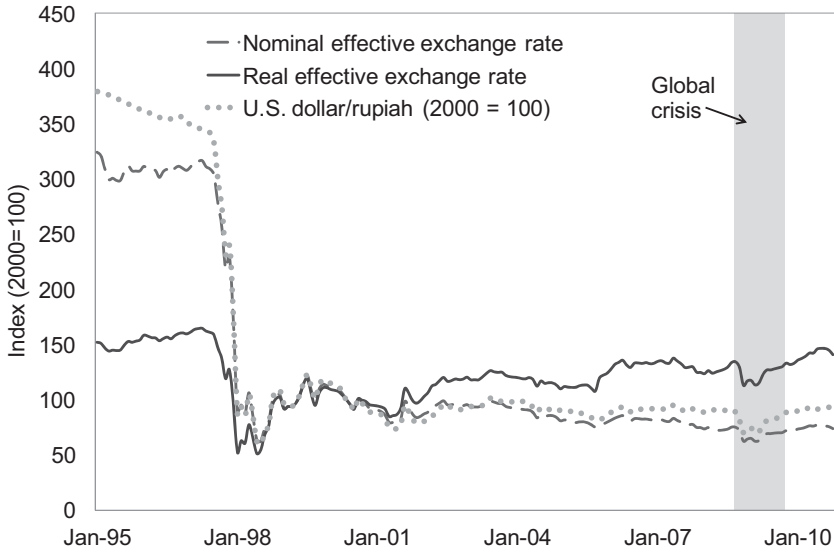
demand volatility in the last few years following a prolonged period of very low volatility (consistent with the phenomenon often referred to as the “Great Moderation”). Heightened volatility of foreign demand, also affecting other countries, reflects mainly a sharp increase in correlations across trading partners rather than their changing shares in Indonesia’s exports (as suggested by the negligible gap between the index with fixed and moving weights in Box Figure 4.1.4). At the same time, covariance with trading partners picked up recently, after a long period of negative or zero correlation, although, again, the changing structure of trading partners has played no significant role.



Source: IMF staff estimates.

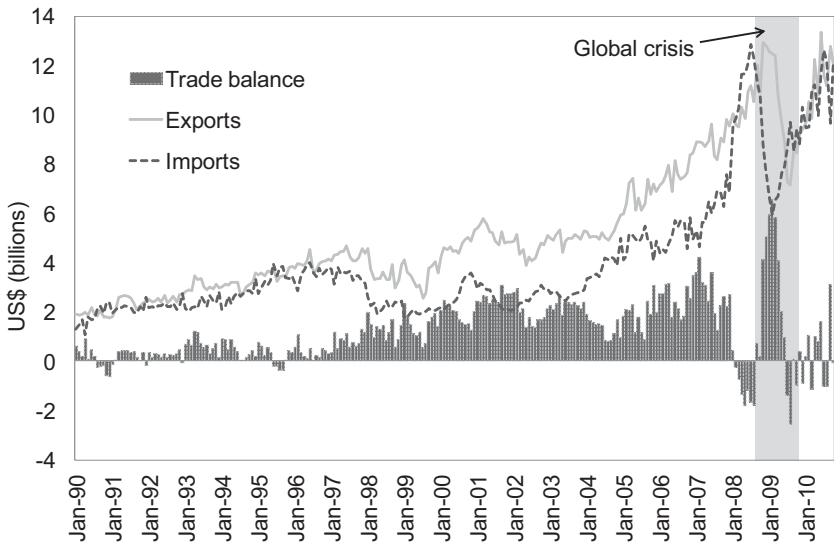
**Box Figure 4.1.4** Covariance of Indonesia’s GDP and Trading Partners’ Domestic Demand, 2000–10

But an appreciating real exchange rate and a sharp pickup in imports have raised questions about the effect on other sectors and the increasing vulnerability to external shocks. Driven mainly by marked upward pressures on the rupiah, the real exchange rate appreciated about 14 percent from late 2003 to mid-2008. The sharp depreciation following the collapse of Lehman Brothers reversed most of the previous appreciation, but the subsequent rebound quickly raised the real exchange rate above precrisis levels and 20 percent above the levels before the commodity boom (Figure 4.6). Notwithstanding appreciating pressures, fast-growing exports allowed Indonesia to maintain trade (and current account) surpluses for a prolonged period. However, after a lengthy time of sluggish import growth, a rapid catch up in 2007–08, mainly reflecting capital and intermediate goods, led to trade deficits for the first time in more than a decade (Figure 4.7). Against this backdrop of weakening external balances, the increased reliance on commodity exports could be a source of vulnerability because commodity prices tend to be highly volatile, potentially exposing the economy to large terms-of-trade shocks that could rapidly translate into mounting external imbalances. This situation is of particular concern if the commodity boom occurred at the expense of growth in the manu-



Source: IMF, Information Notice System.

**Figure 4.6** Nominal and Real Exchange Rates, 1995–2010



Source: CEIC Data Co., Ltd.

**Figure 4.7** Trade Balance, 1990–2010

facturing sector (a phenomenon often referred to as Dutch disease)—manufacturing is unlikely to recover quickly in the event of a reversal in commodity exports. The next section assesses the evidence for Dutch disease in Indonesia.

## DUTCH DISEASE IN THE MAKING?

Commodity booms often lead to Dutch disease. As extensively documented, first by Corden and Neary (1982) and by Corden (1984), and later by an extensive literature,<sup>3</sup> commodity booms—resulting from sharp increases in production (e.g., following the discovery of new sources) or in prices—often have pervasive effects on other sectors (see Box 4.2). Dutch disease is normally associated with

### BOX 4.2

#### *The Dutch Disease Hypothesis*

The Dutch disease phenomenon is normally associated with two main effects:

- A *resource movement effect* that refers to the reallocation of factors from other sectors of the economy (e.g., manufacturing) to the booming natural resource sector. This effect is caused by increased demand for production factors in the resource-intensive sector, which tends to attract labor from other sectors of the economy by means of higher wages. That is, if labor is mobile across sectors, higher wages in the booming export sector would cause labor to move toward this sector, leading to lower output in the other sector (if the economy is operating at full capacity). This process of resource reallocation also often leads to an appreciating real exchange rate. Lower productivity in the nonbooming sector (including nontradables) results in a loss of production, giving rise to excess demand for nontradables, and leading to an increase in the relative price of nontradables (thus, the real exchange rate).
- A *spending effect* that relates to the appreciation of the real exchange rate as a result of increased spending of (at least part of) the booming sector's extra income. Increased demand for nontradables leads to exchange rate appreciation because nontradable goods prices need to adjust upward to induce higher production in response to higher demand. The magnitude of this effect normally depends on the propensity to consume nontradable goods. That propensity tends to be higher when a large part of the additional income is received by the government because the government tends to have a high propensity to consume nontradable goods.

Combining the two effects, the Dutch disease hypothesis generates three unambiguous predictions: (a) because the relative price of nontradable goods increases, the real exchange rate appreciates; (b) manufacturing output and employment fall as a result of factor reallocation; (c) the overall wage level increases (possibly starting with higher wages in the booming sector) in response to higher demand for labor. The combined effect on output and employment in the nontradable sector is ambiguous because the spending and resource movement effects push in opposite directions.

<sup>3</sup>Recently studied cases of Dutch disease include Bolivia (Cerutti and Mansilla, 2008), Russia (Oomes and Kalcheva, 2007), and many oil exporting countries (Ismail, 2010).



(a) real exchange rate appreciation; (b) a slowdown in manufacturing exports, output, and employment; and (c) an increase in wages.

In Indonesia, the recent commodity boom has been accompanied by significant real exchange rate appreciation, although there is no evidence of overvaluation. Marked appreciation in recent years followed rapid income and productivity gains—mainly earlier in the first decade of the 2000s—and served to reverse much of the overshooting experienced during the 1997–98 Asian financial crisis. As a result, today the exchange rate is broadly in equilibrium with economic fundamentals, as suggested by the different Consultative Group on Exchange Rates methodologies (Box 2 in IMF, 2010).

Evidence of effects on manufacturing exports is mixed, with significant heterogeneity within the group. Although manufacturing exports have been noticeably outpaced by commodity exports in recent years, growth in that sector has still been robust at an aggregate level (Figure 4.3). Some traditional industries (mainly textiles, wood manufactures, and paper products) have performed poorly, whereas others (e.g., chemicals and machinery and apparatus) have shown remarkable growth. Still, most of the sectors that witnessed sluggish growth in recent years seem to have been on that path long before the commodity boom manifested itself (Figure 4.8).

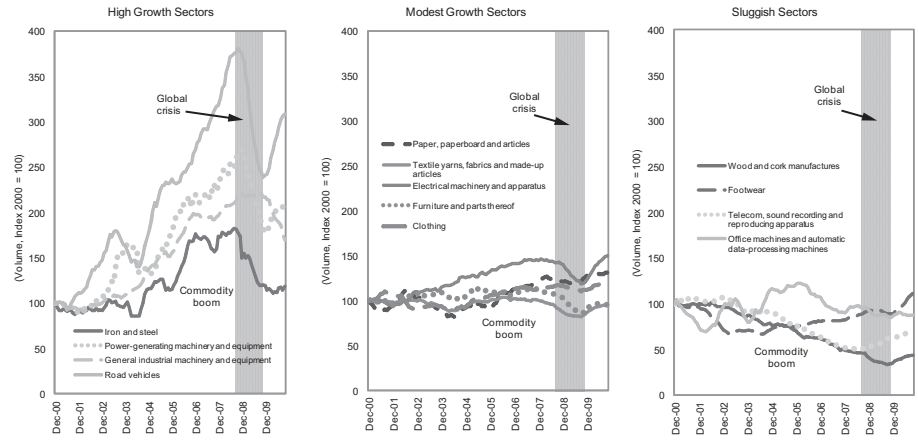
GDP data confirm that sectoral performance has been uneven, and weak output does not appear to be linked to the recent commodity boom. A long-term view of sectoral output reveals that sectors that have been sluggish in recent years were displaying weak performance long before the commodity boom, suggesting that real exchange rate appreciation may not have been the main factor behind these sectoral weaknesses (Figure 4.9). This is particularly clear for textiles, wood manufactures, and iron and steel industries, which have shown sluggish growth since 2000. At the same time, sectors closely linked to commodities (e.g., food; fertilizers, chemicals, and rubber; and cement) have witnessed decent, although slowing, economic performance in recent years. And other capital-intensive industries (e.g., automotive and machinery) have actually been booming recently—similar to their performance in the period preceding the commodity boom—arguably suggesting that long-standing labor market frictions may have been a constraint on growth in some labor-intensive industries.<sup>4</sup>

Only recently have wage pressures started to appear in the manufacturing sector.<sup>5</sup> Consistent with the Dutch disease hypothesis, wages in the commodity sectors (particularly in mining) have grown rapidly and outpaced those in other sectors in recent years. Employment in these sectors (except in agriculture, forestry, and fishery) has also grown fast, and faster than in the manufacturing sector. Still, until 2008, wage pressures on the manufacturing sector had not materialized, partly reflecting one-time reforms that helped to lower wages in the sector.<sup>6</sup> In fact, wages in this sector decreased about 15 percent in real terms during 2003–08, along with somewhat smaller decreases in service sectors, while real wages in the mining sector

<sup>4</sup>In particular, high severance payments have been a major constraint on labor-intensive industries (see Thacker, 2005).

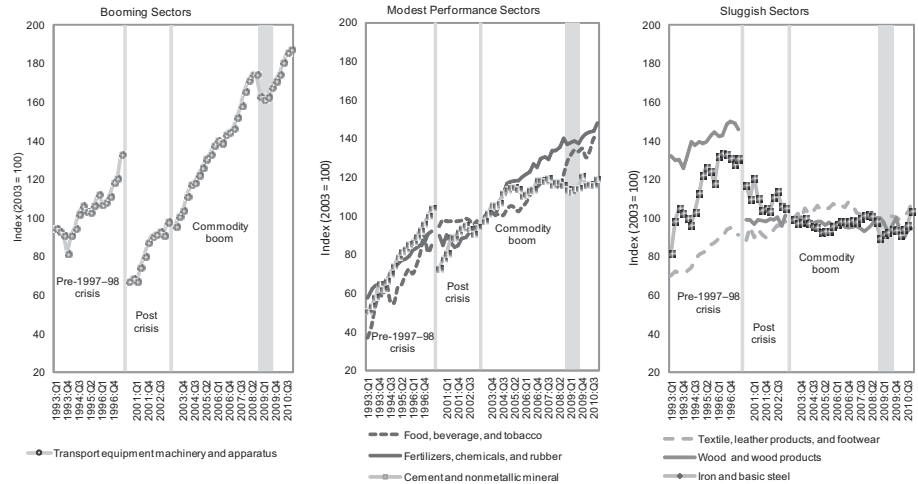
<sup>5</sup>Serious limitations (low coverage and frequency) of the data on wages and employment prevented more in-depth analysis of sectoral trends.

<sup>6</sup>Minimum wage setting was decentralized to the provinces, giving rise to interprovince wage competition.



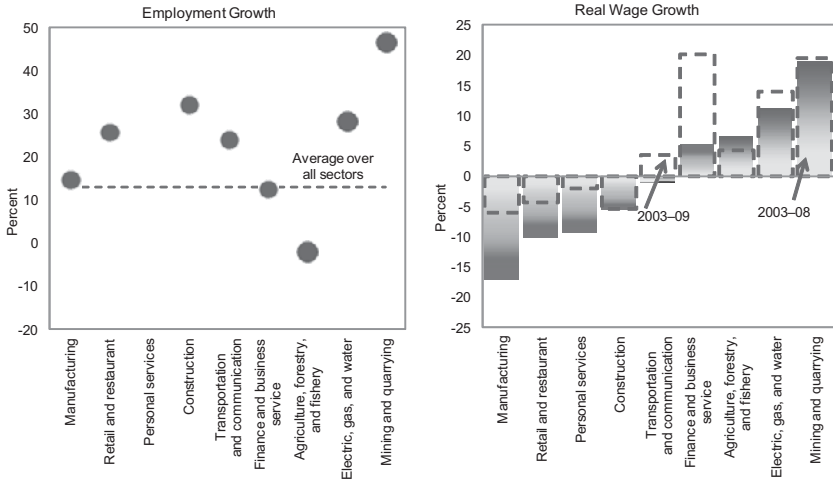
Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

**Figure 4.8** Manufacturing Exports by Main Products, 1990–2009



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

**Figure 4.9** Real GDP by Manufacturing Sector, 1993–2010



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.  
Note: Employment data not available for personal services.

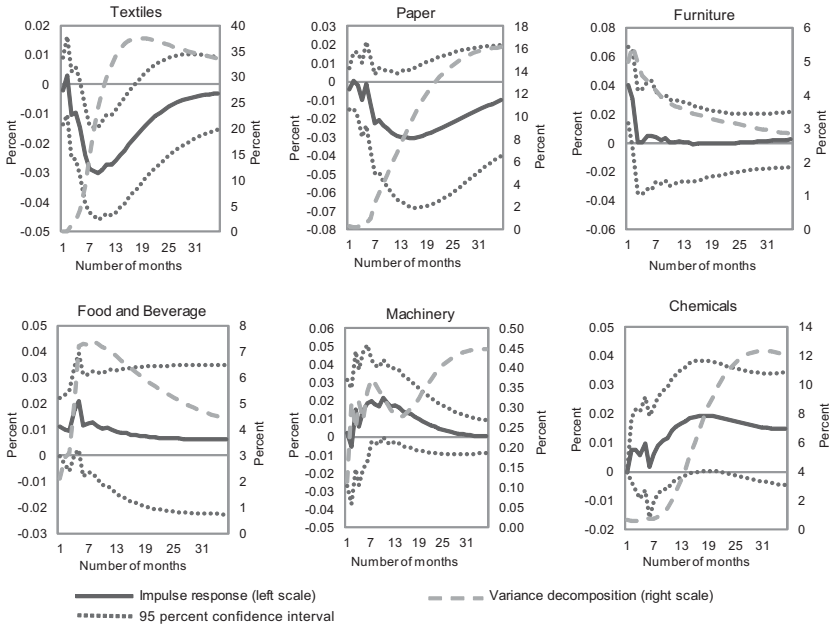
**Figure 4.10** Employment and Wage by Sector, 2003–09

grew by 19 percent (Figure 4.10). More recently, however, wage pressures have appeared in the service and manufacturing sectors, with the latter showing real wage increases of about 13 percent during 2009 alone.

Econometric analysis also suggests little evidence of Dutch disease. A vector autoregression model was estimated to gauge the effect of commodity price shocks on the output of key manufacturing sectors. The model was estimated for each sector with monthly data for the period 1993–2008 (until the Lehman Brothers crisis). Sectoral output was measured by the corresponding industrial production index. To control for possible correlation between commodity and sectoral manufacturing prices, the sectoral export price deflator was also included in the model. Finally, an index of total imports in trading partners—weighted by their share in Indonesia's exports—was introduced to control for external demand shocks. Results (Figure 4.11) suggest that only the textile sector may have been affected by commodity price shocks (as indicated by the negative and statistically significant impulse response and the 35 percent of the variance explained by commodity prices). Other sectors do not display any statistically significant evidence of Dutch disease. In fact, if any, the effect of higher commodity prices seems to be positive, reflecting some correlation between commodity and industry-specific export prices, as well as likely intersectoral complementarities (e.g., machinery and chemical industries are closely linked to production in the commodity sector), although the role of commodity prices in explaining the variance in output is limited.

## IS INCREASED RELIANCE ON COMMODITY EXPORTS A SOURCE OF CONCERN?

Although no clear evidence of Dutch disease is apparent, greater reliance on commodities raises questions about increasing vulnerability to terms-of-trade shocks



Source: IMF staff estimates

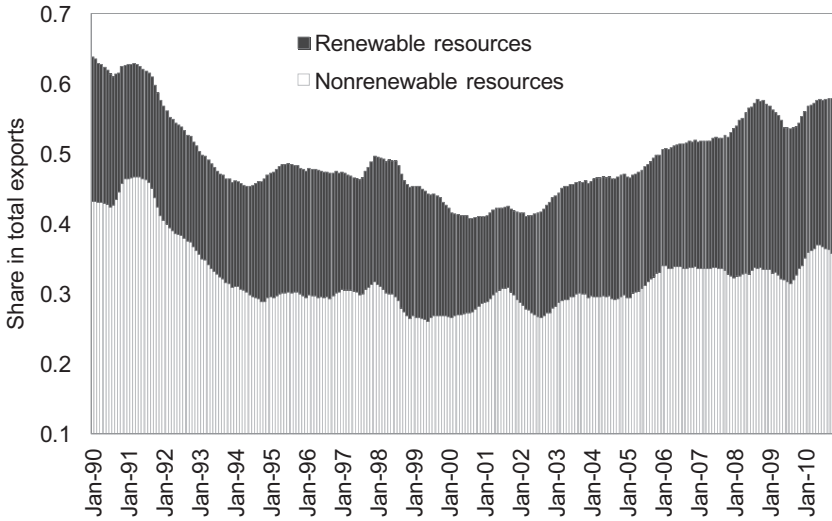
**Figure 4.11** Vector Autoregression: Impulse Responses and Variance Decomposition (Relative to commodity export prices)

(Figure 4.12). Despite increasing diversification within manufacturing exports, and to some extent within the commodity group as well, overall diversification has remained broadly constant for more than a decade—as indicated by the overall Herfindahl index of product concentration<sup>7</sup>—reversing the trend seen in the 1990s and early 2000s. This is reflected by the fact that greater within-group diversification has been offset by increased reliance on commodities, which have a lower degree of diversification (higher Herfindahl index) than the manufacturing sector (Figure 4.13).

