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INDONESIA

Selected Issues

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Approved by the Asia and Pacific Department

July 11, 2008

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I. Inflation Outlook and Monetary Policy Challenges: A Model-Based Analysis[1]

A. Introduction

1. **Rising inflationary pressures are posing a major challenge for monetary policy in Indonesia.** Driven by rising food prices, strong economic activity, declining real interest rates, and a slightly weaker rupiah, inflationary pressures built up since mid-2007. While inflation remained within the target range at end-2007, it has been accelerating in 2008. Meanwhile, rising oil prices increased pressures to adjust domestic fuel prices, and the resulting 29 percent adjustment in May further raised inflation which reached 11.0 percent in June. As a result, Bank Indonesia (BI) has been gradually tightening monetary policy since May, but uncertainty about the global environment and the mix between demand and supply factors as sources of inflationary pressures pose significant challenges to monetary policy making at this juncture.

2. **This chapter uses a small structural macro model of the Indonesian economy to analyze the inflation outlook and monetary policy challenges.** The model is a version of the IMF's forecasting and policy analysis system (FPAS) model which has been modified to fit key features of the Indonesian economy. In analyzing the inflation outlook and policy options, emphasis is given to specific risks arising from the external environment as well as possible domestic shocks. The remainder of the chapter is structured as follows: Section B provides background and outlines current conditions, Section C briefly describes the model, Section D discusses the baseline forecast and alternative policy and risk scenarios, and Section E concludes.

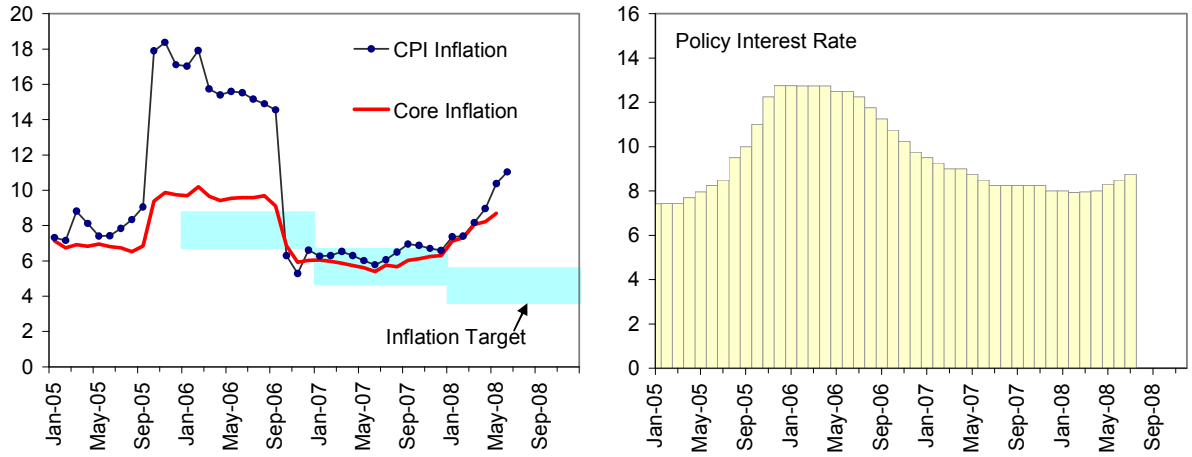
B. Background and Current Conditions

3. **BI introduced its Inflation Targeting Framework in July 2005 with the goal to reduce inflation in the medium term to 3 percent.** BI's official mandate is stability of the rupiah, both internal and external, and BI views the inflation targeting regime with a floating exchange rate as the best strategy to fulfill that mandate. Under this framework, the primary objective is achieving the inflation target. In practice, however, BI also aims to support economic growth and at times dampen the volatility of the exchange rate. Specific annual targets are set by the government in coordination with BI. The most recent targets are 5±1 percent for 2008, 4.5±1 percent for 2009, and 4±1 percent for 2010, although the 2009–10 targets might be adjusted following 2008 overshooting. At this point BI does not publish official multi-year inflation forecasts.

[1] Prepared by Steffen Reichold (APD).

4. **The framework has been very successful in reducing inflation following the fuel price shock in October 2005.** Sharp rate hikes in 2005 helped limit second round effects of the fuel price increases.[2] Inflation stabilized after the initial spike and fell below the (revised) target range by end-2006 (Figure 1). This allowed BI to gradually ease monetary policy which helped stimulate credit growth and domestic demand. After falling to 5.5 percent in 2006, GDP growth accelerated again reaching 6.3 percent in 2007 and Q1 2008—the highest annual rate since the Asian crisis.

Figure 1. Inflation and Interest Rate Developments



5. **However, inflation started increasing again in mid-2007.** High food prices played an important role given their large weight in the CPI index (36 percent in the recently rebased basket), but this has been largely offset by stable administered prices, especially fuel prices, which remained unchanged between October 2005 and May 2008. Nevertheless, broader price pressures started to build, as evidenced in the gradual increase of core inflation.[3] Several factors contributed to this development: (1) strong growth and falling unemployment supported by low real interest rates and accelerating credit growth, (2) the relative weakness of the rupiah compared with other regional currencies (resulting in an 11 percent depreciation of the nominal effective exchange rate between June 2007 and April 2008), and (3) some pass-through of high commodity and food prices. BI reacted by keeping rates on hold for most of the second half of 2007. However, with inflation close to the end-2007 target, BI cut interest rates one more time in December by 25 basis points.

[2] Prices for gasoline were raised by 30 percent in March 2005, followed by an 88 percent increase in October. Similar price increases took place for other types of fuel. In addition, subsidies were removed for industrial users.

[3] Indonesia's measure of core inflation excludes volatile food prices (currently accounting for about 20 percent of the CPI) and administered prices, such as fuel prices, transportation tariffs, electricity, and tobacco among others (currently about 28 percent of the CPI). The numbers refer to the 2002 base year CPI as core inflation measures have not yet been released under the recently rebased CPI.

6. **Inflationary pressures accelerated further in 2008.** Food prices rose to new highs, while economic activity remained strong and credit growth continued to accelerate. With headline and core inflation moving further away from the end-2008 target, BI reversed its easing bias, started raising rates in May by 25 bps. The 29 percent increase in fuel prices in late May further added to headline inflation (which reached 11.0 percent in June) and BI raised rates by another 25 bps in June.[4]

7. **The key challenge for BI is now to bring inflation back on a declining path towards the medium-term inflation target.** With growth likely close to potential, credit growth exceeding 30 percent annually, and real interest rates in negative territory, this will require rate increases, and early action could help to anchor inflationary expectations. However, BI needs to strike a careful balance. Risks to growth are slanted to the downside considering the global slowdown and continuing global financial market problems. In addition, the high volatility of food and energy prices and continuing pressures to reduce fuel subsidies over the medium term are posing additional challenges.

C. Brief Description of the Model

8. **The FPAS model is a small system of forward-looking structural equations that describe the relation between a several key macro variables.**[5] The model allows for rational, as well as adaptive expectations. It is a "two-country" model, with Indonesia as the home country and the rest of the world proxied by the U.S.[6] At the heart of the model are four equations that determine endogenously the main macro variables output, inflation, exchange rate, and interest rates:

- **IS curve:** or aggregate demand curve that relates the level of real activity to expected and past real activity, the real interest rate, and the real exchange rate.
- **Phillips curve:** a price-setting curve that relates inflation to past and expected inflation, the output gap, and the exchange rate.
- **Exchange equation:** an uncovered interest parity condition, with some allowance for backward-looking expectations and incomplete adjustment of the exchange rate to interest rate differentials

[4] Under the old CPI weights which were in effect until May 2008, measured inflation would have been significantly higher. While precise numbers are not available, an estimate based on monthly inflation in the 7 main CPI categories results in 12.6 percent y/y.

[5] See Berg, Karam, and Laxton (2006a) and (2006b) for a more detailed description of the basic model.

[6] In the simulations, US variables are taken as exogenously given, based on the latest WEO forecast.

- **Monetary policy rule:** a Taylor rule-type equation that sets the policy interest rate as a function of the output gap and expected inflation, with some interest rate smoothing.

9. **Several extensions have been made to the basic model to better fit the Indonesian economy.** Considering the importance of regulated fuel prices in Indonesia, an equation has been added that describes the evolution of domestic fuel prices, assuming periodic adjustments with a view to keep the subsidy from exceeding a certain target level. Separate Phillips curves are introduced for headline and core inflation with fuel prices directly affecting headline, and some pass-through from headline to core. The real interest rate affecting aggregate demand is based on core inflation, while monetary policy is assumed to target an average of headline and core.[7]

10. **Despite the parsimonious structure, the model captures the main monetary transmission channels.** Monetary policy affects inflation in three distinct ways. First, interest rates directly affect aggregate demand which in turn affects inflationary pressures. While not explicitly modeled in this paper, this could work through borrowing costs, the availability of financing, or asset prices. The second key channel is through the exchange rate. Interest rates directly influence the exchange rate through the yield differential, which then has a pass-through effect on inflation. And finally, monetary policy—in particular the policy reaction function and future inflation targets—can affect inflationary expectations which have a direct effect on contemporaneous inflation.

11. **However, due to the parsimonious structure, several important variables have to be determined exogenously, outside of the model.** The key variables are expressed in terms of their deviations from equilibrium, in other words in "gap" terms. The model itself does not attempt to explain movements in equilibrium real output, the real exchange rate, or the real interest rate, or in the inflation target. Rather, these are taken as given from various sources employing filtering methodologies or using judgment and views about these equilibrium values.

12. **The model parameters have been estimated using Bayesian techniques.** Estimation of the model is complicated by the major structural changes associated with the Asian crisis. To ensure that model parameters are not affected by the crisis period a relatively short sample is used (Q1 2000 to Q1 2008). Potential output growth is assumed to be 6.3 percent currently and rise to 6.7 percent over the medium term as a result of higher investment rates and improvements in the investment climate. The historic output gap and equilibrium real exchange rate are derived by HP filter. Implied inflation targets for the pre-

[7] While Indonesia's official target is on headline inflation, BI is assumed to react less aggressively to shocks to food and administered prices than to broad inflationary shocks reflected in core inflation. This behavior can be modeled by reducing the weight of headline inflation in the policy reaction function, and raising the weight of core inflation.