Export price volatility has increased significantly, reflecting increased volatility in international prices as well as increased concentration in price-volatile products. This analysis constructs an index of export price volatility that tracks the variance of main export prices over time, weighting them by their share in total exports (Figure 4.14).<sup>8</sup> As expected, the index shows that volatility increased significantly in the last few years, even before the sharp and generalized fall in commodity prices associated with the collapse in trade (after Lehman Brothers collapsed). This increase is explained by both the heightened variance of underlying prices and the increased correlation among them. As suggested by the difference

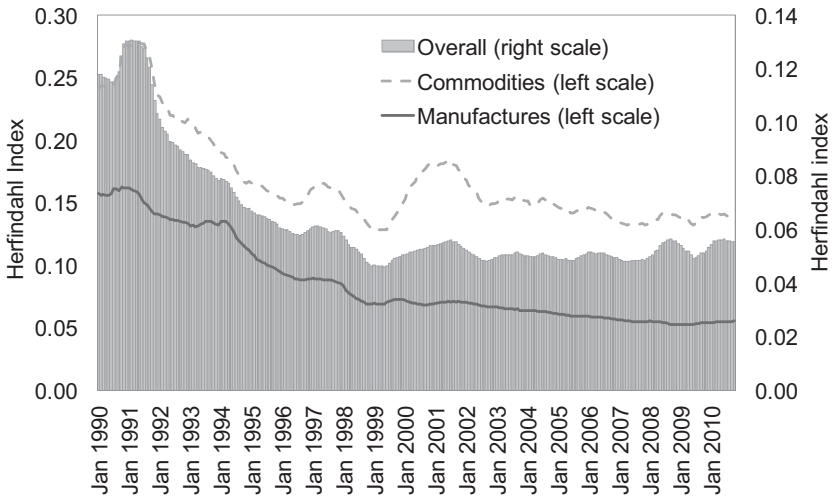
<sup>7</sup>The Herfindahl index of product concentration is constructed from SITC 2-digit disaggregation groups.

<sup>8</sup>Based on the construction of the overall export deflator ( $P = \sum_{i=1}^n (p_i w_i)$ ), the vulnerability index is computed as  $\sigma^P = \sum_i \text{var}(p_i) w_i^2 + 2 \sum_{i < j} \text{covar}(p_i, p_j) w_i w_j$ , where  $P$  is the export deflator,  $p_i$  is product  $i$ 's price deflator,  $w_i$  is product  $i$ 's share in total exports and  $\sigma^P$  is the variance of  $P$ . As before, weights are fixed or allowed to move over time depending on the desired information. Variances and covariances are measured on seasonally adjusted and (Hodrick-Prescott filter) detrended series of export deflators.



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

**Figure 4.12** Product Concentration, 1990–2010 (Share of natural resource-intensive products in total exports)

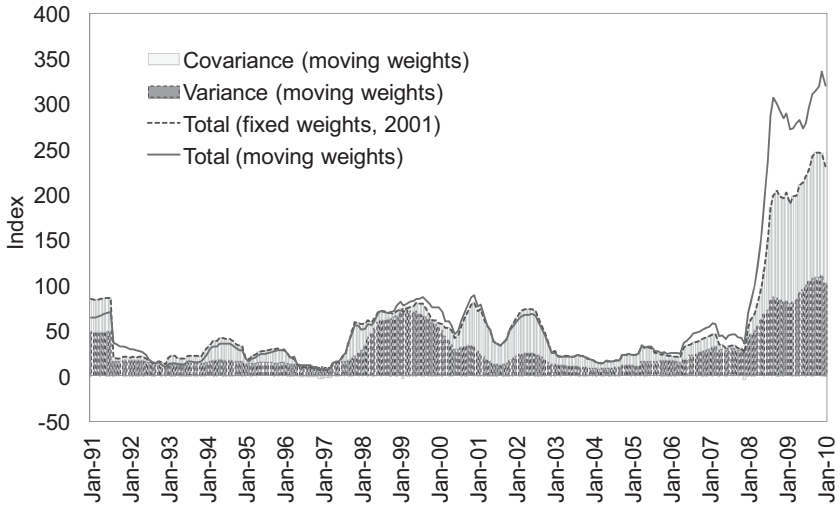


Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

Note: Herfindahl index varies from 0 to 1 with higher value representing greater concentration.

**Figure 4.13** Product Concentration, 1990–2010

between the index with fixed weights and the index with moving weights, increased reliance on commodity exports has contributed significantly to Indonesia's export price volatility, precisely because commodities display higher volatility than do manufacturing products (even after detrending and seasonally adjusting them).



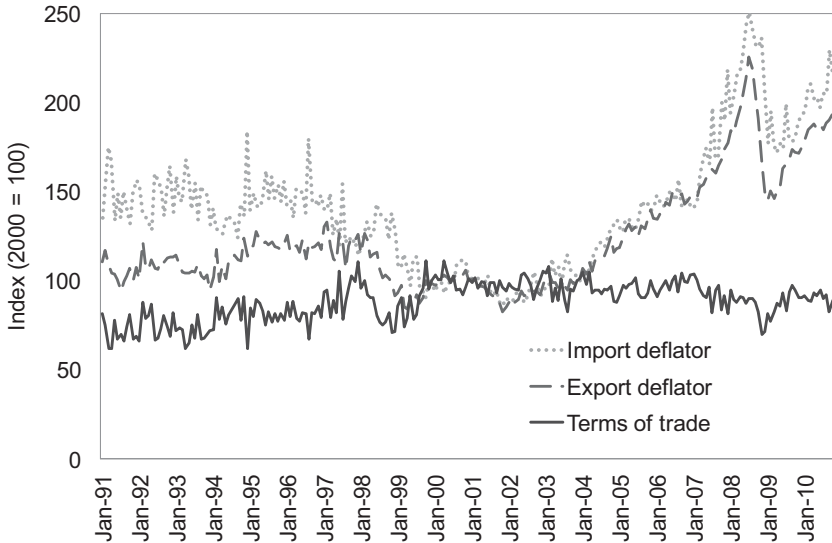
Sources: CEIC Data Co., Ltd.; and IMF staff estimates.

**Figure 4.14** Volatility of Export Prices, 1991–2010 (Moving and fixed weights)

However, Indonesia's terms of trade have displayed limited volatility. Indonesia is also a significant importer of raw materials, thus, its import prices have also fluctuated sharply in recent years, and moved closely with export prices (Figure 4.15). As a result, terms of trade have actually remained stable during the commodity boom period, as well as during the commodity price bust of the 2008–09 global crisis. This suggests that, despite significant exposure to commodities, Indonesia's external balances are likely to remain resilient to external price shocks.

## CONCLUSIONS

The unprecedented export boom preceding the 2008–09 global crisis, and the associated marked real exchange rate appreciation and import boom, have raised questions about the impact of the commodity boom on other sectors of the economy, given that a reversal in commodity prices (and demand) could quickly lead to mounting external imbalances. An in-depth look at recent trade patterns, sectoral output, and labor markets, however, does not point to an obvious case of Dutch disease at this point, although some evidence indicates accumulating pressures in some sectors. Although there is evidence of stagnation in some manufacturing sectors, it does not seem to relate to the recent commodity boom, suggesting that other known structural factors (e.g., infrastructure bottlenecks and labor market frictions) may have played a role. Increasing reliance on commodity exports, however, could make the economy vulnerable to external price shocks, although a high correlation between export and import prices (reflecting a high commodity content in imports) goes a long way toward mitigating price shocks. Addressing structural problems will be the key to fostering growth in the



Sources: CEIC Data Co., Ltd.; and IMF staff estimates.

**Figure 4.15** Terms of Trade, 1990–2010

manufacturing sector and diversifying the economy away from commodities, while still exploiting its comparative advantage.

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# Adequacy of Indonesia's Foreign Exchange Reserves

MARTA RUIZ-ARRANZ AND MILAN ZAVADJIL\*

Indonesia has seen a sharp increase in its international reserves holdings in recent years. Reserves have increased from less than \$10 billion (6 percent of GDP) in the early 1990s to \$120 billion (14.8 percent of GDP) as of June 2011. The pace of accumulation has picked up in the past two years owing to large capital inflows, as well as consistent current account surpluses. This trend is not unique to Indonesia. For emerging Asia as a whole, reserves have increased seven times in nominal terms since the Asian financial crisis of 1997–98. Even excluding China, reserves increased by the equivalent of 10 percentage points of GDP during the 2000–10 period (Figure 5.1).

The buildup of international reserves has contributed to reducing Indonesia's vulnerabilities. The economy is now better prepared to weather sudden capital account reversals than it was a decade ago and, therefore, is less vulnerable to shifts in investor sentiment. Together with moderate current account surpluses and declining domestic and external debt ratios, the solid level of reserves helped to maintain financial stability during the 2007–09 global financial crisis, when capital outflows rose significantly. During this crisis, Indonesia's reserves were somewhat lower than those in many other emerging Asian economies, and some private sector analysts believe this may have contributed to the relatively high volatility of Indonesian markets.

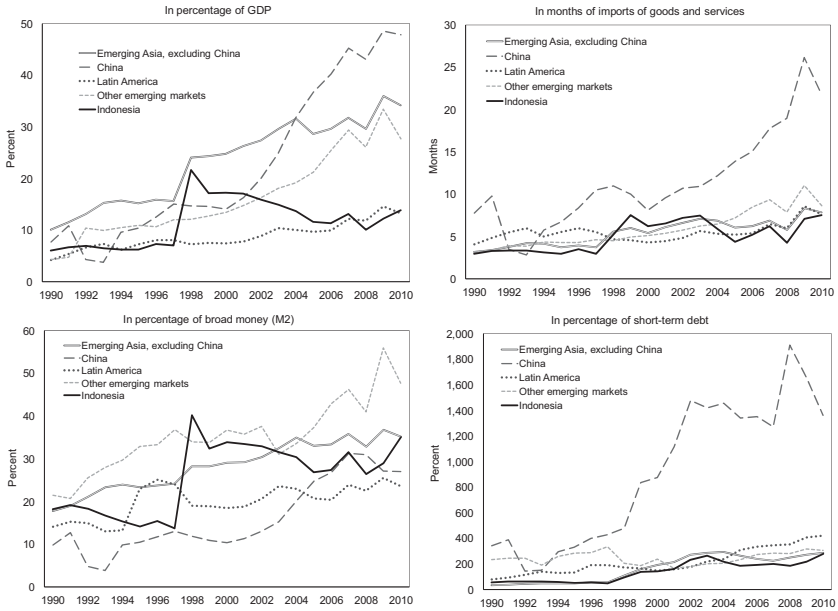
Countries hold reserves to provide liquidity in the event of temporary shortfalls in exports or capital inflows, and thus to avoid disruptive changes in the exchange rate or in investment and consumption. In addition, reserves can protect the domestic banking system—and more broadly, domestic credit markets—from outflows of domestic or external resources (Obstfeld, Shambaugh, and Taylor, 2008).

Based on these motivations, emerging markets in Asia, and Indonesia in particular, had ample cause to increase reserves holdings over the past decade. Much of the recent increase in reserves can be explained by the precautionary motive, with the increase paralleling the sharp expansion of trade and capital flows as well as the rise in the volatility of gross capital flows (IMF, 2007). These factors have increased the disruptive potential of sudden stops. In addition, accelerated financial intermediation, including the development of local bond and equity markets,

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\*Lutzardo Tobing and Leo Putera Rinaldy also assisted in the preparation of this chapter.





Sources: IMF, World Economic Outlook database; Bank for International Settlements; CEIC Data Co., Ltd.; and IMF staff calculations.

**Figure 5.1** International Reserves, 1990–2010

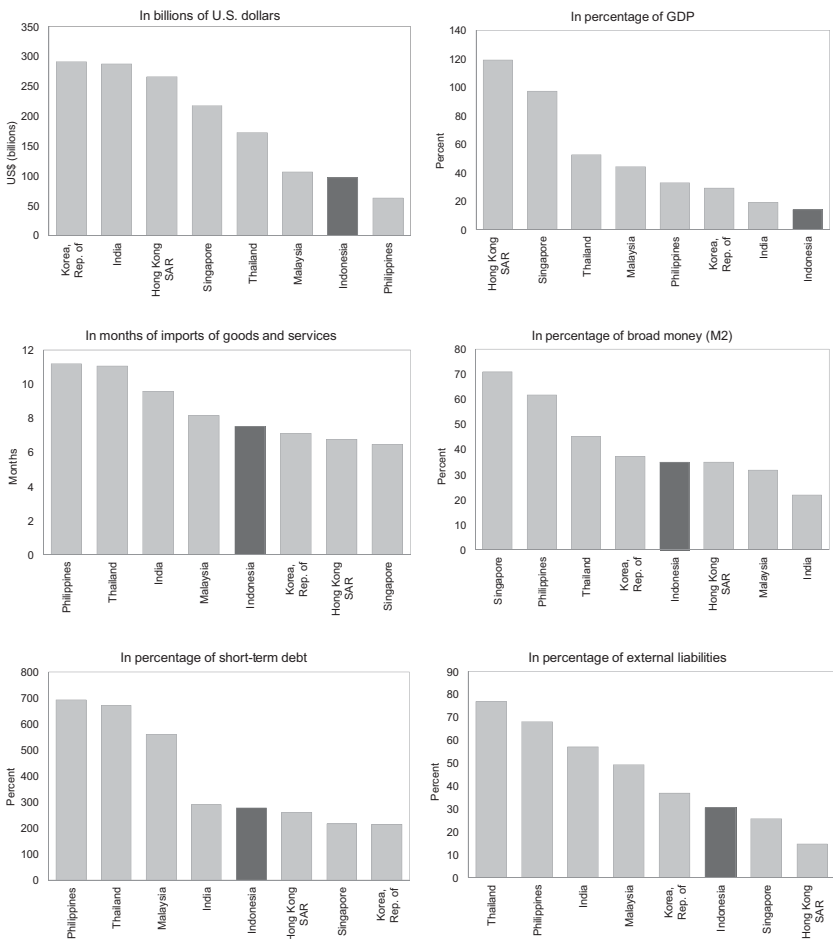
has raised the risks associated with possible outflows from the domestic financial system. Finally, the buildup of reserves in Indonesia and some other Asian countries was a natural response to the disruptions and the disastrous impact of the crises of the late 1990s on the economic, political, and social fabric of these countries, which has understandably increased their risk aversion. Thus, despite moves toward more flexible exchange rates and better capital market access, like many other emerging-market central banks, Indonesia has used the opportunities provided by current account surpluses and capital inflows since the 1997–99 crises to build reserves.

Empirical analysis suggests that although foreign exchange reserves in Indonesia are currently comfortable, they are not excessive. Measured by traditional adequacy indicators, Indonesia's reserves have been “adequate” for some time. However, they have only recently exceeded levels predicted by an optimal insurance model under which reserves provide a steady source of liquidity to cushion the impact of a sudden stop in capital inflows on output and consumption. Furthermore, when the increase in the size and volatility of foreign liabilities—against which reserves provide insurance—is taken into consideration, the case for maintaining current reserves levels is further strengthened. Finally, Indonesia continues to benefit in that its higher reserves have resulted in reduced spreads on privately held external debt.

Going forward, further accumulation of reserves no longer seems essential from a financial stability point of view. At the current juncture, the rupiah has room to appreciate and support monetary policy in containing inflation. Thus, a more modest pace of reserves accumulation, if any, is called for. However, reserves accumulation may still provide some benefit in reducing credit spreads.

## DEVELOPMENTS IN RESERVE ADEQUACY INDICATORS

Indonesia's reserves are high relative to traditional reserve adequacy indicators, but not by the standards of emerging Asia. At the end of 2010, reserves covered 7.5 months of imports of goods and services—more than twice the traditional benchmark of 3 months of imports and Indonesia's level in 1997, but below the average of 8 months of imports in emerging Asia. The ratio of reserves to short-term external debt was more than twice the recommended 100 percent under the Greenspan-Guidotti rule, albeit significantly lower than the average in Asia (excluding China). Indonesia's reserves level was also above the Wijnholds and Kapteyn (2001) recommended holding of 5–20 percent of broad money (M2) (Figure 5.2).<sup>1</sup>



Sources: IMF, International Financial Statistics; and BIS, International Investment Position data.

**Figure 5.2** Indonesia: Reserve Adequacy Indicators Relative to Other Asian Countries, 2010

<sup>1</sup>These measurements use debt at remaining maturity. The ratio of reserves to short-term debt with an original maturity of less than one year is about 300 percent.

Indonesia's reserve adequacy indicators resumed an upward trend in 2009–10, after a dip in 2008. Since the Asian financial crisis, Indonesia's reserve adequacy indicators have broadly mirrored trends in other emerging markets, excluding China, rising sharply immediately after the crisis. However, from 2003 to 2008, reserves in Indonesia declined or were stagnant relative to imports, short-term debt, and total external liabilities, reflecting the acceleration of trade and capital flows in this period. Indonesia's reserve adequacy indicators as of early 2011 are broadly similar to averages in various emerging-market groupings.

Reserves in Indonesia are not seen as excessive against historical levels given the size of gross liabilities and the increased volatility of these flows. Indonesia's very high levels for the traditional reserve indicators overstate the extent to which Indonesia is insured against sudden stops, especially in view of the sharp increase in portfolio flows (Box 5.1). Reserves currently cover about 21 percent of external liabilities in

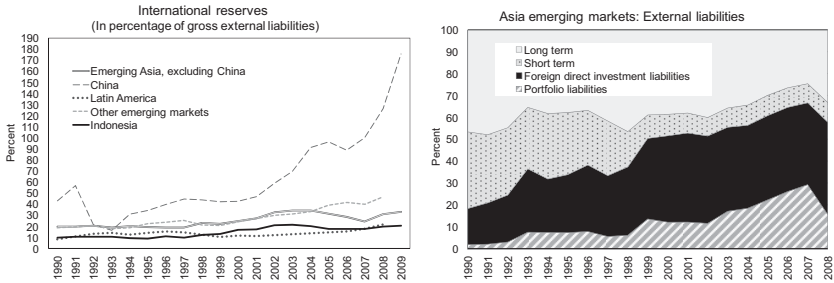
**BOX 5.1*****Why Scale Reserves by Gross External Liabilities?***

Over time, the nature of balance of payments shocks has evolved. The ratio of reserves to imports was developed to measure resilience to the kinds of trade shocks that tended to predominate before the liberalization of financial systems and capital accounts. Subsequently, with the increase in cross-border capital flows and the rising possibility of sudden stops and capital outflows, the ratio of reserves to external debt maturing within a year became a key indicator of reserve adequacy. This measure reflected, in part, the nature of the financial crisis in Asia and elsewhere in the late 1990s, when banks and corporations built up large short-term foreign exchange liabilities with which they financed long-term investments that did not generate foreign exchange. Foreign exchange reserves were not sufficient to finance outflows of short-term capital when they occurred. The ratio of reserves to short-term debt was thus highly suitable for assessing vulnerability to these types of currency and maturity mismatches and was indeed a good predictor of crisis.