IT period (2000–04) are based on inflation projections from past IMF staff reports. Priors are based on similar models estimated for other countries, as well as on other empirical work on Indonesia and judgment. Key results of the estimation are: a neutral real interest rate slightly above 3 percent (despite a lower prior of 2.5 percent), a sacrifice ratio of about 0.9 percent (indicating that a permanent reduction in inflation by 1 percentage point will require a cumulative loss of output of 0.9 percent of annual GDP), and an exchange rate pass-through somewhat below 10 percent after one year assuming no fuel price adjustment and endogenous monetary tightening. [8,9]

D. Simulation Results[10]

Model Forecast

13. **The baseline model forecast suggests that substantial rate increases will be needed to bring inflation back on a declining path toward the medium-term target** (Figure 2). A tightening cycle, with rates peaking in Q2 2009, would result in significantly positive real interest rates (forward-looking) and help contain the pass-through from headline to core inflation. The exchange rate should appreciate, in line with contemporaneous and expected future interest differentials, contributing to the dampening trend on inflation. Core inflation would decline gradually over the medium term, reaching about 4 percent by end-2012. Assuming no further fuel price adjustments until 2010, headline inflation would fall below core inflation in 2009 and end the year at about 6.5 percent. However, this assumes no additional price pressures from food prices.[11]

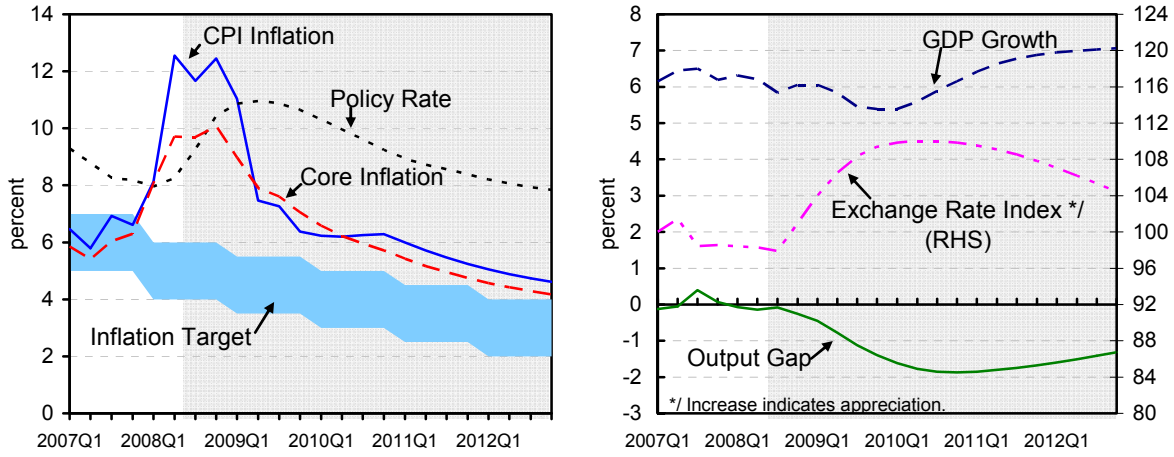
[8] Estimating the equilibrium real interest rate is difficult and estimates depend on the sample period. Moreover, the equilibrium rate may change over time. As real interest rates were relatively high during 2000–02, a shorter sample period would likely result in a lower estimate. Thus the current neutral real interest rate could be somewhat lower than the estimated 3.15 percent, consistent with a lower risk premium compared to the earlier post-crisis years. However, the model projections in this paper are based on the formal estimate over the full 2000–08 sample.

[9] The estimated pass-through is low compared to previous studies that find values around 40 percent after one year (see Choudhri and Hakura (2006) and Ito and Sato (2007)). However, those studies include the crisis years which were characterized by a high exchange rate pass-through and the estimates were affected by periodic fuel price adjustments. Assuming proportionate fuel price adjustments, the pass-through would be significantly higher than 10 percent in the estimated model.

[10] Model simulations start in Q4 2008. Q2 and Q3 are based on a near-term judgment forecast that takes into account a broader set of available data, short-term indicators, and projections.

[11] As food prices are not explicitly included in the model, the implicit assumption is that food inflation is in line with underlying core inflation. In other words, relative prices of food are assumed to remain at the current level.

Figure 2. Model Forecast



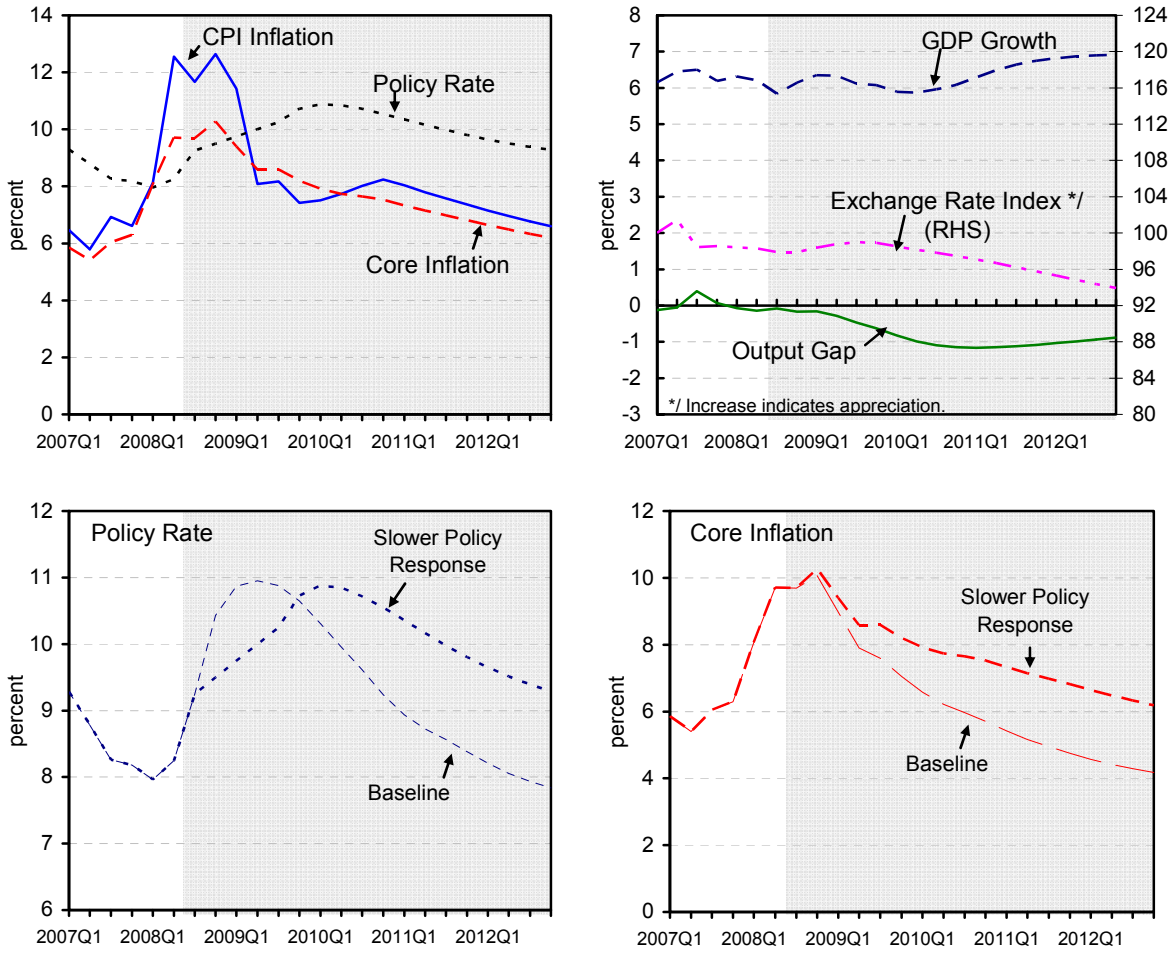
14. **Higher real interest rates and a more appreciated exchange rate would cause output growth to slow.** The output gap would open gradually, keeping growth below the assumed potential growth rate of 6.3 percent in 2008. In this simulation, growth would average about 5.7 percent in 2009. Over the medium term, with a gradually closing output gap, growth would accelerate again. However, as this medium-term scenario envisages substantial disinflation, output would have to remain below potential for extended period.

15. **Despite tight monetary policy, however, headline inflation could remain above 6 percent for quite some time.** The assumption of gradual fuel price adjustments starting in 2010 would result in some upward pressure on headline inflation, with some pass-through to core. Moreover, this baseline scenario assumes a policy reaction broadly in line with BI's past behavior, suggesting that moderate deviations from the target would likely be accepted, if needed to prevent sharper declines in output.

Scenario 1: Slower Policy Response

16. **A slower pace of monetary tightening would support growth in the near-term, but result in significantly higher inflation over the medium term** (Figure 3). This scenario assumes that BI is less ambitious regarding its inflation objective, with the goal to prevent a significant drop in growth. With the policy rate rising only to 9.5 percent by end-2008, output would stay at or above 6 percent. However, real rates would remain low and the rupiah would fail to appreciate as in the baseline scenario. The result would be higher inflation in the medium term. However, interest rates would still have to be raised significantly in order to maintain real rates consistent with a gradually declining inflation.