Capital flows to emerging Asia have evolved considerably since the crisis of the late 1990s. The share of debt, including short-term debt, has decreased (Figure 5.3) while portfolio flows have risen. Portfolio flows have proved to be volatile in Indonesia—recent episodes of global risk aversion, such as May–June 2006, August 2007, or October–November 2008, have been felt primarily in domestic bond and equity markets. The volatility of direct investment flows has also increased (IMF, 2007). Moreover, long-term liability holders rarely remain passive when balance of payments problems arise. As noted by Wyplosz (2007), speculation mostly takes the form of short-term liabilities, but long-term holders can quickly build up hedges, and the potential for such a buildup is captured by looking at the overall liability position.

Of course, reserves do not need to cover external liabilities entirely, as would be mandated by the Greenspan-Guidotti rule. The appropriate coverage adequacy ratio should clearly be lower for some components (foreign direct investment, portfolio equity) than for others (short-term debt).

In sum, the ratio of reserves to gross external liabilities appears to best capture vulnerability to sudden stops and capital account reversals, especially in light of the growing complexity of capital market instruments.



Sources: IMF, World Economic Outlook database; BIS, International Investment Position data; and Lane and Milesi-Ferretti (2007).

**Figure 5.3** International Reserves and External Liabilities

Indonesia compared with about one-third in emerging Asia (excluding China) (Figure 5.3). Reflecting greater real and financial integration with the global economy, cross-border capital flows in emerging Asia—both in and out—have grown sharply since 2000, resulting in a buildup in external assets and liabilities in all the economies of the region. The ratio of reserves to external liabilities increased through 2002 as emerging Asia rebuilt its reserves following the crisis, but then eased before rising again during 2009–10. In addition to the increase in size, the volatility of gross capital flows has risen (IMF, 2007).

## AN INSURANCE MODEL OF OPTIMAL RESERVES

In assessing the appropriateness of current reserves levels, it is useful to analyze how the recent buildup of reserves compares with the results of an insurance model of optimal reserves. In the model, based on the work by Jeanne (2007), reserves enable an economy to cushion the impact of a sudden stop in capital flows on domestic consumption and output by providing a ready source of liquidity. However, holding liquid reserves assets results in an opportunity cost equal to the difference between the return on capital and the return on reserves. The optimal level of reserves is derived from this cost-benefit analysis and depends on the probability and size of a sudden stop (or crisis), the output loss in the event of a sudden stop, the opportunity cost of holding reserves, and the degree of risk aversion.<sup>2</sup>

The model is calibrated on economy-specific data for the emerging-market economies in Asia, including Indonesia, and results are compared with actual levels of reserves at the end of 2010.

- *Estimating output loss.* The 1997–98 Asian crisis provides a useful benchmark for assessing the size of an output loss in the event of a sudden stop in capital flows. The cost to output during the period 1997–99 is estimated by cumulating the output gap in these years under the assumption that output would have grown at the same rate as the average before the crisis.<sup>3</sup> Results suggest

<sup>2</sup>The model is explained in more detail in Appendix 5.1.

<sup>3</sup>Results are robust to using averages corresponding to different time periods. The real GDP series are detrended with a Hodrick-Prescott filter.

**TABLE 5.1**  
Output Loss in Asian Crisis

Economy	Average Growth <sup>a</sup> (percent)	Difference Between Actual Growth and Average Growth (percentage points)			Cumulative Output Loss
	1970–96	1997	1998	1999	1997–99
Hong Kong SAR	7.4	-2.2	-12.8	-3.4	18.4
Indonesia	6.9	-2.2	-20.0	-6.1	28.2
Korea, Rep. of	8.1	-3.5	-15.0	1.4	17.1
Malaysia	7.6	-0.3	-14.9	-1.4	16.6
Philippines	3.6	1.6	-4.2	-0.2	4.4
Thailand	7.6	-9.0	-18.1	-3.2	30.3
Average	6.9	-2.6	-14.2	-2.2	19.2

Source: IMF staff estimates.

<sup>a</sup>Real GDP series have been detrended using a Hodrick-Prescott filter. Results are robust to different time period of averages.

that the cumulative output loss for the six Asian economies most affected by the crisis was 19 percent of GDP, on average (Table 5.1). This was significantly higher in Indonesia and Thailand, where the cumulative cost amounted to about 30 percent of GDP. These estimates may, however, underestimate the total output loss of the Asian crisis if the recession actually lowered the level of output permanently, rather than being a temporary deviation from trend.<sup>4</sup> The exercise in this chapter assumes a potential output loss of 19 percent of GDP, in line with the average output loss estimate from the Asian crisis experience, although a higher estimate would also be reasonable.

- *Estimating the probability of a sudden stop.* Consistent with the benchmark calibrations in Jeanne and Rancière (2006) and Jeanne (2007), the average probability of crisis is set to 10 percent, equal to the unconditional frequency of sudden stops in a large sample of emerging economies during the period 1975–2003.<sup>5</sup> In this exercise, the probability of crisis is assumed to be exogenous and thus independent of the level of reserves. It is, however, plausible that reserves could have a crisis-prevention role by reducing the likelihood of crises. If this were the case, the optimal level of reserves could be significantly larger.
- *Estimating the size of a sudden stop.* The stock of short-term external debt could be a good predictor of the potential immediate rollover needs and, therefore, of the size of the capital outflows in a sudden stop. For Indonesia, this stock

<sup>4</sup>Cerra and Saxena (2005) find evidence of permanent losses in the levels of output in six Asian economies following the 1997–98 crisis. The magnitude of the permanent losses is found to be economically significant for all economies, except perhaps the Philippines. For instance, in Indonesia, the contemporaneous output loss is estimated at 22 percent of GDP, and the total loss including the losses beyond the crisis period reached 42 percent of GDP.

<sup>5</sup>Jeanne (2007) identifies sudden stops as those years in which net capital inflows fell by more than 5 percent of GDP.

is estimated to be about 4.8 percent of GDP. For other Asian countries, short-term liabilities average 10 percent of GDP, except in Hong Kong SAR and Singapore, where they are well above this level. Nevertheless, the potential size of capital flight in Indonesia could be significantly larger than 4.8 percent of GDP given that gross external liabilities exceed 50 percent of GDP. As discussed in Box 5.1, total foreign liabilities may capture Indonesia's vulnerability to reversals in capital flows better than short-term debt.

- *Estimating the opportunity cost of holding reserves.* The opportunity cost of reserves is the difference between the return on reserves and the return on capital or an alternative investment. In the absence of a broad consensus about how best to capture this cost, several measures have been used in the literature. The baseline scenario in this analysis assumes the opportunity cost of reserves is equal to the interest spread on foreign debt.<sup>6</sup> In this case, the opportunity cost of reserves can be viewed as the return that the government has to pay in excess of the return on liquid foreign assets to finance the purchase of reserves. This is proxied by the sovereign risk premium (as measured by the Emerging Markets Bond Index [EMBI] or the 10-year government bond spread). As shown in Table 5.2, sovereign interest rate spreads for foreign debt vary widely; they have also fluctuated sharply during the 2007–10 period. In Indonesia, EMBI spreads averaged slightly less than 200 basis points (bps) in 2007–10, although in 2008 they even reached 1,000 bps briefly. An alternative method of computing the opportunity cost of reserves—the fiscal cost of sterilizing reserves—suggests that the opportunity cost could be even larger. In particular, in Indonesia the difference between the policy rate and the yield on the one-year U.S. Treasury bill averaged 6.2 percent in 2010 (Table 5.3).

The findings suggest that reserves in Indonesia now exceed the optimal level by a modest amount. By mitigating the potentially large welfare costs of crises, reserves accumulation can provide benefits through insurance that more than

**TABLE 5.2**

Interest Rate Spreads (*Monthly average, 2007–10*)

Economy	Basis points
Hong Kong SAR	–74
India	402
Indonesia	341
Korea, Rep. of	156
Malaysia	164
Philippines	263
Singapore	–103
Thailand	43

Sources: IMF, International Financial Statistics; CEIC Data Co., Ltd.; and IMF staff estimates.

Note: EMBI spreads for Indonesia, Malaysia, the Philippines, and China; 10-year government bond spreads for others.

<sup>6</sup>Levy-Yeyati (2006), Rodrik (2006), and others have argued that the alternative use of one dollar of reserves is one dollar less of foreign debt or, alternatively, reserves can be accumulated by issuing foreign debt.

TABLE 5.3

Estimated Sterilization Financing Cost ( <i>As of December 2010</i> )			
Economy	Domestic financing costs (Sterilization rate, percent)	Net carry (percent interest on foreign reserves minus sterilization rate)	Carry income on total reserves (percentage of GDP)
China	2.25	-1.96	-0.94
India	5.25	-4.96	-0.96
Indonesia	6.50	-6.21	-0.84
Korea, Rep. of	2.50	-2.21	-0.65
Malaysia	2.75	-2.46	-1.08
Philippines	4.00	-3.71	-1.22
Singapore	0.20	0.09	0.09
Hong Kong SAR	0.50	-0.21	-0.25
Thailand	2.00	-1.71	-0.90

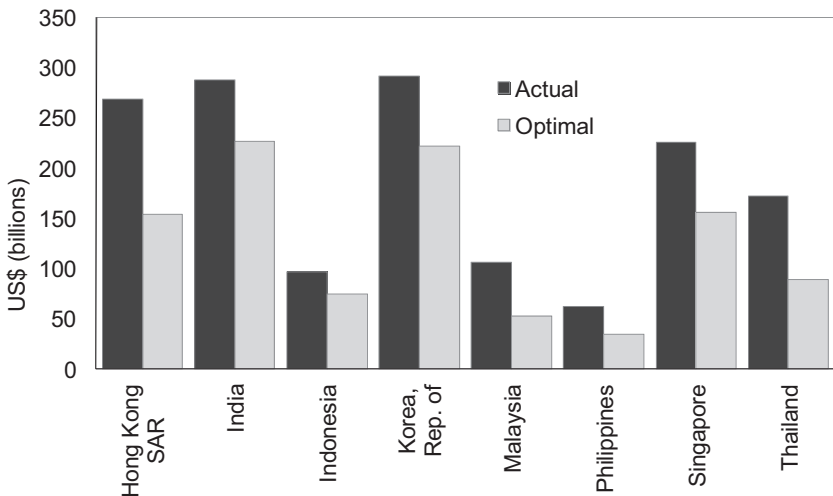
Sources: Country authorities; IMF, APDCORE database, World Economic Outlook database; and IMF staff calculations.

Note: The rate on foreign reserves is assumed to be the yield on the one-year U.S. Treasury note (0.29 percent at the end of 2010).

compensate for the opportunity cost of holding liquid assets. Until recently, reserves accumulation in Indonesia largely reflected this favorable trade-off, but the level of reserves is now above the optimal level (Figure 5.4).

The need for further reserves buildup has diminished. As noted, current reserves levels are comfortable and have contributed to reducing vulnerabilities in the past few years. As of mid-2011, however, the rupiah appears to have room to appreciate and support monetary policy in containing inflation, which would call for limiting reserves accumulation. However, the use of reserves to smooth volatility in the face of the recent turmoil in the financial markets appears appropriate. The model suggests that a reserves level of about \$75 billion is optimal. However, these estimates should be interpreted with caution—the model is sensitive to the assumptions used and therefore should be only one of several inputs into determining adequate reserves levels.

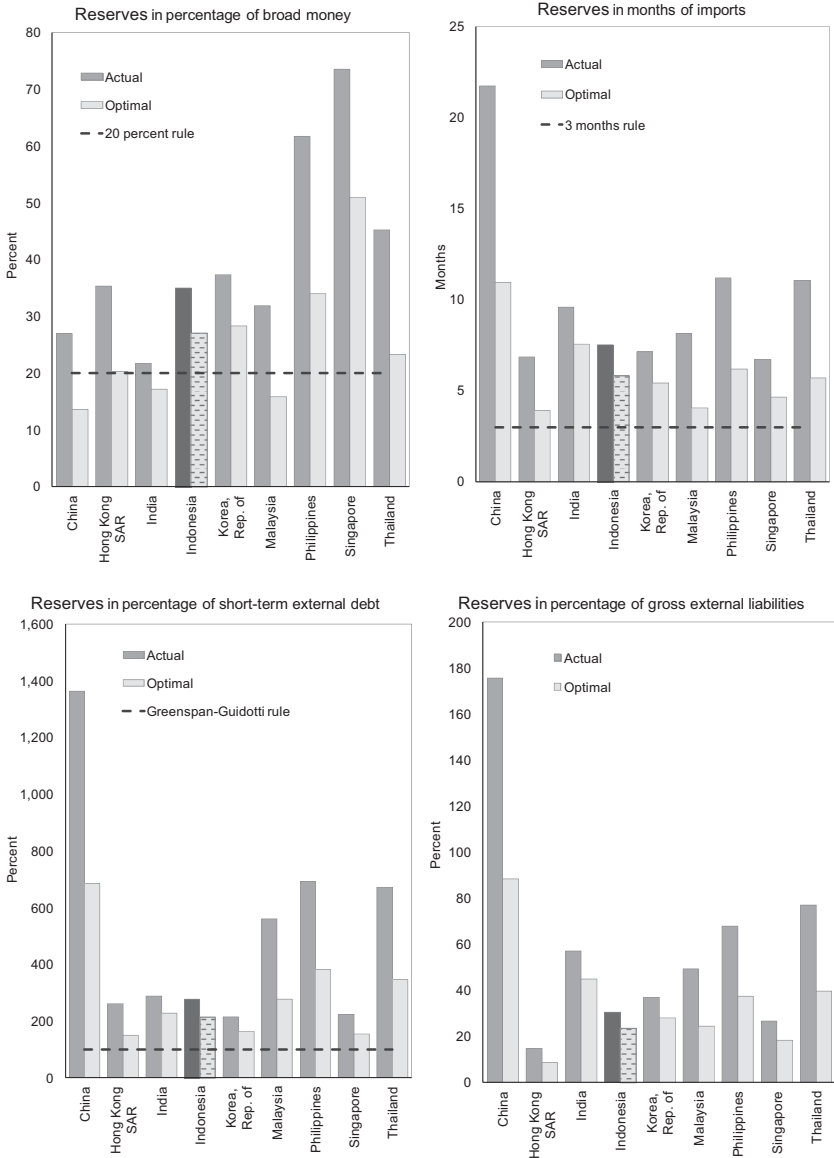
Optimal reserves adequacy ratios predicted by the model are higher than the standard rules of thumb. Optimal ratios estimated by the model for Indonesia exceed



Source: Authors' calculations.

Figure 5.4 The Optimal Level of International Reserves, 2010

seven months of imports, more than twice as large as the traditional benchmark. With regard to short-term external debt, Indonesia's estimated optimal reserves level is also higher than the Greenspan-Guidotti rule's 100 percent. Similarly, the estimated optimal level of reserves to broad money is about 30 percent, exceeding the 5–20 percent range usually proposed in the literature (Figure 5.5). The model



Sources: BIS, International Investment Position; IMF, World Economic Outlook database; and Lane and Milesi-Ferretti (2007).

**Figure 5.5** Optimal Levels of International Reserves and Traditional Reserves Adequacy Indicators, 2010



also predicts excessively high ratios for other countries in Asia, suggesting that the traditional rules of thumb may no longer be relevant and that economy-specific indicators that take into account a particular country's vulnerabilities and opportunity costs may be preferable to standardized rules.

The evolution of reserves cannot be assessed independently of the trade and capital account flows against which reserves provide insurance. The difference between current and optimal levels seems to be smaller when expressed as a proportion of months of imports, broad money, short-term debt, or gross external liabilities than when presented in nominal terms. In light of these results, it can be concluded that the recent increase in reserves in Indonesia can be explained by the precautionary motive, and that the increase has paralleled the expansion of trade and capital flows. If this trend continues, it would be desirable from an insurance point of view that reserves keep up with these flows.

## A THRESHOLD MODEL OF SPREADS-RESERVES ELASTICITY

To the extent that reserves lower the spreads on the economy's privately held external debt, the opportunity cost of holding reserves is reduced and the incentives to accumulate reserves become higher. Alternatively, one could argue that holding reserves reduces the probability of a sudden stop. In either case, the desired level of reserves holdings is increased. Reserves coverage is also a key variable used by rating agencies to assess credit risk and, therefore, an important determinant of borrowing costs. This section estimates the significance of this "prevention" effect and whether current reserves levels can be justified by the benefits of reduced borrowing costs.

The analysis estimates spreads-reserves elasticities for a panel of 34 emerging economies, including Indonesia, for the period 1997–2006 applying threshold estimation. Because the marginal effect of reserves on spreads might be different at different levels of reserves, the analysis looks for a nonlinear relationship between spreads and international reserves. This methodology can endogenously determine the threshold level(s) of reserves (and confidence intervals) at which the relationship between reserves and spreads changes. In particular, these threshold levels will provide information about the maximum level of reserves at which no further gains from lower spreads could be realized. They can then be compared with the optimal levels found in the previous section as well as with the traditional rules of thumb.

Threshold estimation takes the form

$$S_{it} = \beta_1'X_{it-1} + \beta_2R_{it-1} + \varepsilon_{it}, \quad R_{it-1} \leq v, \quad (5.1)$$

$$S_{it} = \alpha_1'X_{it-1} + \alpha_2R_{it-1} + \varepsilon_{it}, \quad R_{it-1} > v, \quad (5.2)$$

where  $S$  is J.P. Morgan's EMBI spreads;  $R$  is a reserves ratio indicator, which is used both as a regressor and as the threshold variable that splits the sample into two groups;  $v$  is the endogenously determined threshold level; and  $X$  is a vector

of control variables. The vector of control variables includes (a) two exogenous global factors: the international risk-free asset (proxied by the 10-year U.S. Treasury rate) and global risk aversion (proxied by Credit Suisse First Boston's High Yield spread); and (b) the country's GDP growth rate and ratio of debt to GDP to control for country-specific and time-varying characteristics. All the variables are estimated in logs and are lagged one period to reduce potential endogeneity concerns. The regressions also include country-specific fixed effects. A description of the variables and their sources can be found in Tables 5.1.1 and 5.1.2 in Appendix 5.1.

The objective of the analysis is to estimate the threshold level beyond which the marginal impact of reserves on spreads is no longer significant. If needed, the analysis performs multiple threshold regressions proceeding sequentially. First, a threshold model is fitted to the data to estimate a first reserves ratio threshold level and the least-squares coefficients of each subsample. Confidence intervals are computed for the parameters, including the reserves threshold coefficient, and an asymptotic simulation test is provided of the null hypothesis of linearity against the alternative of a threshold. If the spreads-reserves elasticity beyond the threshold is not statistically significant, the procedure stops. If the analysis finds evidence of a first threshold, it proceeds to the second stage (provided the number of observations allows doing so). The second stage consists of dropping the subsample below the threshold and repeating the procedure just described but applying it to the rest of the sample in search of a second threshold. This allows the computation of estimates for the two remaining subsamples and testing of the null hypothesis of no second reserves threshold.

Results suggest that holding reserves has a significant impact in the form of reducing borrowing spreads, and this effect continues to be important even at relatively high levels of reserves. The elasticity of spreads with respect to reserves is estimated to be between 30 percent and 50 percent, depending on the adequacy ratio employed. That is, a 1 percent increase in the reserves ratio leads to a 0.3–0.5 percent decline in spreads. The estimated thresholds beyond which there are no gains in holding reserves (i.e., that is, the cost of borrowing is not reduced further) are significantly above the levels suggested by the standard rules of thumb and closer to the optimal reserves levels found in the previous section. For instance, the threshold level of reserves to imports is estimated at 6.3 months, twice as large as the traditional rule of thumb. Similarly, the threshold of reserves to broad money is found to be 28 percent, close to the average optimal level of 32 percent predicted by the model in the previous section. The findings for six different reserves adequacy indicators are presented in Tables 5.4–5.6.