Figure 3. Scenario 1: Slower Policy Response



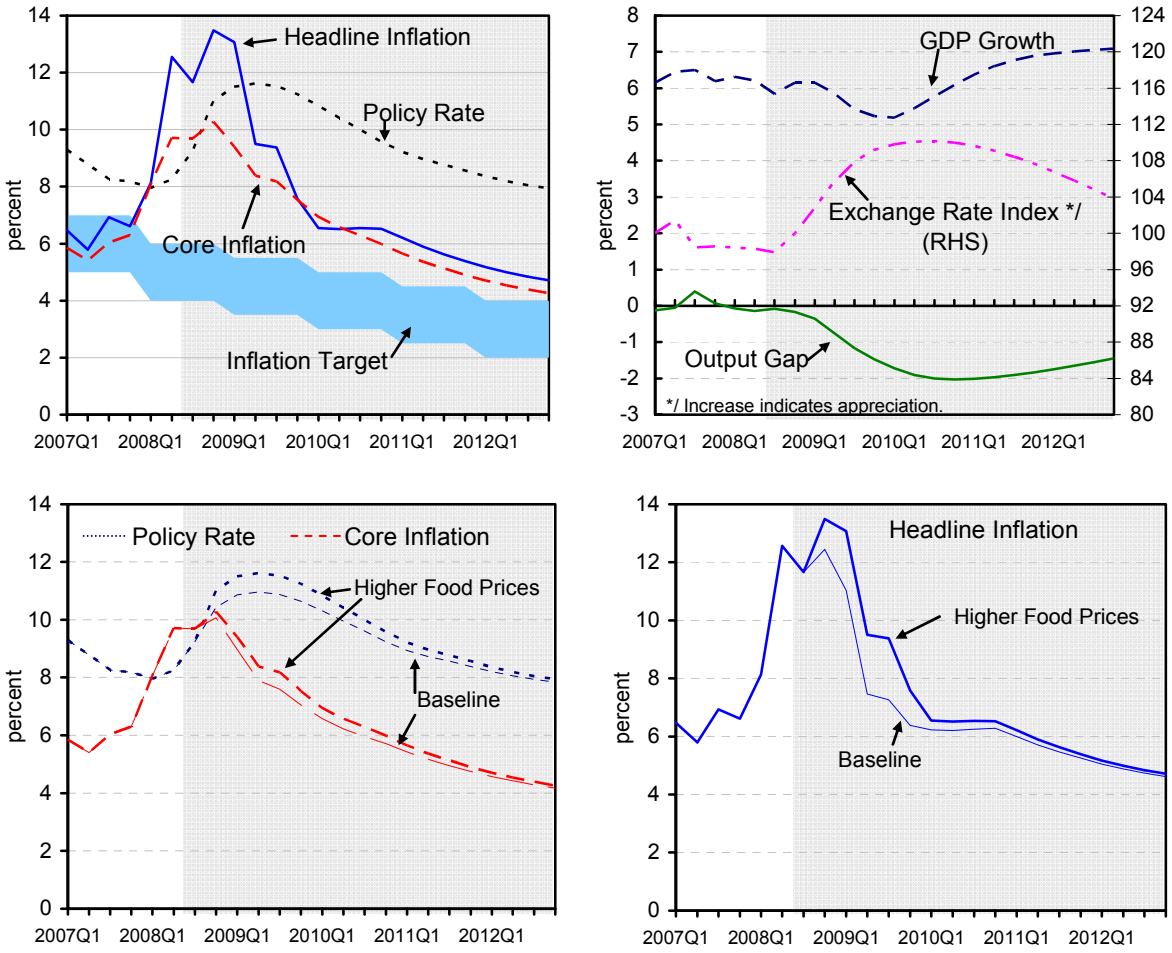
17. **However, these results are sensitive to the estimate of the equilibrium real interest rate.** This is the real rate that is neutral in the sense that it neither leads to an acceleration of inflation nor a deceleration. The estimation yielded a value slightly above 3 percent, despite a lower prior. However, estimating this rate is difficult and it may in fact change over time. If the equilibrium real rate were 1 percentage point lower than in the baseline simulation, the policy rate could also remain 1 percentage point lower, while achieving the same results with respect to inflation, output, and the exchange rate. In this case, a slower pace of tightening would be sufficient.

Scenario 2: Continued Rise in Food Prices

18. **Food prices continue to pose a significant risk to the near-term inflation outlook.** This scenario considers a further increase in food prices, similar to what has been observed over the past year. Specifically, it assumes a 10 percent rise in the relative price of volatile food items over the course of 2 quarters. While the model does not explicitly include food prices, this shock can be simulated as a shock to headline inflation. The cumulative shock to

headline inflation would be 2 percentage points. With an approximately 50 bps increase in policy rates, the pass-through to core inflation should remain limited to about 50 bps and the effect on headline inflation should be relatively short-lived. However, the slowdown in output would be somewhat more pronounced.