Indonesia has benefited from higher reserves because the higher reserves have reduced borrowing costs. The analysis shows that Indonesia's current level of reserves is below the threshold estimates, suggesting that additional reserves accumulation continues to have a positive impact in reducing spreads (Figure 5.6). Results suggest that this benefit could be somewhat larger for Indonesia than for other emerging-market countries with relatively higher reserves holdings. This exercise is likely to provide a lower bound estimate of the benefits of reserves as

**TABLE 5.4**  
Thresholds in the Spreads-Reserves Relationship

Measurement	Threshold 1		Threshold 2		Reserve adequacy benchmark
	Estimate	Confidence interval	Estimate	Confidence interval	
Reserves to					
GDP <sup>a</sup> (percent)	49	[23, 51]	n.a.	n.a.	n.a.
Months of imports <sup>b</sup>	6	[2, 9]	n.a.	n.a.	3
Broad money <sup>b</sup> (percent)	28	[6, 85]	n.a.	n.a.	5–20
Short-term debt <sup>b</sup> (percent)	125	[112, 692]	534	[534, 535]	100
Foreign liabilities <sup>c</sup> (percent)	12	[12.0, 12.4]	52	[52, 66]	n.a.
Financial system deposits and equities <sup>c</sup> (percent)	13	[12, 14]	30	[14, 40]	n.a.

Source: Authors' calculations.

<sup>a</sup>The marginal impact of reserves is negative and significant below threshold 1; there are insufficient observations to estimate the impact above the threshold.<sup>b</sup>The marginal impact is negative below threshold 1 and not significant above the threshold.<sup>c</sup>The marginal impact is not significant below threshold 1, negative between thresholds 1 and 2, and insignificant above threshold 2.**TABLE 5.5**  
Threshold Estimates of the Elasticity of EMBI Spreads with Respect to International Reserves, Traditional Indicators

Thresholds	GDP	Months of imports		Broad money		Short-term debt		
	< 49	< 6.3	> 6.3	< 28.3	> 28.3	< 125	[125,534]	> 534
Spreads-reserves elasticity	-0.425*** (0.11)	-0.329*** (0.12)	0.004 (0.37)	-0.463** (0.17)	0.167 (0.25)	-0.31 (0.20)	-0.311* (0.19)	-0.531 (0.37)
Observations	286	176	112	151	144	80	169	38
R-squared	0.53	0.5	0.46	0.42	0.46	0.24	0.6	0.7

Source: Authors' calculations.

Note: Robust standard errors in parentheses.

\* significant at 10 percent.

\*\* significant at 5 percent.

\*\*\* significant at 1 percent.

**TABLE 5.6**  
Threshold Estimates of the Elasticity of EMBI Spreads with Respect to International Reserves, New Indicators

Thresholds	Total foreign liabilities			Financial system deposits and equities		
	< 12	[12, 52]	> 52	< 13	[13, 30]	> 30
Spreads-reserves elasticity	-0.13 (0.15)	-0.419** (0.19)	-0.268 (0.71)	0.035 (0.18)	-0.609* (0.32)	0.259 (0.24)
Observations	82	182	12	47	132	74
R-squared	0.33	0.60	0.77	0.46	0.49	0.60

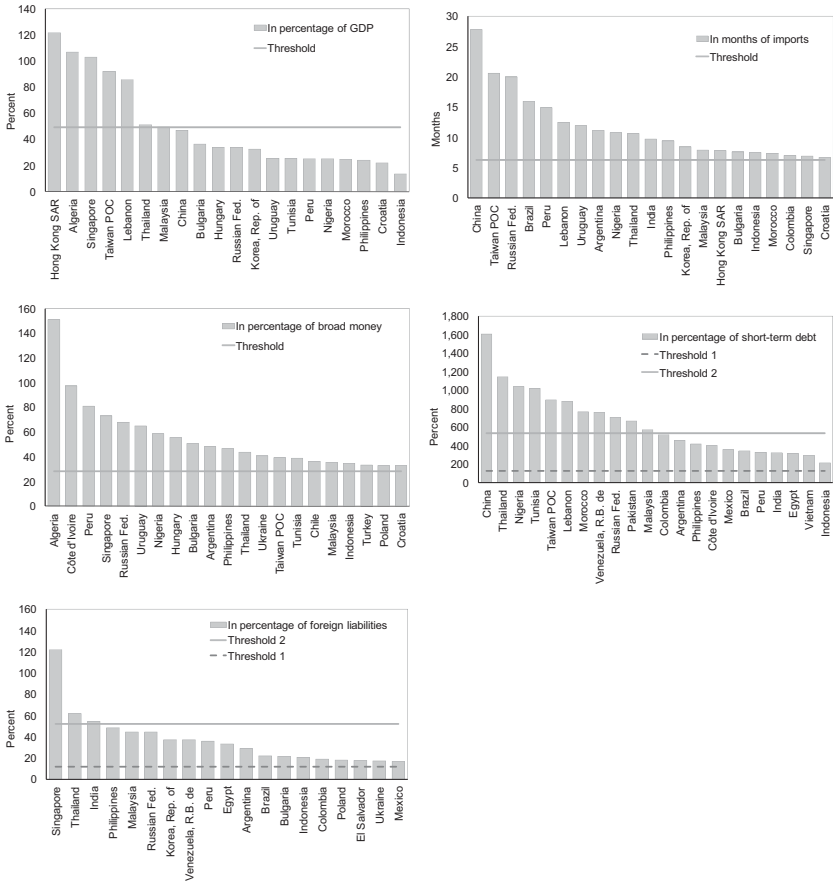
Source: Authors' calculations.

Note: Robust standard errors in parentheses.

\* significant at 10 percent.

\*\* significant at 5 percent.

\*\*\* significant at 1 percent.



Sources: IMF, World Economic Outlook database; BIS, International Investment Position; and IMF staff calculations.

**Figure 5.6** International Reserves and Threshold Estimates

measured by lower financing costs because it does not incorporate similar gains in the private sector. This is particularly relevant in the current context, in which borrowing costs for corporations have increased significantly as a result of tighter global liquidity.

Finally, a word of caution with regard to the use of threshold estimates (or the estimated optimal levels in the previous section) as benchmark values for policy purposes. As discussed earlier, the estimates are sensitive to the assumptions used, and the confidence intervals for some of the threshold parameters are sufficiently large to suggest uncertainty regarding their true values.

## CONCLUSIONS

In assessing reserves adequacy in Indonesia, the empirical analysis concludes that reserves levels are comfortable, and further accumulation is relatively

unnecessary. Although the estimates are sensitive to parameters and assumptions, the study suggests that current reserves levels are somewhat above the levels predicted by a simple model of optimal reserves, thus indicating further accumulations will result in little benefit with regard to reducing vulnerabilities. Limiting accumulation could also help alleviate inflationary pressures. However, reserves accumulation continues to have a positive impact by reducing borrowing costs for both the government and the private sector.

## APPENDIX 5.1. A MODEL OF OPTIMAL RESERVES

Jeanne (2007) derives the optimal level of reserves by minimizing a loss function that equals the opportunity cost of reserves plus the expected welfare cost of a crisis:

$$Loss = \delta R + \pi f(R), \quad (5.1)$$

where  $\delta$  is the opportunity cost of reserves;  $R$  is reserves holdings;  $\pi$  is the probability of a crisis or sudden stop; and  $f(\cdot)$  is the welfare cost of a crisis, which increases with the size of the sudden stop and the output loss ( $L$  and  $\Delta Y$ ). Assuming constant risk aversion ( $\sigma$ ) and an exogenous probability of crisis, the optimal level of reserves is given by

$$R = L + \Delta Y - \left[ 1 - \left( 1 + \frac{\delta}{\pi} \right)^{-1/\sigma} \right]$$

That is, the optimal level of reserves is larger the greater the size and output cost of a crisis, the higher the probability of a sudden stop, the lower the cost of holding reserves, and the higher the degree of risk aversion.

## DATA FOR THE THRESHOLD ESTIMATION

TABLE 5.1.1

Variable Definitions and Sources		
Variable	Description	Source
Spread	J.P. Morgan EMBI spread in bps	Bloomberg, Datastream
10-year U.S. T-bond	U.S. Treasury note, 10-year maturity	U.S. Treasury
Risk aversion	CSFB high yield spread	Bloomberg
Reserves	International reserves	IMF, WEO
GDP growth	GDP growth	IMF, WEO
Debt	Sovereign debt stock	IMF, WEO
Imports	Imports of goods and services	IMF, WEO
Broad money	M2	IMF, WEO
Short-term external debt	External debt maturity within 1 year	BIS
Foreign external liabilities	Gross external liabilities	Milesi-Ferretti IIP database
Financial system deposits and equity	Total deposits and market capitalization	World Bank

Source: Authors' compilation.

Note: CSFB = Credit Suisse First Boston; WEO = World Economic Outlook database; BIS = Bank for International Settlements; IIP = International investment position.

TABLE 5.1.2

Summary Statistics					
Measurement	Observations	Mean	Standard Deviation	Min	Max
Sovereign spread	320	514.9	823.8	-260.9	6,182.0
U.S. 10-year bond rate	320	4.7	0.7	4.0	6.3
High yield spread	320	584.7	240.6	329.2	950.8
GDP growth	320	4.1	3.9	-11.0	18.3
Debt to GDP	310	93.5	265.5	4.9	2,101.7
Reserves to GDP	320	22.0	19.9	1.5	104.5
Reserves to months of imports	320	6.4	4.1	0.3	35.3
Reserves to short-term debt	320	395.4	659.4	6.5	7,530.8
Reserves to broad money	320	35.5	22.9	2.9	146.3
Reserves to foreign liabilities	298	25.8	36.8	2.0	490.5
Reserves to financial system deposits and equities	248	28.5	22.2	1.6	113.9

Source: Authors' calculations.

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PART II

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# **The Impact of Volatility on the Corporate and Financial Sectors**

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# Corporate Governance and Leverage Trends

R. ARMANDO MORALES, EDO MAHENDRA, AND  
WIWIT WIDYASTUTI

Serious corporate governance problems may lead to overborrowing by firms in a weak institutional environment. However, improvements in governance can help increase leverage when access to credit has been constrained. The relationship between governance and leverage also has a medium-term dimension: firms facing a significant debt overhang because of past overborrowing pass up profitable investment opportunities (Bris and Koskinen, 2002). The importance of governance to leverage decisions has macroeconomic implications—and this relationship may have an important impact on growth, particularly for industries that are most dependent on external finance (De Nicolo, Laeven, and Ueda, 2006). Moreover, economies with weak institutions may be prone to bigger contractions in output during crisis periods (Shimpalee and Breuer, 2006).

The 1997–98 Asian financial crisis illustrated the dramatic impact of governance deficiencies on leverage. In Indonesia, corporate governance problems led to major risk-management failures. Before the crisis, high GDP growth rates in Indonesia were spurred by rapid corporate borrowing, in many cases by groups with ownership links to banks providing the financial resources. Large corporate groups accessed low-cost financing beyond what was economically justified.<sup>1</sup> Once the crisis hit, the impact on the cost of borrowing for the corporate sector was substantial and access to financing was drastically curtailed.

This chapter assesses whether improvements in corporate governance have translated into improved access to credit by Indonesian corporate groups. Based on Rajan and Zingales (1995), sequential regressions are used to analyze the impact of changes in corporate governance on leverage. In particular, the low significance of firms' size in explaining leverage ratios would reflect creditors' lingering concerns about corporate governance problems in large firms. Also, the sign and significance of Tobin's Q in explaining leverage would reflect shareholders' preference for either issuing equity or borrowing in the face of asset valuation increases, with a negative sign expected in an environment of good

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<sup>1</sup>Some 417 firms and 17 percent of market capitalization were traced back to a single family, and 10 families controlled more than half of the corporate sector (Claessens, Djankov, and Lang, 2000).

corporate governance. Finally, an alternative specification of Rajan and Zingales (1995) is used to assess the role of debt overhang problems arising from past governance deficiencies in explaining leverage decisions. The analysis finds that creditors seem to have had concerns about corporate governance in large firms up to about 2005, but these concerns have subsided since then. In fact, the governance environment has improved markedly since the Asian crisis. Further improvements in the legal framework and protection of shareholder rights will be important for supporting higher investment in the future.

The chapter is organized as follows: The next section discusses governance-leverage links and is followed by a section highlighting the corporate governance environment and corporate leverage patterns in Indonesia. The subsequent section reviews a regression analysis based on Rajan-Zingales (R-Z) employing the sequential regressions and the alternative specifications described above.

## GOVERNANCE-LEVERAGE LINKS

Corporate governance and corporate financing are linked in multiple ways. At the country level, a better legal and institutional framework will ensure the enforcement of contracts. In that environment, creditors will be more willing to provide financing to economic agents. Better transparency and disclosure allow for better-informed decisions by firms, including on lending and borrowing. Protection of minority shareholders reduces the scope for internal conflicts within the firm, including on leverage choices. The channels through which governance and financing are interrelated can be classified as follows:

- *Risk taking.* Firms are more willing to take risks in a better corporate governance environment. Corporate risk taking and firm growth seem to be positively related to the quality of investor protection (John, Litov, and Yeung, 2008). By contrast, investment will be discouraged in governance systems that are relationship-based, dominated by ownership structures that allow control by insiders, and that show high uncertainty with regard to property rights and lack of protection of minority shareholders' rights (McGee, 2009).
- *Firm valuation.* Good governance practices have a positive impact on firms' market valuation. Evidence shows a positive and statistically significant relationship between firm value and the percentage of the board made up of directors not affiliated with the dominant shareholders, especially in countries with weak shareholder protection (Dahya, Dimitrov, and McConnell, 2008). Weak governance and low valuation may have an impact on overborrowing: Nielsen (2006) finds that companies with weaker shareholders are more highly leveraged and more likely to pay higher dividends.
- *Financing costs.* Increased transparency and disclosure will tend to reduce risk premiums in credit markets. By the same token, weaknesses in the rule of law and problems in the exercise of creditor rights have an impact on firms' borrowing costs. Creditors may be less willing to lend to companies

when governance is a concern, which may lead to financial constraints for firms, with an impact on financing costs (Mahendra, 2009).

- *Access to capital.* More sources of financing are available to firms operating in an environment of good governance. Also, the impact of improvements in accounting disclosure and transparency on real economic activity appears particularly pronounced for industries that are most dependent on external finance (De Nicolo, Laeven, and Ueda, 2006). By contrast, in countries with weakly enforceable minority shareholder rights, a small loss of confidence may lead to a sharper decline in the amount of capital that investors are willing to provide, which seems to explain the sharp variation across countries in exchange rates and stock prices during the Asian crisis (Johnson and others, 2000).

In sum, improvements in governance will lead to higher demand for and more access to capital, associated with more confident risk taking, lower borrowing costs, and lower incentives to overborrow. The complexity of assessing these channels requires the use of more specific variables to try to explain the impact of governance on leverage. This analysis uses a set of tractable variables to identify the determinants of capital structure used by R-Z for the Group of Seven (G-7) industrial countries, based on Harris and Raviv (1991). The variables selected by R-Z are tangibility of assets, firm profitability, the market-to-book-value of assets ratio (a proxy for investment opportunities), and firm size. These variables are closely linked to governance features, underscoring the key role of governance in the determination of firms' capital structure.

- The tangibility ratio (fixed assets divided by total assets) as a proxy for tangible collateral will be important when minimum creditor rights standards are in place.
- Firms showing higher profitability will prefer to finance their activities with internal funds when leverage is driven by firms' decisions rather than creditors' rationing in an environment of relatively unconstrained access to financing.<sup>2</sup>
- Firms expecting high future growth would use a greater amount of equity finance when shareholders give a higher priority to taking advantage of profitable investment opportunities than to maintaining control (negative impact on leverage).
- Larger firms tend to be more diversified and fail less often, suggesting that size could be seen as an inverse proxy for the probability of bankruptcy. Other empirical work applying the R-Z framework, especially in developing countries, assumes that size provides an advantage when it comes to accessing financing.

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<sup>2</sup>This is consistent with Korajczyk and Levy (2002), who show that leveraging is procyclical for constrained firms and countercyclical for unconstrained firms. Creditors are unlikely to respond to lower profitability by increasing lending, which is the reason a negative sign must reflect the prevalence of borrowers' financial decisions in the absence of financing constraints.

This chapter uses the R-Z framework to assess the impact of governance on leverage over time. It assumes that differences between the signs and level of significance of the explanatory variables relative to the ones found by R-Z for G-7 countries are driven by governance differences. The analysis uses tangibility and profitability as control variables, showing that minimum creditor rights standards are in place and firms do not have major constraints in accessing financing.

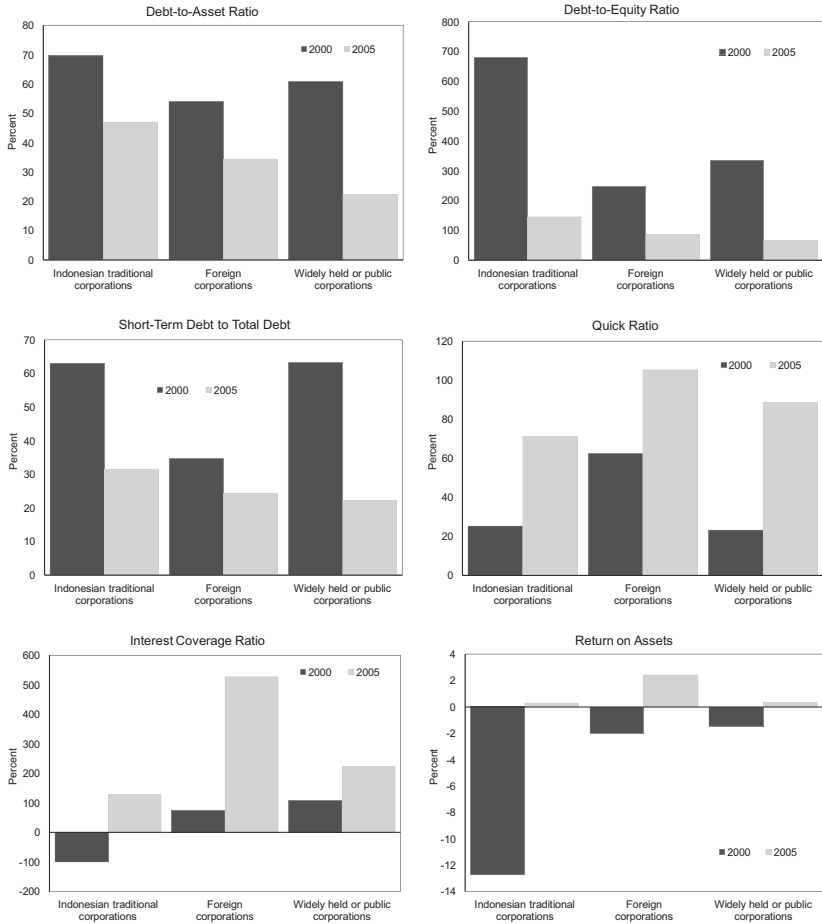
The hypothesis is that weak governance is a significant factor in explaining leverage patterns. In particular, (a) weak governance will be reflected in a weak (or negative) relationship between firm size and leverage as the result of a combination of constrained access and higher borrowing costs; (b) weak governance will be reflected in a weak (or positive) correlation between market-to-book-value of assets and leverage, reflecting some overborrowing explained by a preference to maintain control even when firm valuation improves; (c) improvements in governance will bring significance and signs of these explanatory variables in line with R-Z findings; and (d) the impact of explanatory variables is influenced by debt-overhang problems inherited from governance deficiencies associated with the 1997–98 crisis that constrain risk taking.

The rationale for the above-mentioned hypotheses can be explained as follows: (a) it would take time for large firms to regain their advantage in borrowing following a financial crisis; (b) dominant shareholders will resist issuing equity if they perceive that keeping control of the firm provides information advantages relative to external creditors; (c) leverage decisions are actually conditioned by debt overhang problems arising from governance deficiencies from the Asian crisis period, regardless of governance improvements.

## **CORPORATE GOVERNANCE ENVIRONMENT AND LEVERAGE TRENDS IN INDONESIA**

Immediately after the 1997–98 Asian crisis, progress in shareholder diversification was moderate. The share of family-based ownership structures declined and widely held ownership became increasingly more important while the presence of foreign companies expanded. However, companies still favored ownership structures that preserved the dominant position of traditional shareholders. An analysis using a methodology based on Sato (2003) found that 51 percent of the largest 100 companies were private domestic corporations for which a single shareholder or group held more than 40 percent of equity in 2005 compared with 60 percent in 2000. More important, sharp differences are found in the financial performance of “traditional” corporations and companies with more diversified ownership structures, with the former showing higher leverage and weaker financial positions (Figure 6.1).

From 2000 to 2010, Indonesia benefited from the wide access to international financing available to emerging markets. In Indonesia, higher access to credit had been accompanied by lower leverage ratios. This apparent paradox simply reflected that asset growth had exceeded liability growth over time, for

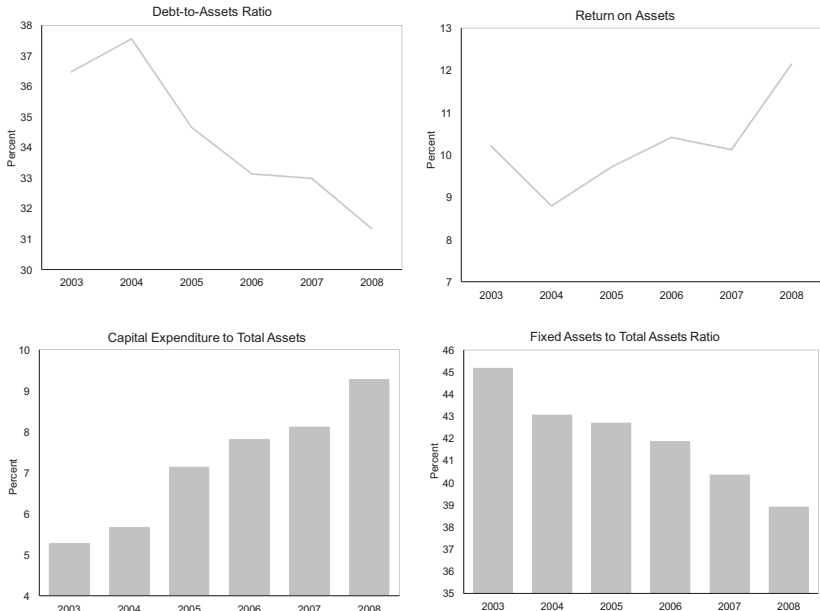


Source: Thomson Reuters, *Worldscope* database.

**Figure 6.1** Indonesia: Top 100 Corporate Financial Indicators, 2000 and 2005

three reasons: (a) the share of retained earnings and equity issuance to total financing increased relative to borrowing; (b) capital expenditure increased faster than borrowing; and (c) the share of nontangible assets in total assets increased as firm valuation improved. This is consistent with trends observed during 2003–08 for leverage, profitability, and asset growth for a sample of 214 listed firms listed on the Indonesian Stock Exchange (Figure 6.2).

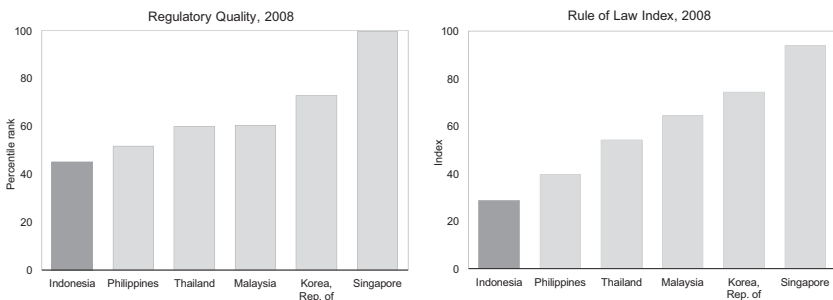
The governance environment in Indonesia improved measurably following the Asian crisis, both at the country level and at the firm level. Widespread bank-corporate ownership ties were broken as a result of bank restructuring; financial reporting became more transparent following the adoption of basic international financial reporting standards; and the excessive degree of ownership concentration observed before the crisis moderated markedly. Then, before the



Sources: Indonesia Stock Exchange; and authors' calculations.

**Figure 6.2** Indonesia: Leverage, Profitability, and Asset Growth for a Sample of Listed Firms, 2003–08

2007–09 global financial crisis, improvements in governance showed a degree of international convergence over time. Many countries, especially emerging markets, went through a process of bringing their domestic governance frameworks up to international standards. Therefore, improvements in governance quality may not give a country an advantage in accessing capital markets beyond a certain threshold (De Nicolo, Laeven, and Ueda, 2006). In fact, Indonesia still compares unfavorably with other countries in the region on compliance with the rule of law (Figure 6.3).



Sources: World Bank, World Governance Indicators, <http://info.worldbank.org/governance/wgi/index.asp>.

**Figure 6.3** Governance Indicators in Selected Asian Countries, 2008

In Indonesia, limited openness of ownership structures remains a problem. The World Bank's 2004 "Report on the Observance of Standards and Codes (ROSC)" found widespread pyramidal structures and family-based groups to be the preferred ownership structure. Although disclosure is required by the Capital Market Supervisory for ownership shares of 5 percent or more for listed companies, detection of cross ownership is difficult because of deficient reporting procedures. Thus, controlling shareholders often pursue group or family interests rather than those of the firms.

## REGRESSION ANALYSIS

The analysis uses annual data from nonfinancial companies listed on the stock exchange available through Datastream. Some caveats are worth noting: The results may not be fully comparable with other empirical work because this analysis uses financial indicators as reported by firms, whereas other cross-country applications (including R-Z) make adjustments to account for differences in treatment between countries. Also, using information from listed firms introduces a sample bias—listed companies are normally representative of high quality firms. As shown by Rauh and Sufi (2008), "credit-quality firms" may enjoy access to discretionary, flexible sources of financing whereas other firms rely on tightly monitored, secured bank loans for liquidity.

The basic regression model is the R-Z empirical model based on Harris and Raviv (1991):

$$\begin{aligned} \text{Leverage}[\text{firm } i] = & \alpha + \beta_1 \text{Tangibility}_i + \beta_2 \text{Market-to-Book Ratio}_i \\ & + \beta_3 \text{Sales}_i + \beta_4 \text{Profitability}_i + \varepsilon_i. \end{aligned} \quad (6.1)$$

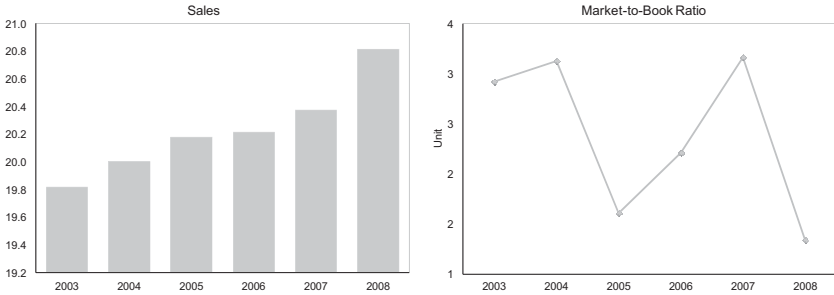
An alternative specification tries to capture the postcrisis process of deleveraging while controlling for sector-specific effects:

$$\begin{aligned} \text{Change in Leverage} [\text{firm } i] = & \alpha + \beta_1 \text{Tangibility}_i + \beta_2 \text{Market-to-Book Ratio}_i \\ & + \beta_3 \text{Sales}_i + \beta_4 \text{Profitability}_i \\ & + \beta_5 \text{Initial Leverage Deviation}_i + \varepsilon_i. \end{aligned} \quad (6.2)$$

This alternative specification measures the impact of the same variables as in R-Z on corporate leverage, but adds as an explanatory variable the initial deviation from the sectoral mean of every individual firm's leverage ratio in the initial year of the data sample. This variable is expected to capture industry-specific debt overhang problems. Firms with high leverage relative to their sectoral mean at the beginning period are more likely to experience debt overhang problems inherited from the crisis period. These firms will embark on a deleveraging process independently of other variables.

Tangibility and profitability are treated as control variables. The high significance of these two factors in the sample period (2003–08) provides evidence that (a) Indonesian firms generally enjoyed access to financing associated with the strength of their collateral and (b) firms had sufficient discretion to decide on





Sources: Indonesia Stock Exchange; and authors' calculations.

**Figure 6.4** Indonesia: Average Sales and Market-to-Book Ratio for a Sample of Listed Firms, 2003–08

their borrowing based on their capital structure strategy. As for the other explanatory variables, size shows a steady increase and the market-to-book ratio responds to market conditions, specifically declining in 2005 and 2008 when stock markets were under stress (Figure 6.4).

Regressions were run with debt-to-capital and debt-to-assets as dependent variables, for 2002–05 and 2004–07.<sup>3</sup> The results are generally consistent with R-Z (Table 6.1), with better results for debt-to-assets as a measure of leverage. The high significance of tangibility and profitability confirms that access to financing has been generally appropriate for Indonesian firms, with collateral being important to creditors and retained earnings a key source of financing for firms. Significance seems to improve when sectoral dummies are introduced.

The following findings are worth highlighting:

- Access to financing has been improving over time, as shown by the increasing significance of tangibility in explaining corporate leverage.
- Resorting to retained earnings has always been significant in explaining leverage, but its coefficient seems to decline over time. This may reflect sizeable debt-equity conversions in the first half of the 2000s as profits increased, which may have magnified the reduction of leverage in this period. In recent years, the coefficients are closer to those normally observed in other countries.
- The “normalization” of the significance of firm size over time confirms that large firms did not benefit from access advantages in obtaining credit soon after the crisis (2002–05), although this advantage is present and significant when moving away from the crisis period (2004–07).
- The fact that Indonesian firms increased leverage as firm valuation improved rather than raising equity as would be expected is a common feature in emerging markets, which may reflect governance challenges in these economies (Booth and others, 2001). The interpretation is that the composition

<sup>3</sup>To address potential endogeneity problem, the analysis follows R-Z strategy by using four-year averages as the independent variables with one period of lag with respect to the dependent variable. For example, if the independent variable sample period is 2002–05, then the dependent variable sample period is 2006. See Harris and Raviv (1991) and Rajan and Zingales (1995) for further discussion.

TABLE 6.1

Determinants of Corporate Leverage: Basic Regressions							
Independent variables	Dependent variable: Debt-to-capital			Dependent variable: Debt-to-assets			
	United States <sup>a</sup> 1987–90	Canada <sup>a</sup> 1987–90	Japan <sup>a</sup> 1987–90	Indonesia 2002–05 (1)	Indonesia 2002–05 (2)	Indonesia 2004–07 (3)	Indonesia 2004–07 (4)
Tangibility	0.50*** (0.04)	0.26*** (0.10)	1.41*** (0.18)	0.81* (0.49)	0.28*** (0.09)	0.28*** (0.09)	0.20** (0.08)
Market-to-book	-0.17*** (0.01)	-0.11*** (0.04)	-0.04 (0.04)	0.27** (0.13)	0.16*** (0.06)	0.29** (0.13)	0.41*** (0.15)
Sales	0.06*** (0.01)	0.08*** (0.01)	0.11*** (0.02)	3.78 (2.45)	2.06 (1.45)	2.46** (1.08)	3.38*** (1.03)
Profitability	-0.41*** (0.1)	-0.46** (0.22)	-4.26*** (0.60)	-1.98*** (0.48)	-1.04*** (0.26)	-0.59*** (0.18)	-0.66*** (0.17)
Sectoral dummies				No	Yes	No	Yes
Number of observations	2,079	264	316	206	213	142	142
R-squared	0.21	0.19	0.29	0.13	0.26	0.22	0.28

Source: IMF staff estimates.

Note: Robust standard errors are in parentheses. Equations are run using ordinary least squares.

\* significant at 10 percent.

\*\* significant at 5 percent.

\*\*\* significant at 1 percent.

<sup>a</sup>Rajan and Zingales (1995) results.

TABLE 6.2

Independent variables	Dependent variable: Change in debt-to-assets	
	2001–05 (5)	2003–07 (6)
Tangibility	0.16 (0.10)	0.14 (0.07)
Market-to-book	0.17*** (0.03)	0.7 (1.51)
Sales	2.07 (1.42)	1.74* (0.98)
Profitability	-1.14*** (0.21)	-0.37** (0.15)
Initial deviation of debt-to-assets	-0.83*** (0.04)	-0.74*** (0.05)
Number of observations	211	197
R-squared	0.69	0.56

Source: IMF staff estimates.

Note: Robust standard errors are in parentheses. Equations are run using ordinary least squares.

\* significant at 10 percent.

\*\* significant at 5 percent.

\*\*\* significant at 1 percent.

of financing becomes skewed to favor control by existing shareholders, reflecting a perceived “information advantage” by shareholders that has implications for the efficient allocation of resources.

To what extent has the behavior described above been driven by an autonomous deleveraging process? Table 6.2 shows the results for the alternative specification, using changes in leverage as the dependent variable.

The debt overhang seems to be a very important variable explaining changes in leverage. Firms showing higher debt-to-assets ratios relative to their sectoral mean embarked on a deleveraging effort. For every percentage point that the debt-to-assets ratio was above the corresponding sectoral average in the initial period, firms reduced their debt-to-assets ratios by between 0.7 and 0.8 percentage points in the following five years.

Findings worth noting, taking into account that this specification is more restrictive because it explains changes in leverage ratios, follow:

- Profitability is still significant, which seems to ratify that firms’ financing was relatively unconstrained, that is, the observed deleveraging process was driven by a decision by firms rather than by creditors.
- Tangibility and size show the correct signs and increasing significance, consistent with the hypothesis of gradual convergence toward R-Z results.
- The market-to-book ratio still shows the wrong sign, but a lower significance in 2003–07. It remains to be seen if in the future this translates into an increasing preference to issue equity as control advantages fade away.

## SUMMARY AND CONCLUSIONS

The recent history of corporate financing in Indonesia provides a good illustration of the different dimensions of the impact of governance on leverage. During the crisis, governance problems led to overborrowing, followed by creditors' reticence to lend when default problems materialized. Improvements in governance increased access to credit, but firms that overborrowed at the time of risk-management failures took a long time to reduce leverage to more reasonable levels. Still, the ample availability of liquidity allowed Indonesian firms to increase borrowing at the same time that asset growth exceeded liability growth supported by equity issuance and the use of retained earnings.

The complexity of the interaction between governance and leverage is impossible to capture with any linear formulation. This analysis used an approach based on a widely accepted representation of the determinants of capital structure to assess consistency with governance patterns observed in Indonesia following the crisis. The results confirm that creditors may have had lingering concerns about corporate governance problems in large firms up to 2005, but that those concerns seem to have subsided. However, shareholders prefer to borrow rather than issuing equity in the face of asset-valuation increases, to prevent loss of control. This effect seems to remain in place even well after the 2007–09 crisis, consistent with low protection of minority shareholders and remaining disadvantages in the governance environment relative to comparable countries in recent periods. However, once autonomous deleveraging is introduced, as driven by firms suffering from debt overhang problems arising from past governance deficiencies, this effect vanishes, although the sign remains the opposite of what is observed for G-7 countries.

Several policy implications are pertinent:

- A sustained increase in the investment ratio in Indonesia would require that firms take larger risks, which is associated with the quality of investor protection. Relationship-based structures that allow control by insiders will be a significant constraint, especially if compliance with the rule of law, raising uncertainty about property rights, is weaker than in neighboring countries.
- The valuation of firms will be affected by the inability of investors to ensure a proper assessment of the firms' assets and liabilities, leading to higher financing costs to compensate for the higher risk.
- High priority should be given to synchronizing governance regulations and practices with other emerging-market countries and improving protection of minority shareholders. At the aggregate level, improvements in regulations and the legal framework need to be paired with significantly better enforcement that may improve investors' perceptions of Indonesia's business environment.

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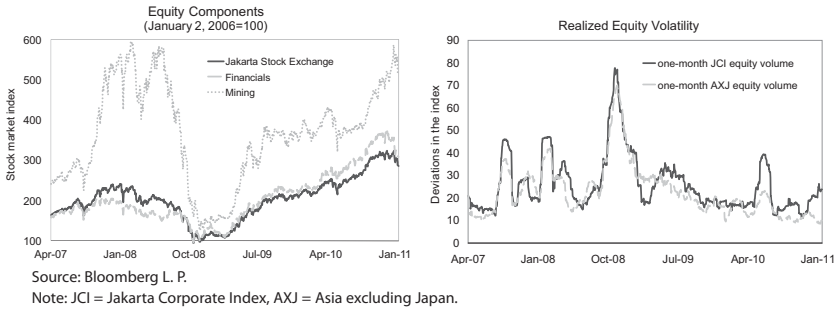
# Assessing Corporate Sector Vulnerabilities

MARTA RUIZ-ARRANZ

This chapter discusses how the nonfinancial corporate sector in Indonesia was affected by the 2008–09 global financial crisis and recovery. It then uses contingent claims analysis to assess how vulnerable the corporate sector is going forward. Results suggest that losses from corporate defaults in Indonesia are expected to be manageable. Banks also appear able to absorb deteriorating credit conditions, but credit risks need careful management. Further improvements in corporate governance, credit resolution practices, and the judiciary could help reduce the risk perception investors have of Indonesian firms and their costs of doing business.

The spillovers from the global crisis affected the income and balance sheet positions of Indonesian firms, raising corporate sector vulnerabilities. The financial and corporate sectors were hit hard in 2008 and early 2009 by the increase in global risk aversion and the sharp drop in commodity prices. The damage from the crisis was evidenced by the collapse of equity prices, the jump in the estimated corporate default probability, and the increase in the yields on dollar-denominated corporate debt. The default by a large conglomerate caused market confidence to deteriorate further and accentuated capital outflows and pressures on the rupiah. Despite the resilience of the Indonesian economy—achieving growth of 4.5 percent and 6.0 percent in 2009 and 2010, respectively, the Indonesian corporate sector faces continued risks given the weakened global economic environment and uncertainties about the strength and sustainability of the ongoing recovery.