Figure 4. Scenario 2: Continued Rise in Food Prices

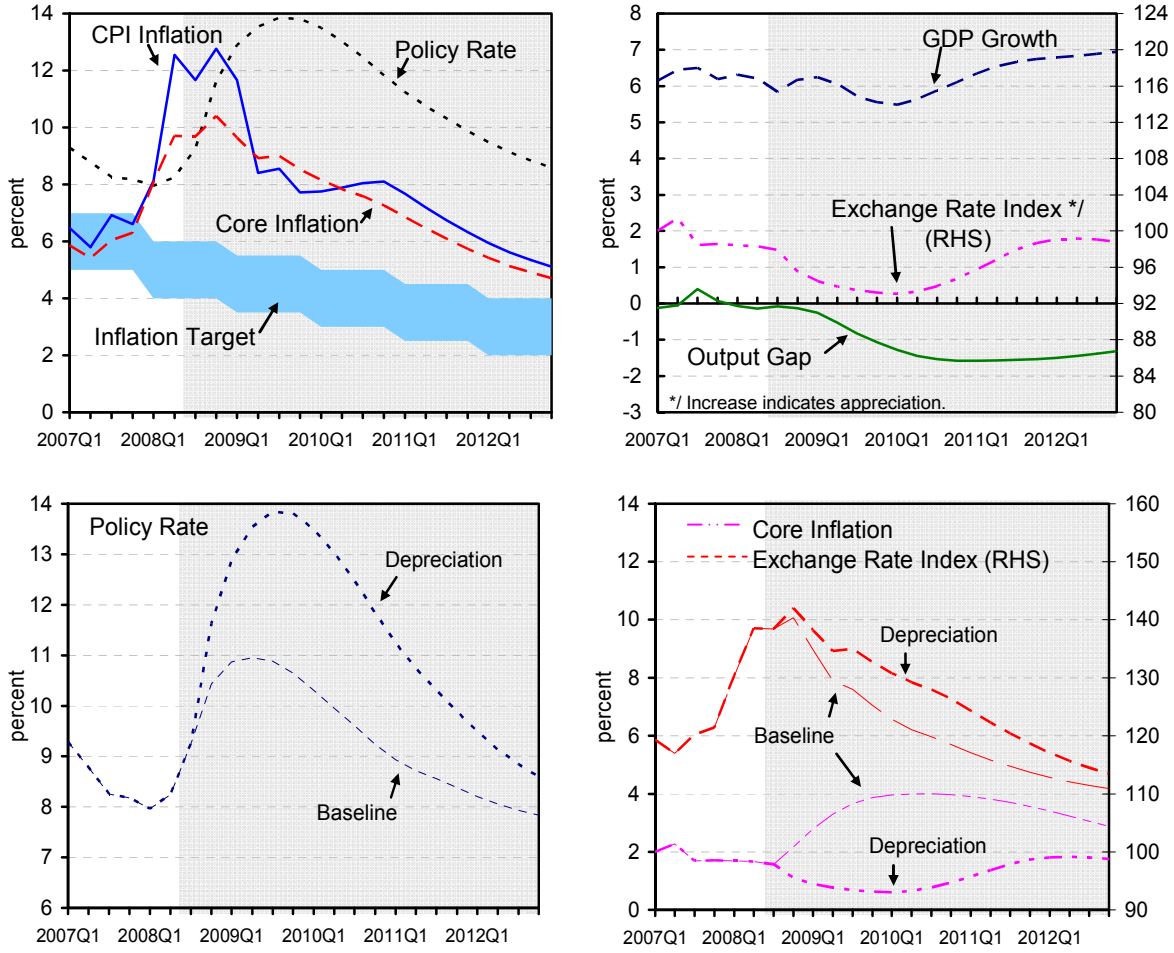


Scenario 3: Increased Risk Premium and Exchange Rate Depreciation

19. The key result of this adverse shock scenario is that a significant depreciation of the rupiah resulting from capital outflows would require an aggressive policy response. This scenario assumes a sharp increase in the required risk premium, resulting in a 15 percent depreciation relative to the baseline. To limit the pass-through to inflation and prevent sharper depreciation, policy rates would be raised by an additional 250 bps. The decisive policy action would limit the impact on inflation. However, inflation would still run about 1½ to 2 percentage points higher compared to the baseline after about one year. Output

would be slightly more volatile than under the baseline, with the initial expansionary effect of the depreciation being offset later by higher interest rates.

Figure 5. Scenario 3: Surge in Risk Premium—Exchange Rate Depreciation



E. Conclusions

20. **While the results need to be interpreted carefully, the model-based analysis can provide valuable inputs for inflation forecasting and monetary policy making.** It provides a consistent quantitative framework to analyze policy options and risks, which takes into account dynamic interactions between shocks, policy reaction, and forward-looking expectations. Moreover, it does so in a simple structural framework that can be easily interpreted. However, simplification also means that some important factors are not considered within the framework. This includes in particular a more detailed analysis of supply-side factors, the external, financial, and fiscal sectors.

21. **The baseline simulation suggests that significant monetary tightening is needed to contain inflationary pressures.** Expectations about future monetary policy play a key

role in the transmission of monetary policy, both for anchoring inflation expectations and for determining the exchange rate. While there is uncertainty about the magnitude of the needed rate hikes, the model simulations suggest an increase in the policy rate to at least 10½ percent at the peak of the cycle. This would be consistent with the estimated policy reaction function and should ensure that inflation is put back on a firmly declining path. Of course, the path and the extent of the rate increases will have to be reconsidered in line with future inflation and economic developments.

22. **Decisive action early on would have significant medium-term benefits for inflation and would create room to lower rates at an earlier stage.** An excessively slow pace of rate increases would likely result in a loss of credibility and would make achievement of the medium-term target more difficult. Moreover, it would only delay but not prevent the need for further rate hikes. On the other hand, the risk of too aggressive rate hikes seems small at this point, considering that significant rate hikes would be needed even under more benign assumptions.

23. **Key risks emanate from food prices and the external environment.** Food prices continue to pose a significant risk in the near term. However, effects should generally be short-lived and the policy reaction should thus be less aggressive. On the other hand, a sharp loss of confidence, resulting in a significantly weaker exchange rate would require a much more aggressive response.