Corporate sector distress could exert pressure on banks' profit margins and capital positions. Loans account for about 80 percent of total banking assets and more than 45 percent of loans are channeled to the nonfinancial corporate sector. This chapter seeks to quantify the potential adverse feedback loop between the corporate and financial sectors. To assess the expected losses from corporate defaults and their spillovers to the banking sector, the chapter relies on contingent claims analysis.



**Figure 7.1** Jakarta Stock Market

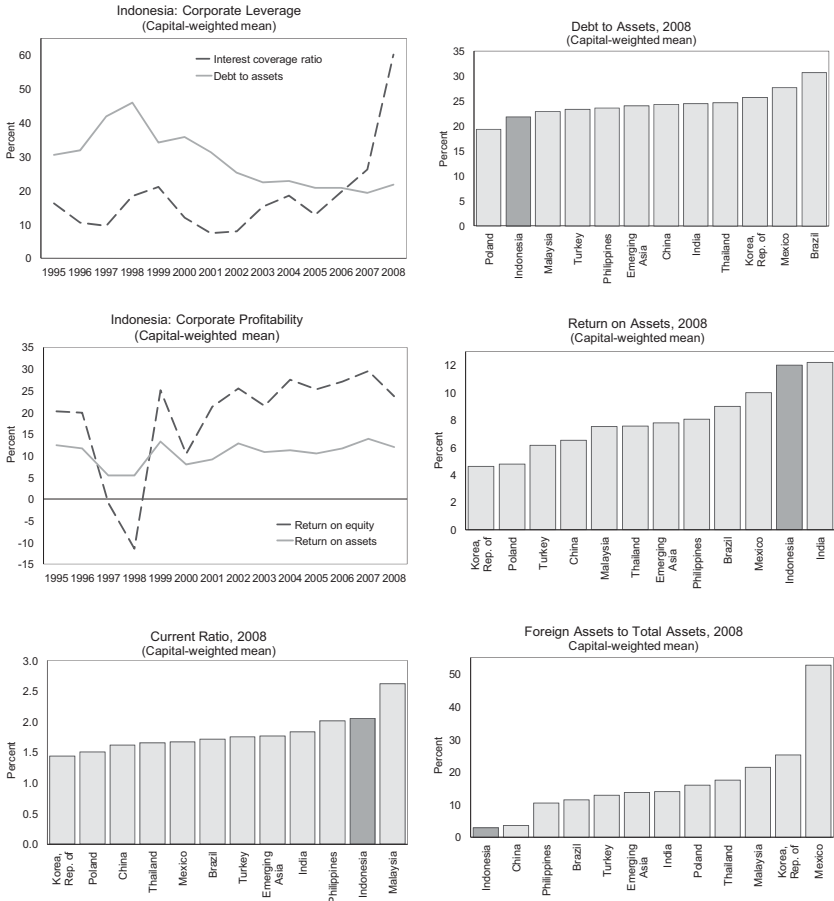
## BACKGROUND

Indonesia's corporate sector entered the global financial crisis in robust health (Figure 7.2). Indonesian companies had, over time, reduced their vulnerabilities.

- *Corporate leverage declined sharply after the 1997–98 crisis.* The debt-to-assets ratio (market capitalization weighted average) dropped below 20 percent in 2007, down more than 25 percentage points from its peak in 1998. Indonesian firms also compared favorably from an international perspective. Among 10 comparator emerging-market countries, Indonesia exhibited the second lowest corporate leverage ratio in 2008, reflecting higher reliance on own funds and lower relative dependence on bank and bond financing.
- *In the run-up to the global crisis, Indonesian companies showed strengthened capacity to repay obligations.* This capacity was demonstrated by the rising interest coverage ratio, defined as net income relative to interest expenditures.
- *Profitability indicators were among the highest in emerging-market countries.* With the average rate of return on assets reaching 12 percent in 2008, firms in Indonesia were the most profitable, after those in India, among 10 comparator countries.
- *Indonesian firms had built up their liquidity before the global financial crisis and were able to withstand reduced access to foreign funding.* The average current ratio was higher than 2, indicating that firms had twice as much liquid assets (including inventories) to service short-term liabilities.
- *Foreign exposure of Indonesian firms was the lowest in emerging-market countries.* In 2008, foreign assets as a percentage of total assets were below 5 percent on average in Indonesia, compared with about 50 percent in Mexico and more than 25 percent in the Republic of Korea.

In addition, Indonesia had addressed many of its structural weaknesses and vulnerabilities that led to the financial crisis in 1997. Post-Asian-crisis restructuring measures were broadly based and affected all areas of economic activity.

- *Indonesian firms have been able to diversify their sources of funding.* They have reduced their dependence on foreign borrowing and increased self-financing (through retained earnings) as well as expanded their reliance on equity and bond financing, supported by the development of the domestic securities



Source: IMF, Corporate Vulnerability Utilities database.

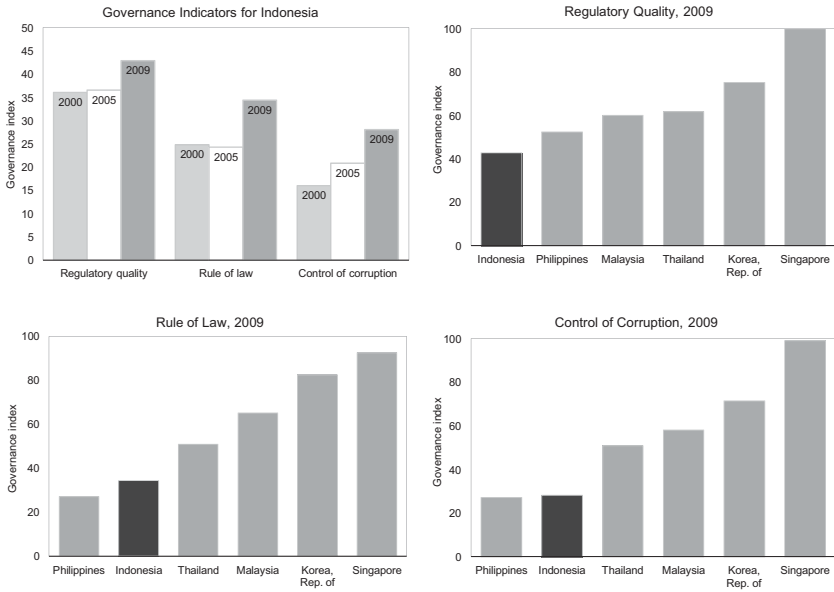
Note: Emerging Asia = China, Indonesia, India, Malaysia, Pakistan, the Philippines, Sri Lanka, Thailand, and Vietnam.

**Figure 7.2** Indonesia: Health of the Aggregate Corporate Sector

market. Private external debt declined from 40 percent of GDP in 2000 to 14 percent of GDP in 2008, thus reducing devaluation risks and balance sheet mismatches.

- Corporate governance has improved, although weaknesses remain.* Improvements in corporate governance are reflected in a less concentrated ownership structure, strengthened financial supervision, and more transparent financial reporting and disclosure following the adoption of basic international reporting standards. During the 1990s, the corporate ownership structure was heavily concentrated in a few families with nontransparent relationships with the government and with banks. Many large corporate groups owned banks that lent intragroup in excess of regulatory limits, and misreporting was widespread. Currently, legal lending limits apply for both connected





Source: World Bank, Worldwide Governance Indicators.

Note: Higher country rankings on the index correspond to better governance outcomes.

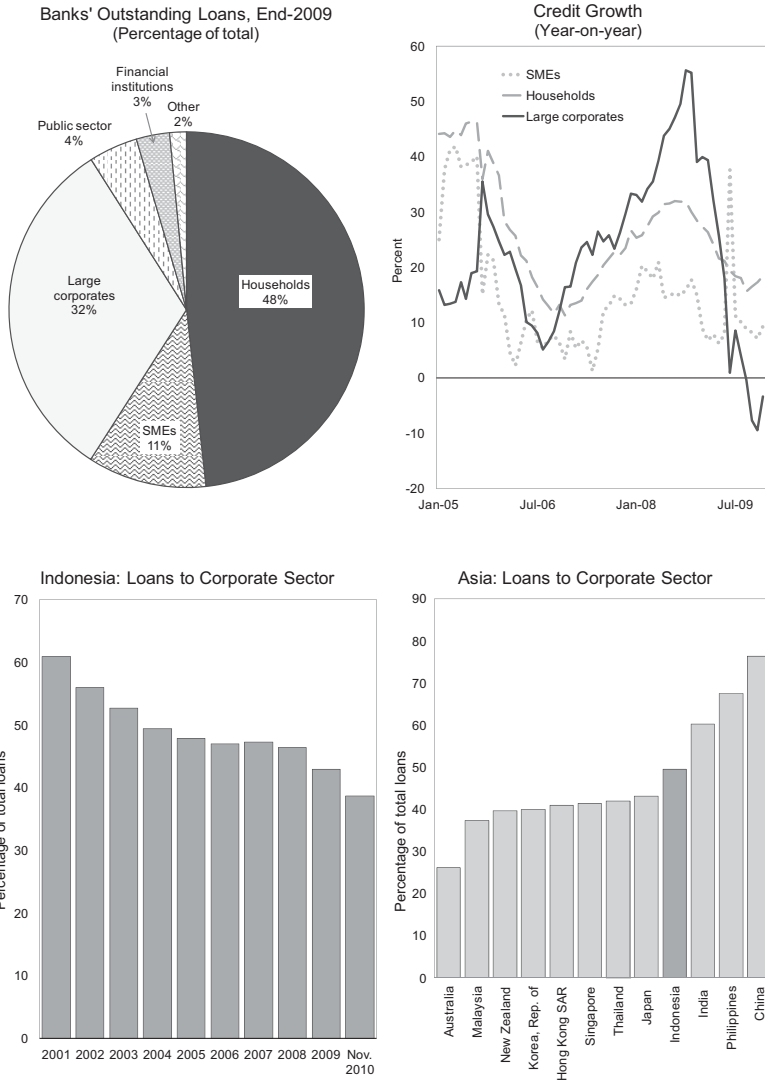
**Figure 7.3** Indonesia: Governance Indicators Relative to the Region

and nonconnected parties, and violators of the limits are subject to sanctions and may be subject to criminal prosecution.<sup>1</sup>

- *The institutional environment has improved significantly.* Many shortcomings in the legal and judicial systems for settlement of contractual disputes and application of a viable bankruptcy regime have been addressed, although weaknesses remain. Political reform to decentralize power has complemented improvements in financial regulation and supervision, helping reduce vulnerabilities stemming from close corporate-political ties. A trend toward improved regulatory quality, compliance with the rule of law, and control of corruption is clearly apparent according to the World Bank's governance indicators (Figure 7.3). However, these indicators still compare unfavorably with those in neighboring countries.
- *The reduction of the state-owned enterprise sector* following a privatization program has also contributed to decreased perceptions of risk and instability.

Banks have also diversified their loan portfolios, thereby reducing credit risks. The exposure of banks to the corporate sector has declined sharply. The share of bank loans to the corporate sector is now less than 45 percent of total bank loans at end-2010, from higher than 60 percent in 2001. This is in line with the average in Asia (Figure 7.4). Loans to small and medium enterprises (SMEs) account for about

<sup>1</sup>The legal lending limit for nonconnected parties is 20 percent of bank capital for an individual debtor and 25 percent for one group of debtors. The legal lending limit for connected parties is 10 percent of bank capital.



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

**Figure 7.4** Banking Sector Exposure to Corporate Risks

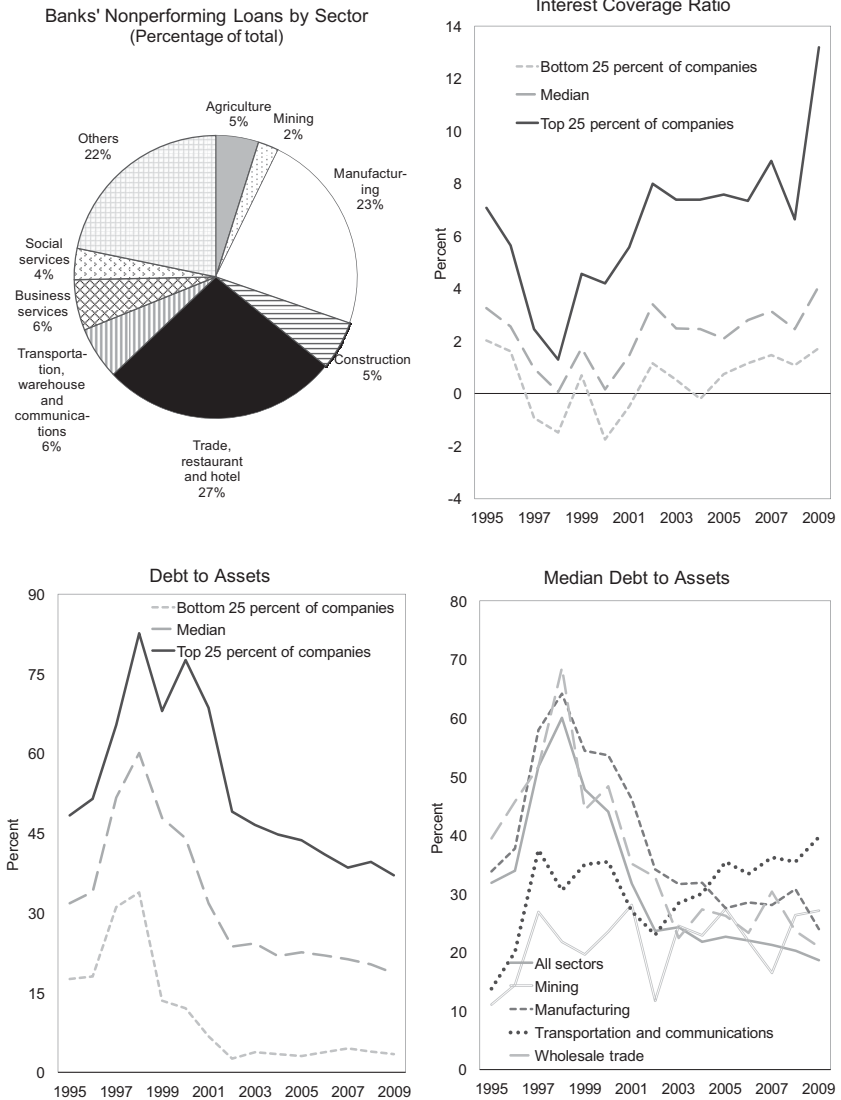
11 percent of total banking sector loans or about a quarter of loans to the non-financial corporate sector. Although Indonesian SMEs had borrowed heavily in several episodes in the past, beginning in 2005, credit growth to the SME sector decelerated toward more moderate rates. As a result, SME creditworthiness has improved and the perception of SME vulnerabilities has declined. SMEs were the first to be turned away for bank credit at the peak of the financial turmoil, when large firms looked to domestic banks for funding. However, credit to SMEs rebounded strongly just after the peak of the crisis, whereas sequential growth of credit to large

firms was negative for some time. The default by a large conglomerate in 2008, difficulties faced by some large companies exposed to derivative contracts, and higher legal risk resulting from collection uncertainty could explain why banks are increasingly directing credit to SMEs at the expense of large corporations.

Despite the significant improvements over the last decade, several pockets of vulnerability remain (Figure 7.5).

- The aggregate-level analysis presented above masks important differences between individual firms. For some listed companies, net income does not exceed interest payments, pointing to a level of distress that is not sustainable over the long term. Companies with interest coverage ratios below 1 are sometimes referred to as technically bankrupt because they can only survive by drawing upon their cash reserves or other liquid assets.
- Although aggregate leverage indicators have improved significantly, about a quarter of listed companies have debt ratios higher than 40 percent of assets, compared with 20 percent on average.
- Furthermore, some sectors appear to be overextended. The median debt ratios in manufacturing, mining, transport and telecommunications, and wholesale trade are well above the median debt ratio for all sectors. The manufacturing sector, in particular, accounts for more than 20 percent of all the corporate sector nonperforming loans (NPLs) in the banking industry.
- Concentration risk remains important. The system on the whole is heavily exposed to a small number of borrowers, with the top 25 borrowers accounting for 25 percent of system loans and close to 30 percent or more of total loans for some of the largest domestic banks and foreign-owned branches.

Other key risks to the corporate sector relate to the underlying strength of global demand and to external liquidity conditions. Although these risks have diminished significantly since mid-2009, further cyclical declines in exports and domestic demand would have a negative impact on corporate earnings. Another bout of global risk aversion could also lead to financing pressures and debt-rollover difficulties. In such a case, SMEs would be under more significant stress, given their more-limited financing options. In addition, the risk of a sharp reversal in capital flows leaves the rupiah vulnerable to depreciation pressures. Firms that are more vulnerable to depreciation risks are those with significant unhedged foreign currency borrowings (large conglomerates), those with large domestic revenue bases, and those with significant foreign currency-denominated input costs (processors of imported raw materials). Nevertheless, natural hedging is large because commodity exporters account for much of the foreign currency borrowing. International borrowing by the corporate sector has declined from almost two times reserves in mid-1997 to 47 percent more recently. However, the level of borrowing as a proportion of reserves remains one of the highest in the region (Table 7.1).



Sources: CEIC Data Co., Ltd.; and IMF, Corporate Vulnerability Utilities database.

**Figure 7.5** Corporate Sector Vulnerabilities

**TABLE 7.1**

International Claims on Corporate Sector (Percentage of international reserves, excluding gold)

Period	Indonesia	Korea, Rep. of	Malaysia	Philippines	Thailand
1997:Q2	195.4	93.1	61.8	70.3	131.5
2006:Q3	56.0	20.0	24.9	43.1	18.7
2010:Q3	46.6	8.4	11.0	32.1	54.6

Source: Bank for International Settlements, Consolidated Banking Statistics.

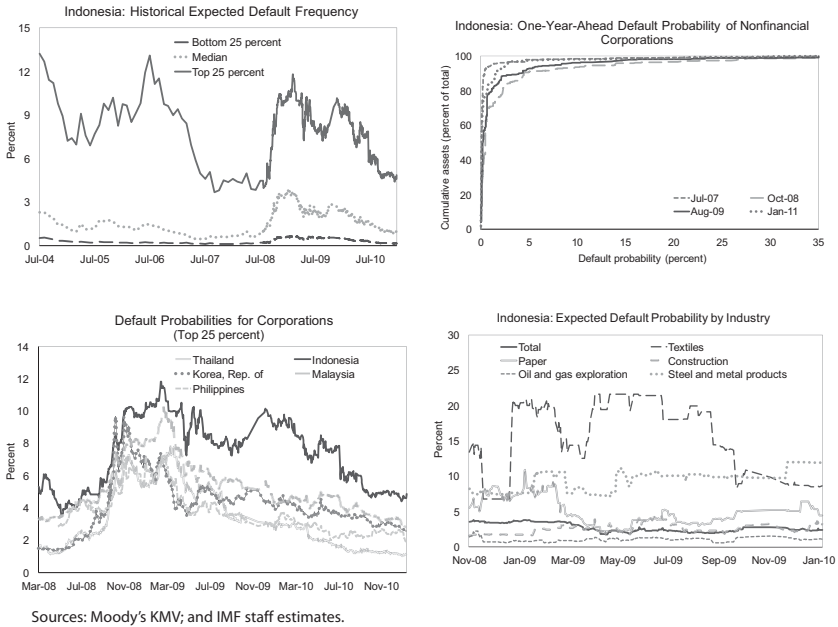
## EXPECTED LOSSES FROM CORPORATE DEFAULT AND THE IMPACT ON THE BANKING SECTOR

This section uses contingent claims analysis (CCA) to estimate the likely impact of the 2008–09 global economic downturn on Indonesian corporations and the banking system. Under this approach, the risk of default is related to the probability that the value of a firm's assets will fall below the value of its liabilities. This, in turn, depends on two factors: firm leverage (debt relative to the market value of its equity) and uncertainty about the value of firm assets. Increases in either of these factors increase the probability that a firm will default. With this and other information, expected default probabilities 1 year ahead can be calculated using the CCA framework.

The CCA is a risk-adjusted balance sheet framework in which equity and risky debt of a corporation or financial institution derive their value from assets. The total market value of the assets of a firm or bank at any time is equal to the market value of equity and risky debt. Asset values are uncertain and in the future may decline to the point that debt payments on scheduled dates cannot be made. Debt is “risky” because there is a chance of default. In CCA, the equity and risky debt can be valued using finance techniques, that is, formulas for implicit call and put options whose values are derived from assets, uncertainty of assets, and the promised debt payments. The value of risky debt is equivalent to the default-free debt minus the expected loss resulting from default. In CCA, the value of the equity is computed as the value of an implicit call option and the value of the expected loss from default can be modeled with an implicit put option. The risk-adjusted balance sheet components can be calibrated by using forward-looking information from the equity market and information from the balance sheet to define the default barrier. The implied market value of assets and implied asset volatility are inferred from the market and balance sheet information; credit risk indicators, for example, default probabilities and credit spreads, can then be calculated.

CCA-type models, such as Moody's KMV CreditEdge model, use a modified Merton framework to estimate expected default frequencies (EDFs) and other risk indicators and are useful for vulnerability and credit risk analysis. The EDFs are calculated daily for all banks and financial institutions, as well as for firms, that are traded on the stock exchange. To get an indication of the trends in risk in a sector, such as the corporate sector or banking sector, the median EDF for the sector can be calculated (EDF of the median institution).

Expected default probabilities increased markedly after September 2008, but remained within historical confines and were back to precrisis levels as of 2010 (Figure 7.6). The median expected 1-year default probability for listed firms in Indonesia (derived from Moody's KMV implied credit default swap spreads) increased from 0.6 percent in mid-2008 to 3.6 percent in early 2009, before falling back below 1 percent in early 2011. Despite the magnitude of the shock from the crisis, default probabilities did not increase much beyond earlier episodes of stress, providing evidence of the corporate sector's improved soundness. However, for firms at the 75th percentile of the distribution, the risk of default reached

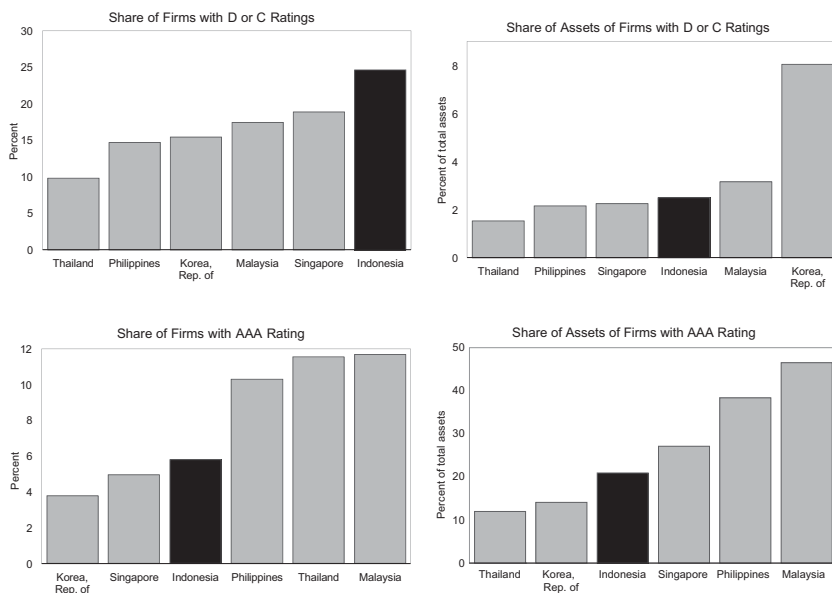


**Figure 7.6** Expected Default Probabilities

almost 12 percent in March 2009. The increase in default probabilities was triggered by the collapse of share prices and rising volatility as well as by tighter financing conditions and increased rollover risks. Looking at this in a different way, before the crisis started (July 2007), only a small fraction of firms (accounting for 2 percent of total assets) had a default risk one year ahead that exceeded 5 percent. By October 2008, this proportion had increased to 10 percent. By January 2011, the share of distressed corporate assets were only slightly above precrisis levels.

Expected default probabilities for Indonesian corporations remain above those of other economies in the region. The risk of default of Indonesia's most vulnerable firms remains at about 5 percent, compared with 1–3 percent in the rest of the Association of South-East Asian Nations (ASEAN) and the Republic of Korea (Figure 7.6). Default risks vary widely across industries within Indonesia. In the recent past, the default probability of the median textile firm has reached 20 percent, compared with less than 1 percent for the corporate sector as a whole. Other industries that display above-average default probabilities include steel and metal products and paper.

The higher risk perception of Indonesian firms is also reflected in their credit ratings. The share of Indonesian firms with D or C ratings by Standard & Poor's (S&P) is about 25 percent of all listed companies, the highest in the region, although such firms account for a larger share of assets in Korea and Malaysia (Figure 7.7). Furthermore, the share of firms with an AAA rating remains low compared with other ASEAN countries. Nonetheless, AAA firms in Indonesia



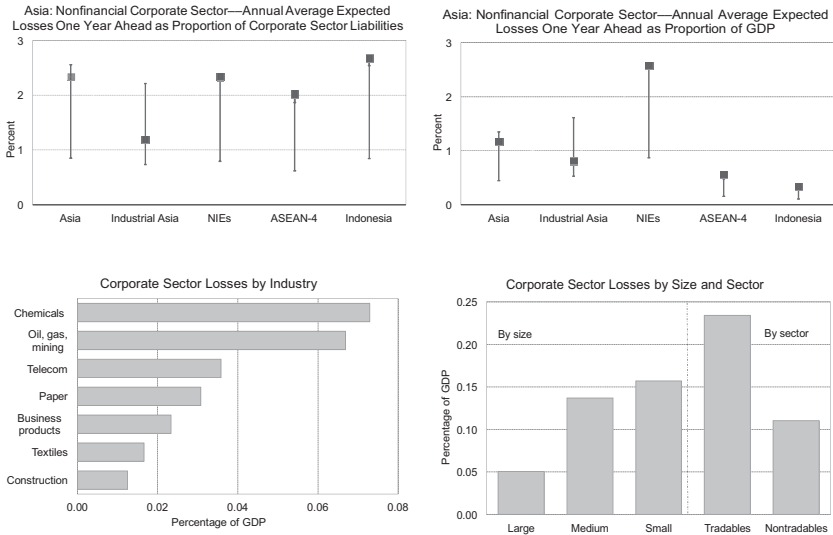
Source: Moody's KMV.

**Figure 7.7** S&P Ratings on Corporate Sector, January 2011

account for a growing share of total assets (20 percent). Fitch raised Indonesia's sovereign debt rating from BB to BB+ in January 2010 with a positive outlook in February 2011. This will help support the improvement of other sectors' credit ratings.

Expected losses from corporate defaults in Indonesia remain limited relative to GDP (Figure 7.8). The stock-listed corporate sector is estimated to incur losses amounting to about 2.75 percent of total corporate sector liabilities, based on equity price data as of January 2011.<sup>2</sup> This compares with 2.25 percent of total corporate sector liabilities for Asia as a whole, 2.25 percent for the newly industrialized countries in Asia (Hong Kong SAR, Korea, Singapore, and Taiwan Province of China), and 1.25 percent for industrial Asia (Australia, Japan, and New Zealand). Nevertheless, given the small size of the corporate sector in Indonesia relative to the average in Asia, losses are expected to be contained when measured by proportion of GDP. Indeed, losses are estimated at about 0.3 percent of GDP in Indonesia, compared with 1.25 percent of GDP for Asia as a whole, and 2.5 percent for the newly industrialized economies (NIEs) in Asia. These loss

<sup>2</sup>The value of expected loss due to default can be modeled with an implicit put option and can be estimated using information from Moody's KMV implied credit default swap spreads and expected default probabilities inferred from market and balance sheet information.  $Loss = LGD \times RNDP \times B \exp(-rt)$ , where  $LGD$  is the loss given default (which is one minus the recovery rate),  $RNDP$  is the risk-neutral default probability,  $B$  is the default barrier,  $r$  is the risk-free rate, and  $t$  refers to the time period.



Sources: Moody's KMV CreditEdge; and IMF staff estimates.

Note: For top two panels squares represent point estimates. Confidence intervals assume 80 percent and 40 percent recovery rate in case of default. ASEAN-4 = Indonesia, Malaysia, the Philippines, and Thailand.

**Figure 7.8** Corporate Sector Losses

calculations are based on historical recovery rates of nonperforming loans, which for Indonesian listed companies are about 35 percent.

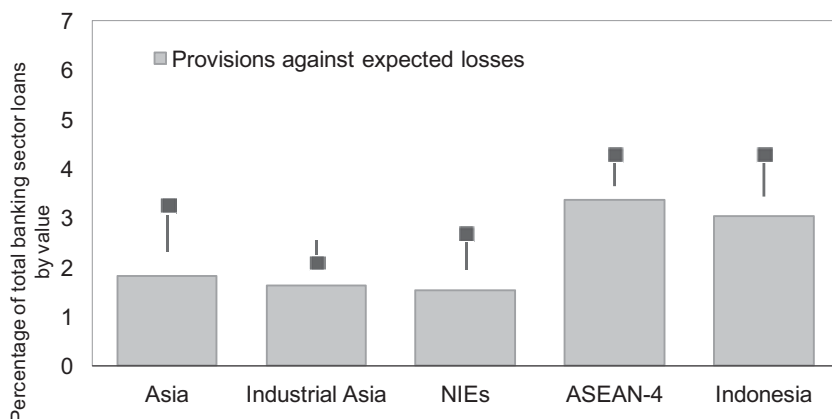
Corporate losses from defaults are expected to be larger in small and medium companies and in the tradable sector. Breaking down the sample of listed companies by size shows that most of the losses are expected to be experienced by small and medium firms.<sup>3</sup> Losses are also expected to be somewhat larger in the tradable sector. The most vulnerable industries appear to be chemicals; oil, gas, and mining; and telecom.

The impact of corporate losses on the banking system, as measured by the NPL ratio, is expected to be among the greatest in the region, but still manageable (Figure 7.9). Corporate losses calculated above are multiplied by the current stock of performing loans to the corporate sector to obtain the expected increase in bank losses stemming from banks' exposure to the corporate sector. Estimates suggest that new bank write-downs could reach 1.25 percent of total bank loans. Such write-downs would bring banks' cumulative losses (existing provisions plus expected new write-downs) to 4.25 percent. This compares with 2 percent in industrial Asia and not quite 3 percent in the NIEs.<sup>4</sup> Because the banking sector in Indonesia is much smaller than that in other countries, corporate losses that

<sup>3</sup> Companies with market capitalization below the median are defined as small, those between the 50th and 90th percentiles are classified as medium, and those above the 90th percentile are defined as large.

<sup>4</sup> To obtain these numbers, the ratio of corporate losses to total corporate liabilities is multiplied by the outstanding stock of bank credit to firms (net of provisions).





Sources: Moody's KMV CreditEdge; and IMF staff estimates.

Note: Squares represent point estimates. Confidence intervals assume 80 percent and 40 percent recovery rate in case of default.

ASEAN-4 = Indonesia, Malaysia, the Philippines, and Thailand.

**Figure 7.9** Banking Sector—Expected Losses from Corporate Sector Distress One Year Ahead

may seem modest as a share of GDP will have a much larger impact on Indonesian bank capital. Nonetheless, banks in Indonesia would be able to absorb the expected increase in NPLs because of their strong initial capital positions relative to the minimum Basel requirements.

Corporate and bank losses estimated here are likely to be undervalued given the limited data coverage. The estimates presented above need to be treated with caution. They include only those bank losses that stem directly from defaults on loans to listed companies. In particular, the estimates exclude losses from loans to the household sector, which account for about 45 percent of bank loans, as well as most of the loans to the SME sector. As a result, the impact on bank balance sheets is likely to be underestimated, especially if SMEs have higher default risks than the average Indonesian listed company.

## SUMMARY AND POLICY IMPLICATIONS

Having reduced macroeconomic and financial vulnerabilities over the decade since 2000, Indonesia's corporate sector was able to withstand the impact of the 2008–09 global financial crisis. Going forward, losses from corporate defaults are expected to increase the banking sector NPL ratio by only about 1.25 percent. With a systemwide capital adequacy ratio of 17 percent, the impact on banks' capital positions will not be significant. Nonetheless, losses stemming from consumer credit and SMEs could represent a more sizeable blow to banks' capital. Although the aggregate impact on banks appears manageable, individual banks with large exposures to vulnerable sectors or to consumer loans could be negatively affected.

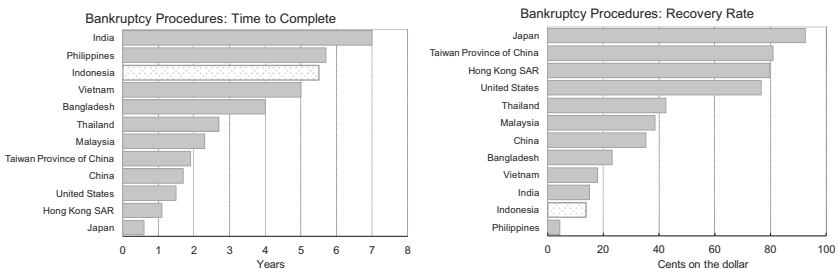
Forward-looking information from the equity market suggests a less rosy picture than the one implied by balance sheet data alone. Indonesia compares favor-

ably with other countries as measured by leverage, profitability, and liquidity ratios. However, expected default probabilities—inferred from the market value of assets, debt, and the volatility of these assets—indicate that firms in Indonesia are more vulnerable than firms elsewhere in Asia. The higher risk perception in Indonesia seems to be associated with institutional and governance factors.

In this regard, further improvements in bankruptcy procedures and enhancements to the rehabilitation of troubled borrowers could increase recovery rates and minimize the impact of corporate losses on the banking system. Despite the passage of improved bankruptcy laws in Indonesia after the 1997–98 Asian crisis, recovery rates remain below 20 percent. According to the World Bank's Doing Business Indicators, Indonesia exhibits the lowest recovery rates in the region, except for the Philippines (Figure 7.10). In addition, the inefficient legal system and weak creditors' rights lead to lengthy court proceedings. Bankruptcies in Indonesia are estimated to take between 5 and 6 years to be resolved, compared with less than a year in Japan. Out-of-court procedures could have an important role in the short and medium term to speed up restructuring and liquidation cases. However, Indonesia lacks an established informal work-out system, which would help in the rehabilitation of borrowers with viable business but who are unable to service their loans because of sudden or short-term liquidity or demand problems. Currently, even though the law provides for rehabilitation, it is hardly ever used because of the lack of judicial support. Ultimately, therefore, improving the judiciary should be a key priority. The lack of independence, predictability, accountability, and qualification of the courts has implications for the cost of lending and the cost of doing business.

Strengthening banks' risk-management strategies could further contribute to containing the increase in NPLs. In the same vein, regulatory forbearance to promote lending to SMEs should be avoided.

The implementation of regulations on early restructuring of performing loans could be strengthened. It is important to ensure that such restructuring aims to restore the debtor's repayment capacity in full, including its ability to repay the principal. Collecting supervisory information on repeatedly restructured loans and restructured loans that migrate to NPL status could be a way to better monitor asset quality. Moving forward, regulators must ensure that banks have adequate credit underwriting policies.



**Figure 7.10** Bankruptcy Procedures

The coverage of the Credit Information Bureau (SID) could be improved and expanded. Information collected covers just 30 percent of total debt, and only 10 finance companies report credit information because data submission is mandatory only for commercial banks and big rural banks. Other shortcomings of the system include the following: (a) many borrowers have more than one identity; (b) banks do not inform customers that they will be providing information to SID and that they can check their credit report with Bank Indonesia; (c) other credit behavior, such as payment of utilities, is not collected; (d) system hardware and software need to be upgraded; and (e) a clear medium-term business plan does not exist for many borrowers.

Registering a new company is a lengthy and tedious process and should be streamlined. Company formation in Indonesia is a complex procedure, requiring transactions with several government bodies: the Ministry of Law and Human Rights, the Ministry of Trade and Industry, the Ministry of Manpower, and the Capital Investment Coordinating Board. Up to 95 percent of all businesses outside the Jakarta province are not formally registered. Additionally, very little updated information is available on any company. No follow-up occurs on the submission of financial statements and yearly filings with the registrar of companies. Enforcement and resource capacity at the Ministry of Law and Human Rights is scarce. Lenders rely on information provided by the borrowers instead of counter checking with information provided at the registrar of companies. Also, the lack of updated information on the directors and owners for unlisted companies makes it impossible to identify related parties or companies. Thus, the cost of lending must factor in all this uncertainty and lack of transparency. According to the *Doing Business Report* published by the World Bank, it normally takes 4 to 6 months for a foreign investor to incorporate a company in Indonesia, whereas company incorporation in Singapore can be completed within one working day.

The lack of a “graduation process” is an obstacle to becoming a publicly traded company. Although the formal process to produce an initial public offering (IPO) is well documented in Indonesia, little guidance is provided about the transformational process by which a company changes from a private to a public firm. The IPO graduation process can be considered to be a restructuring phase during which a company starts the groundwork for becoming a publicly traded company. During this process, a company reexamines its organizational procedures and policies and makes necessary changes to enhance corporate governance and transparency. Most important, the company develops an effective growth and business strategy that can persuade potential investors that the company is profitable. To further encourage firms to go public, consideration should be given to the use of temporary fiscal incentives, by which newly listed companies would benefit from a reduction in the corporate tax rate.

Despite gains in the quality of the institutional framework, corporate governance and financial reporting could be further improved. The perception is widespread among market participants that companies’ financial accounts are not

reliable and that audited reports are of poor quality. Requiring audits to be performed by reputable accounting firms could lead to improvements in the quality and comparability of disclosures.

Finally, more sustained efforts at gathering and disseminating information on the soundness of the corporate sector, including foreign exchange exposures, could foster investor confidence and reduce Indonesia's risk perception. This was evidenced during the peak of the 2008–09 crisis, when uncertainty about the extent of foreign exchange exposure in the corporate sector accentuated the volatility of the exchange rate and bond spreads. In the medium term, financial deepening would help improve the liquidity of corporate bonds, further limiting volatility of spreads.

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# Enhancing Financial Stability

XIANGMING LI

Indonesia has made great strides in the last decade in improving macroeconomic and financial stability. As a result, the country's financial system withstood the contagion from the global financial crisis that started in 2007 and Indonesia emerged as one of the best performing economies in the world in 2009. In 2010, the IMF's Financial Sector Assessment Program (FSAP) identified a number of vulnerabilities and recommended key measures to boost financial stability in the following three areas: bank regulation and supervision, crisis prevention and resolution, and Bank Indonesia's (BI's) financial autonomy. In addition to specific financial sector issues, progress in enforcing the rule of law, especially creditors' rights, is an overarching consideration for improving the performance of the Indonesian economy, with critical implications for the ability of the financial system to function efficiently.