Appendix: Model Equations and Parameters

Key Model Equations:

Phillips Curve:

$$\pi_t = \alpha_\pi \ \pi 4_{t+4} + (1-\alpha_\pi)\pi 4_{t-1} + \alpha_{ygap} \ ygap_{t-1} + \alpha_{zgap}(z_t - z_{t-1}) + \alpha_{fuel1} \ \pi\_rp\_fuel_t + \alpha_{fuel2} \ \pi\_rp\_fuel_{t-1} + \varepsilon_t^\pi$$

Phillips Curve (Core Inflation):

$$\pi c_t = \alpha_\pi \ \pi c 4_{t+4} + (1-\alpha_\pi)\pi c 4_{t-1} + \alpha_{ygap} \ ygap_{t-1} + \alpha_{zgap}(z_t - z_{t-1}) + \alpha_{headline}(\pi_t - \pi c_t) + \varepsilon_t^{\pi c}$$

IS Curve:

$$ygap_t = \beta_{ld} \ ygap_{t+1} + \beta_{lag} \ ygap_{t-1} + \beta_{US} \ ygap_t^{US} + \beta_r(i_{t-1} - \pi c_t - r_{t-1}^*) + \beta_z(z_{t-1} - z_{t-1}^*) - \beta_{fuel1} \ \pi\_rp\_fuel_t - \beta_{fuel2} \ \pi\_rp\_fuel_{t-1} + \varepsilon_t^{ygap}$$

Monetary Policy Reaction Function:

$$i_t = (1-\gamma_{lag})\left[r_t^* + \pi c 4_{t+4} + \gamma_\pi\left(\left(\tfrac{1}{2}\pi 4_{t+4} + \tfrac{1}{2}\pi c 4_{t+4}\right) - \pi_{t+4}^*\right) + \gamma_{ygap} \ ygap_t\right] + \gamma_{lag} \ i_{t-1} + \varepsilon_t^i$$

Interest Parity Condition:

$$z_t = z_{t+1}^e - \theta\left(r_t - r_t^{US} - \rho_t^*\right)/4 + \varepsilon_t^z \quad \text{with} \ \ z_{t+1}^e = \delta_{ld} \ z_{t+1} + (1-\delta_{ld})z_{t-1}$$

Fuel Price Adjustment:

$$pfuel_t = \varphi_{fuel} \ pfuel_{t-1} + (1-\varphi_{fuel})(poil_t - sub_t^*) + \varepsilon_t^{fuel}$$

Variables:

$ygap$	Output gap
$ygap^{US}$	US output gap
i	Nominal interest rate
π	Headline inflation (one quarter at annual rate)
πc	Core inflation (one quarter at annual rate)
$\pi 4$	Headline inflation (past 4 quarters)
$\pi c 4$	Core inflation (past 4 quarters)
π^*	Inflation target
r	Real interest rate

r^{US}	US real interest rate
π_rp_fuel	Rate of change of the relative price of domestic fuel
z	Real exchange rate (in logs)
z^e	Expected real exchange rate
ρ^*	Risk premium
pfuel	Domestic fuel price (in logs)
poil	Global oil price in domestic currency (in logs)
sub^*	Targeted fuel price subsidy (log difference between global and domestic price)

Key Parameters Values:

α_π	0.1841	β_{ld}	0.0761
α_{ygap}	0.2851	β_{lag}	0.6014
α_{zgap}	0.1937	β_{US}	0.1234
α_{fuel1}	0.1173	β_r	0.0827
α_{fuel2}	0.0223	β_z	0.0175
$\alpha_{headline}$	0.4110	β_{fuel1}	0.0040
γ_{lag}	0.6004	β_{fuel2}	0.0019
γ_π	1.1791	θ	0.4286
γ_{ygap}	0.3960	δ_{ld}	0.5173
φ_{fuel}	0.925	r^*	3.15

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II. Adequacy of Indonesia's Foreign Exchange Reserves[12]

A. Introduction

24. **Indonesia has seen a sharp increase in its international reserve holdings in recent years.** Reserves have increased from less than $10 billion (6 percent of GDP) in the early 1990s to $59 billion (13.5 percent of GDP) currently, with the pace of accumulation picking up in the past two years owing to current account surpluses. This trend is not unique to Indonesia. For emerging Asia as a whole, reserves have quadrupled in nominal terms since the financial crisis of 1997–98. Even excluding China, reserves have increased by 10 percentage points of GDP during the 2000–07 period (Figure 1).

25. **The recent build-up of international reserves has contributed to reduce Indonesia's vulnerabilities.** The economy is now better prepared to weather sudden capital account reversals than a decade ago and is, therefore, less vulnerable to shifts in investor sentiment. Together with moderate current account surpluses and declining domestic and external debt ratios, the high level of reserves could be a major help in maintaining financial stability during the current global credit crunch, when the possibility of capital outflows has risen significantly.

26. **Fundamentally, reserves are held to provide liquidity in case of temporary shortfalls in exports or capital inflows, and thus avoid disruptive changes in the exchange rate, or 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, Taylor (2007)).

27. **Based on such motivation, there appears to have been plenty of cause for Indonesia to have increased reserves over the past decade.** Much of the recent increase in reserves can be explained by the precautionary motive, and has paralleled the sharp expansion of trade and capital flows, as well as the increase in the volatility of gross capital flows (Table 1). These factors have increased the disruptive potential of sudden stops. In addition, accelerated financial intermediation, including the development of local bond and equity markets, has raised the stakes in case of outflows from the domestic financial system. Finally, the build-up of reserves in Indonesia was a natural response to the disruptions and the disastrous impact of the 1997–99 crises on the economic, political, and social fabric, which has understandably increased risk aversion. Thus, despite moves towards 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.