This chapter summarizes the main recommendations and conclusions of the FSAP review. These conclusions are placed in a broader context by describing the substantial improvements in financial stability achieved during the last 10 years and by drawing on cross-country experiences in key areas.

## MAJOR ACHIEVEMENTS SINCE THE LATE 1990s

Since the late 1990s, bank regulation and supervision have been strengthened substantially in Indonesia. Improvements include stricter loan classification and provisioning, tightened related-party lending limits, a higher capital adequacy requirement, and a tightened foreign exchange open position limit. In particular, the capital requirement was raised from 4 percent to 8 percent of risk-weighted assets in 2001. Empowered by the 1999 Bank Indonesia Act, BI took measures to improve banks' transparency and corporate governance, enhance on-site and off-site supervision, and institute fit-and-proper tests for controlling shareholders and bank management (Morales, 2007). More recently, BI launched a second generation of reforms. These initiatives include the development of a new rating system architecture and methodology to support individual bank risk assessments, the implementation of consolidated supervision, and a progressive move toward the requirements of Basel II.

The improvements in banking regulations and supervision are also reflected in banks' financial positions. Despite a mild slowdown in economic activity in 2009, banks reported a robust 2.6 percent return on assets. The capital adequacy ratio stood at 17.4 percent, well above the regulatory minimum of 8 percent and BI's informal target of 12 percent. The nonperforming loan ratio stood at only 3.3 percent with reserve coverage of more than 60 percent.

The authorities have also introduced the main components of a comprehensive financial safety net (FSN). These components include (a) a lender-of-last-resort facility; (b) a deposit insurance scheme, a deposit guarantee agency (LPS), and a bank resolution framework; and (c) a Financial Stability Forum, with the participation of BI, the Ministry of Finance, and the LPS to coordinate the government's actions if there were to be systemic risks to the financial sector. Nevertheless, the FSN should be further strengthened by passing the FSN law as noted below.

## **STRENGTHENING BANKING REGULATIONS AND SUPERVISION**

The recently completed FSAP report recommended strengthening the definition and calculation of regulatory capital and regulating interest rate risks. The FSAP's recommendations are informed and supported by stress test results.

### **Stress Test Results**

The results of extensive stress tests show that the banking system is generally robust. The system demonstrated resilience to all but the most extreme shocks thanks to significant capital and liquidity buffers. The stress tests put banks under a set of extreme shocks representing unlikely tail risks. These shocks included a severe economic downturn scenario and a number of shocks to market risk factors. Even under these extreme shocks, only a few banks are vulnerable to credit risks, followed by interest rate risk, and liquidity shocks. A few large banks are susceptible to concentration risk. However, exchange rate and contagion risks are not major concerns.<sup>1</sup>

### **Prudent Banking Regulations and Supervision**

The stress test results underscore the importance of prudent banking regulations and supervision. Given that credit risk remains the most potent of risks, following international best practices in asset classification and provisioning, and ensuring the quality of banks' capital are both crucial. Banks' vulnerability to interest rate risk highlights the importance of issuing a regulation on interest rates to limit the sensitivity of banks' portfolios to this risk.

Although the quality of banking supervision has increased markedly in recent years, the assessment of compliance with the Basel Core Principles for Effective Banking Supervision identified a number of areas for improvement:

- Ensure that all items included in capital meet the permanence and availability requirements to cover losses and that risk weights properly reflect the quality of bank exposures.
- Strengthen the regulatory definition of exposure and eliminate exemptions from prudential limits, including related-party exposure.

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<sup>1</sup>A full discussion of the stress test scenarios is contained in IMF (2010).

- Upgrade asset classification and provisioning norms, including the treatment of restructured loans.

In addition, the authorities need to address deficiencies arising from application of nonstandard risk weights to ensure that they cause no capital shortfalls during the transition to Basel II. BI plans to complete implementation of Basel II in 2014, deploying Pillar 1 in 2011, Pillar 2 in 2012–14, and Pillar 3 in 2011–14. Initially a simplified approach will be adopted. Basel II is a complex framework with three mutually reinforcing pillars. Pillar 1, minimum capital requirements, needs to be complemented by Pillars 2 and 3. Any revisions to the Basel II framework by the Basel Committee on Banking Supervision would also need to be properly reflected. Consistent with the Basel Core Principles assessment findings, BI also needs to improve its supervisory capacity with regard to the oversight of banks' risk-management systems. In addition, Indonesia's adoption of new accounting standards based on International Accounting Standards 32 and 39 should be managed and implemented carefully because they potentially affect banks' capital.

## CRISIS PREVENTION AND RESOLUTION

The FSAP recommends that Indonesia strengthen its prompt corrective action (PCA) regime to reduce undue delays in resolving problem banks, strengthen the financial safety net law, and ensure coordination of macro and micro supervision.

### Prompt Corrective Action Regime

The FSAP recommends that the PCA regime be strengthened to increase its effectiveness in containing emerging problems. The existing regime consists of two phases: Problem banks that meet certain criteria are first put under intensive supervision, and then, if their conditions deteriorate, under special surveillance. The regime ends when a bank is declared failed and sent to LPS for resolution. Until end-2010, there was practically no limit to the time that a problem bank could remain under intensive supervision before being transferred to special surveillance, under which it must be rehabilitated or have its license withdrawn within nine months. With protracted action plans and weak legal protection for supervisors, banks tend to remain troubled for an extended period and are rarely placed under special surveillance. This process raises the expected cost should the bank finally fail. A well-designed PCA mandating corrective actions as soon as a problem emerges has the added benefit of giving supervisors more protection by making explicit the required actions when certain trigger points are breached.

Besides curtailing supervisors' discretion and reducing political interference, a well-devised PCA regime encourages banks to maintain high capital ratios and reduce risk exposures. Because measures for capital restoration and resolving failing banks are mandated, a PCA regime limits the scope for forbearance and provides some insulation from political pressure against taking tough measures. With regard to incentives to banks, moderately well-capitalized banks have the incentive to strive for a higher capital level so as to reduce the intensity of



supervision; and struggling banks are encouraged to improve their capital levels to avoid being placed, at least temporarily, under the control of regulators, or worse, being closed or merged with other institutions.

The experiences of other countries have shown that a properly implemented PCA regime promotes financial stability. Benston and Kaufman (1997) note that regulators acted more timely to impose corrective action against poorly performing institutions and to resolve failing institutions in the 1990s following the enactment of the Federal Deposit Insurance Corporation Improvement Act, which established the PCA regime in the United States. As a result, the level of nonperforming loans and the number of troubled banks declined greatly. The ratio of book value capital to assets for the banking sector climbed above 8 percent at the end of 1993 for the first time since 1963.<sup>2</sup> Aggarwal and Jacques (2001) show that PCA standards, along with restrictions on the activities of undercapitalized banks, have reduced the risk levels in both adequately capitalized and undercapitalized banks. Both groups have increased their capital ratios and accelerated their adjustment to the desired leverage ratio.

Many other countries have now adopted the PCA regime. After its banking crisis, Japan enacted PCA legislation in 1998, as did the Republic of Korea. Thailand implemented a PCA regime when the Financial Institution Business Act was adopted in 2008. PCA regimes have been implemented in many Latin American countries, such as Brazil, Mexico, and Peru, and its adoption is also being considered by many European countries (Eisenbeis and Kaufman, 2007; García, 2008; and Mayes, 2009).

The Indonesian authorities moved swiftly to deal with some weaknesses in its PCA regime by issuing a regulation in January 2011. Triggers for intensive supervision were made less lenient and linked to more explicit and measurable indicators. Banks under intensive supervision must improve within a year or be placed under special surveillance. The 1-year limit can be extended only once, and specific conditions must be met to do so. A bank under special surveillance must resolve the problem within 3 months or be referred to the LPS for resolution. For such banks, BI can freeze certain banking activities if conditions deteriorate or if the banks are in breach of regulations; stricter measures can be taken if, in the view of BI, the banks do not make serious efforts to resolve their problems.

Nevertheless, further strengthening the legal underpinning of the PCA regime in Indonesia will also be essential to ensuring its effectiveness, specifically to correct the perceived legal vulnerability of supervisors, which has been identified as a cause for weak enforcement. The Banking Act should be amended to clarify the powers of the banking authorities to prevent and to confront serious banking problems at different stages. In particular, it should specify more clearly the preventive and corrective actions that supervisors can take to confront early problems and require increasingly intrusive corrective measures if a bank's condition deteriorates.

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<sup>2</sup>Measured by market value, the capital-to-asset ratio increased even more as stocks were traded at about 80 percent of book value in 1990, and at close to 150 percent of book value in 1996.

## Strengthen the Financial Safety Net

The Financial Safety Net (FSN) needs to be completed with the passage of the FSN law. Although many critical elements of an FSN are in place, in light of the potential establishment of an integrated supervisory authority (OJK) in Indonesia, passage of a new FSN law that clearly defines a framework for dealing with banking and broader financial sector problems is urgent. This law should be introduced to ensure that a proper legal framework is in place for financial crisis prevention and resolution. In addition, the deposit insurance fund needs to be increased in proportion to its recently increased deposit coverage.

An FSN law needs to address the following issues:

- *Clarification of the roles of BI and the Ministry of Finance as lenders of last resort* and the access criteria to lender-of-last-resort facilities.
- *Crisis-management framework.* A crisis-management decision-making framework and procedures were introduced during the global financial crisis by a presidential decree, which has since lapsed. Therefore, it is important to explicitly establish triggers for different types of enforcement and crisis-prevention actions, including rules and procedures for dealing with both systemically important as well as nonsystemic banks to increase transparency and promote timely decision making.<sup>3</sup> In addition, in the event that the OJK is created, the roles of the different authorities also need to be redelineated.<sup>4</sup>
- *Legal protection for staff* dealing with the resolution of problem banks. Staff need better legal protection against “second guessing” of their decisions because managing a failing bank is inherently risky. Concerns regarding the strength of legal protections may inhibit the full use of the resolution powers contained in the LPS Act.

The LPS fund needs to be increased in proportion to its increased coverage. In late 2008, during the global financial crisis, the coverage of deposits was increased 20-fold to provide depositors with the appropriate assurance regarding the safety of their deposits. Similar measures were implemented by many countries across the world. As a result of this expanded coverage, the ratio of the LPS fund to insured deposits has declined substantially. Even though LPS can seek a loan from the government when facing liquidity difficulties and an allocation of funds if capital falls below the original capital level, international experience shows that in

<sup>3</sup>Whether a bank is systemic or nonsystemic may depend on the environment. For instance, at a time of high financial uncertainty, some normally nonsystemic banks could become systemic.

<sup>4</sup>The BI Act as amended in 1999 requires the establishment of a new integrated supervisory agency (OJK) that consolidates the banking, insurance, and securities supervision functions in one institution, and the deadline was postponed to end-2010 by the 2004 amendment to the BI Act. The FSAP review identified a number of major risks in the establishment of an integrated OJK. It advised extreme caution, given the potential for loss of existing supervisory capacity and anticipated problems in coordinating micro- and macroprudential policies between BI and the new agency. The draft OJK law and FSN law were still being considered by the parliament when this book went to press in late 2011.

countries where a deposit insurance fund is undercapitalized, problem banks tend to be bailed out or kept open.

## Ensure Coordination of Macro- and Micro-Supervision

The recent global financial turmoil highlights the importance of complementing microprudential supervision with macroprudential oversight. The common exposure of financial institutions to risks and the covariance of such macroeconomic risks can create systemic events, such as those that occurred in some countries in response to a run-up in real estate prices. The objective of microprudential supervision is to limit the likelihood of the failure of individual institutions, or to reduce “idiosyncratic risk.” It cannot capture the common exposure of the system. In contrast, macroprudential supervision strives to limit the costs to the economy of financial distress and lessen the likelihood of the failure, as well as the corresponding costs, of a significant portion of the financial system. This is often loosely referred to as limiting “systemic risk.” Monitoring the potential impact of an individual institution’s behavior on financial system stability and financial infrastructure, as well as the linkage between financial institutions and financial markets, is an integral part of macroprudential supervision.

Macro- and microprudential supervision share common aspects, but also can be in conflict. For example, by ensuring that individual institutions are “safe and sound,” micro-supervision should reduce the systemwide risks or the risk of failure of a financial institution that has systemic implications. In addition, the two approaches share some common tools such as liquidity requirements, minimum capital standards, and loan provisioning requirements. However, micro-supervision, which is intended to reduce an individual institution’s risk, could amplify institutions’ tendency to overexpose themselves during financial booms and become overly risk averse during financial downturns, with a resultant drop in lending and herding into assets deemed safe, thereby overvaluing such assets.

Given the close link between macro- and micro-supervision, coordination among all the relevant authorities is essential to safeguarding financial stability. Although the appropriate architecture and institutional arrangements are still being debated internationally, this coordination is relatively easy in countries where micro- and macroprudential supervisory authorities are lodged in one agency (for example, the central bank) but more challenging when the responsibilities rest with separate authorities. When multiple authorities are involved, it is critical that each authority’s mandate be clearly delineated to avoid regulatory gaps or overlaps.

Central banks are well suited for monitoring and assessing systemic risks. They have expertise and analytical capabilities in monetary and financial stability analysis, and are close to the money and financial markets. The links between monetary policy and prudential policy, as well as the interactions between the financial system and the real sector, further strengthen this rationale.

Ensuring macro and micro coordination will be essential for financial stability before and after the establishment of the OJK. A permanent coordination mechanism should cover the following aspects:

- *Clear legal mandate.* To the extent possible, BI's macroprudential role and OJK's responsibility in micro-supervision should be delineated in their respective laws. To monitor macro-financial stability and assess systemic risk, BI must be able continuously to monitor large banks and financial conglomerates that are systemically important.
- *Coordinated regulatory policies.* As noted above, macro and micro regulations share certain policy instruments, and their objectives might be in conflict at times. Therefore, it is important that macro and micro policy be coordinated and any differences be discussed in the Financial Sector Coordinating Committee (KSSK) chaired by the Minister of Finance, as envisaged under the FSN Law.
- *Fluid information flows.* Safeguarding financial stability will require fluid two-way communication and coordination between OJK and BI. BI needs to continuously monitor individual banks' liquidity, including their balance sheets and their participation in the payments system and the interbank and foreign exchange markets. BI will need access to this data on a continuous real-time basis; OJK will need data with regularity but typically with less frequency. BI also needs to continue its monitoring of systemically important individual large banks and financial conglomerates; this need is recognized in the draft OJK Law. The protocols to facilitate coordination should be established by law.
- *Coordinated crisis management.* BI can use monetary and prudential policies to deal with emerging systemic problems. BI needs to be able to spot weaknesses in bank liquidity and solvency and prepare to take action that is both bank specific and systemic in its lender-of-last resort capacity. OJK and BI need to cooperate closely to prevent a banking crisis from occurring and to deal effectively with any crisis if it were to happen. This will require a new legal framework for an FSN, as discussed in the previous section.

## PROMOTING BANK INDONESIA'S FINANCIAL AUTONOMY

The IMF–World Bank technical assistance on assets and liabilities management and the FSAP team recommend that the nontradable government bonds held by BI be restructured into tradable bonds at market terms to enhance BI's financial independence. Supported by prudent fiscal policy, BI has successfully improved macro stability. However, the large stock of non-interest-bearing government bonds on BI's balance sheet and the need to undertake extensive liquidity absorption could, in the extreme, potentially create a conflict of interest in BI's monetary policy implementation, and should be rectified. Setting BI on sound financial footing will promote continued improvement in macro stability, which is essential for a healthy financial system.

**TABLE 8.1**

Simplified Balance Sheet of Bank Indonesia, End-2009 ( <i>Trillions of rupiah</i> )			
Assets		Liabilities	
International reserves	620	Currency in circulation	279
Government bonds, marketable	25	Bank deposits	157
Other claims on government (Nonmarketable bonds)	254	SBI	259
Other assets (net)	16	FASBI	86
		Other liabilities	42
		Unrealized valuation gains/losses	9
		Capital and reserves	84
Total assets	916	Total liabilities	916

Source: Bank Indonesia, *Annual Financial Statements*, 2009.

Note: FASBI = Financial Accounting Standards Board.

## THE IMPACT OF NONMARKETABLE GOVERNMENT DEBT ON BI'S OPERATIONS

Corresponding to the excess of liquidity in the banking system, BI's balance sheet holds a large amount of nonmarketable government debt (Table 8.1). On the asset side, BI holds rupiah (Rp) 254 trillion in nonmarketable government bonds (SUPs) that pay close to a zero interest rate. These are bonds that BI received in exchange for providing liquidity to commercial banks during the crisis in the 1990s, and they account for more than one-quarter of its assets. On the liability side, the stock of SBIs is Rp 259 trillion, roughly matching the stock of SUPs. The interest cost associated with SBIs forms the lion's share of BI's expenses, leading to a deficit in some years (Tables 8.2 and 8.3).

This large volume of non-income-bearing assets and stock of SBIs can potentially compromise the effectiveness of BI's monetary operations. The large stock of SBIs makes BI a net borrower from the domestic financial system, which may create a conflict of interest in BI's conduct of monetary policy. When a central bank is a net debtor with a weak balance sheet, financial considerations create a disincentive to raise interest rates when otherwise warranted

**TABLE 8.2**

Simplified Income Statement of Bank Indonesia, 2009 ( <i>Trillions of rupiah</i> )	
	Amount
Revenue	29.7
Foreign reserves	25.6
Money market and credit and financing	2.6
Payment system	0.2
Banking supervision	0.2
Other	1.1
Expenditure	30.8
Monetary operations	22.5
Payment system operations	4.0
Banking regulation and supervision	0.1
General and other	4.2

Source: Bank Indonesia, *Annual Financial Statements*, 2009.

TABLE 8.3

Bank Indonesia Profit and Loss Outcome, 2000–08 (Trillions of rupiah)										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total profit/loss	2.6	17.6	2.9	1.5	0.7	16.2	31	-1.4	17.3	-1.0
Without extraordinary income/expenditure	27.1	7.6	2.9	-7.2	0.7	16.2	-6.9	-1.4	17.3	-1.0
In percentage of GDP	1.9	1.1	0.2	-0.4	0	0.6	-0.2	0	0.3	0

Source: Bank Indonesia, *Annual Financial Statements*, 2003–09.

by macroeconomic developments, especially when the central bank is subject to reputational risk if its operational balance were to deteriorate further. In extreme cases, the central bank could be tempted to subordinate its policy target to debt-servicing considerations.

Strengthening BI's balance sheet by swapping SUPs for tradable bonds bearing a market interest rate would not only enhance BI's operational independence but would also promote capital market development. Such an exchange requires no legislative changes and will have no impact on the consolidated sovereign balance sheets of the government and BI, holding maturity structure constant. The central bank's domestic debt is part of overall public domestic debt. From this viewpoint, accumulated losses on the central bank balance sheet represent interest-free credit to the government. Eliminating this financing source sets the correct policy incentives, touching on the core of central bank operational independence. In addition, with more tradable government securities on its balance sheet, BI would be able to use repos for liquidity absorption and, therefore, have greater flexibility in implementing monetary policy. Such a swap also would provide an opportunity to develop an integrated strategy for managing public debt, thus promoting market development because it is beneficial to have only one issuer of bills and bonds.

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