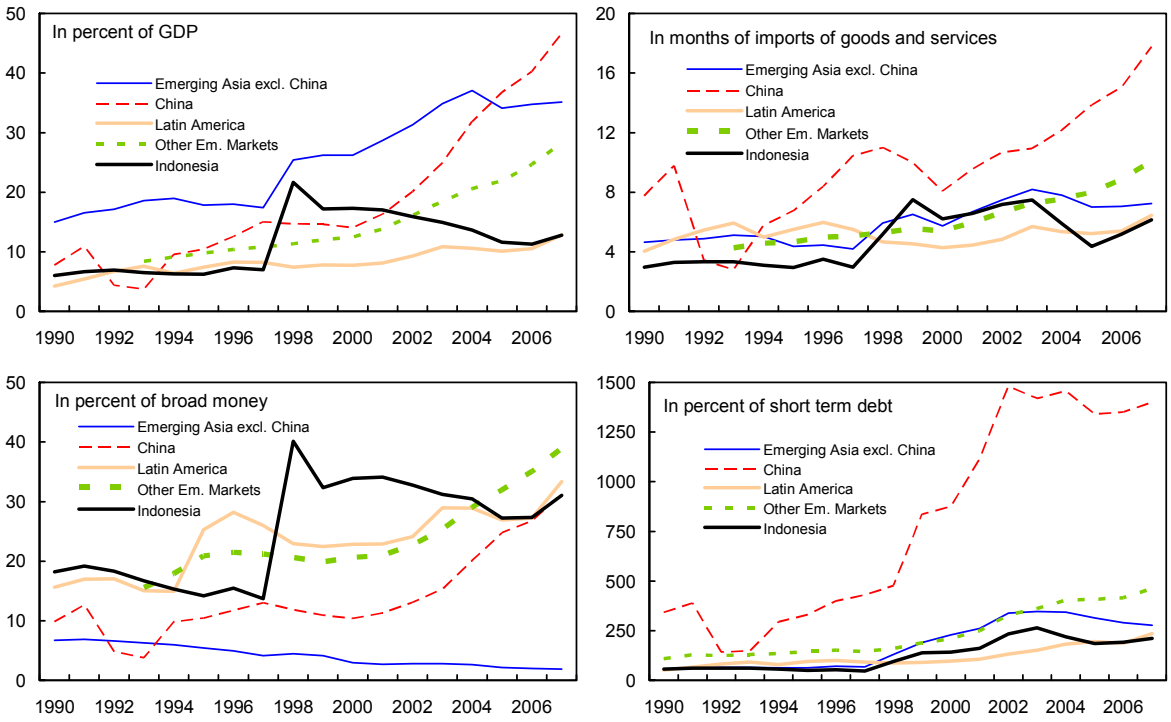
[12] Prepared by Marta Ruiz-Arranz and Milan Zavadjil (APD).

Table 1. Volatility of Capital Flows (Pre and Post the Asian Crisis)

Total Net Inflows	1986–1996	1999–2006
Indonesia	1.2	2.3
Average emerging Asia	2.3	1.1
Average emerging Europe	2.9	2.2
Average Latin America	1.3	1.0
Average Middle East & North Africa	3.1	1.6
Average all EMCs	1.8	0.9
Net FDI		
	1986–1996	1999–2006
Indonesia	0.6	1.7
Average emerging Asia	0.5	0.4
Average emerging Europe	0.8	0.9
Average Latin America	0.5	0.3
Average Middle East & North Africa	2.0	1.6
Average all EMCs	0.8	0.5
Net Portfolio	1986–1996	1999–2006
Indonesia	0.4	1.0
Average emerging Asia	1.0	0.7
Average emerging Europe	0.3	1.0
Average Latin America	0.7	0.8
Average Middle East & North Africa	0.2	0.6
Average all EMCs	0.5	0.4
Net Other Flows	1986–1996	1999–2006
Indonesia	1.5	1.5
Average emerging Asia	1.5	1.0
Average emerging Europe	2.4	2.3
Average Latin America	0.6	1.1
Average Middle East & North Africa	2.0	1.8
Average all EMCs	0.8	0.8

Sources: IMF, World Economic Outlook; and Fund staff calculations.
Note: All flows are expressed as a percent of GDP.

Figure 1. International Reserves, 1990–2007



Sources: IMF, *World Economic Outlook*; Bank for International Settlement; and Fund staff calculations.

28. **Empirical analysis suggests that while current reserves in Indonesia comfortably exceed traditional reserve adequacy levels, there is scope for some further accumulation over the medium term.** Reserves have risen sharply over the last two years and current levels are considered to be adequate by traditional standards. However, they are somewhat lower than the 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 a precautionary motive behind further reserve accumulation is reinforced. Finally, Indonesia can continue to benefit from higher reserves in terms of reduced spreads on privately held external debt.

29. **Going forward, continued reserve accumulation would make the economy more resilient from a financial stability point of view.** However, the accumulation should be at a slower pace than in 2007, which would help alleviate inflationary pressures**.** As discussed in the staff report, in the current juncture there is room for the rupiah to appreciate and support monetary policy in containing inflation. This would call for a slower pace of reserve accumulation in the short-term by recycling some of the foreign exchange proceeds from oil exports. Nevertheless, from a medium-term perspective, a larger buffer of international reserves would help build resilience in the event of sizeable reversal of capital flows.

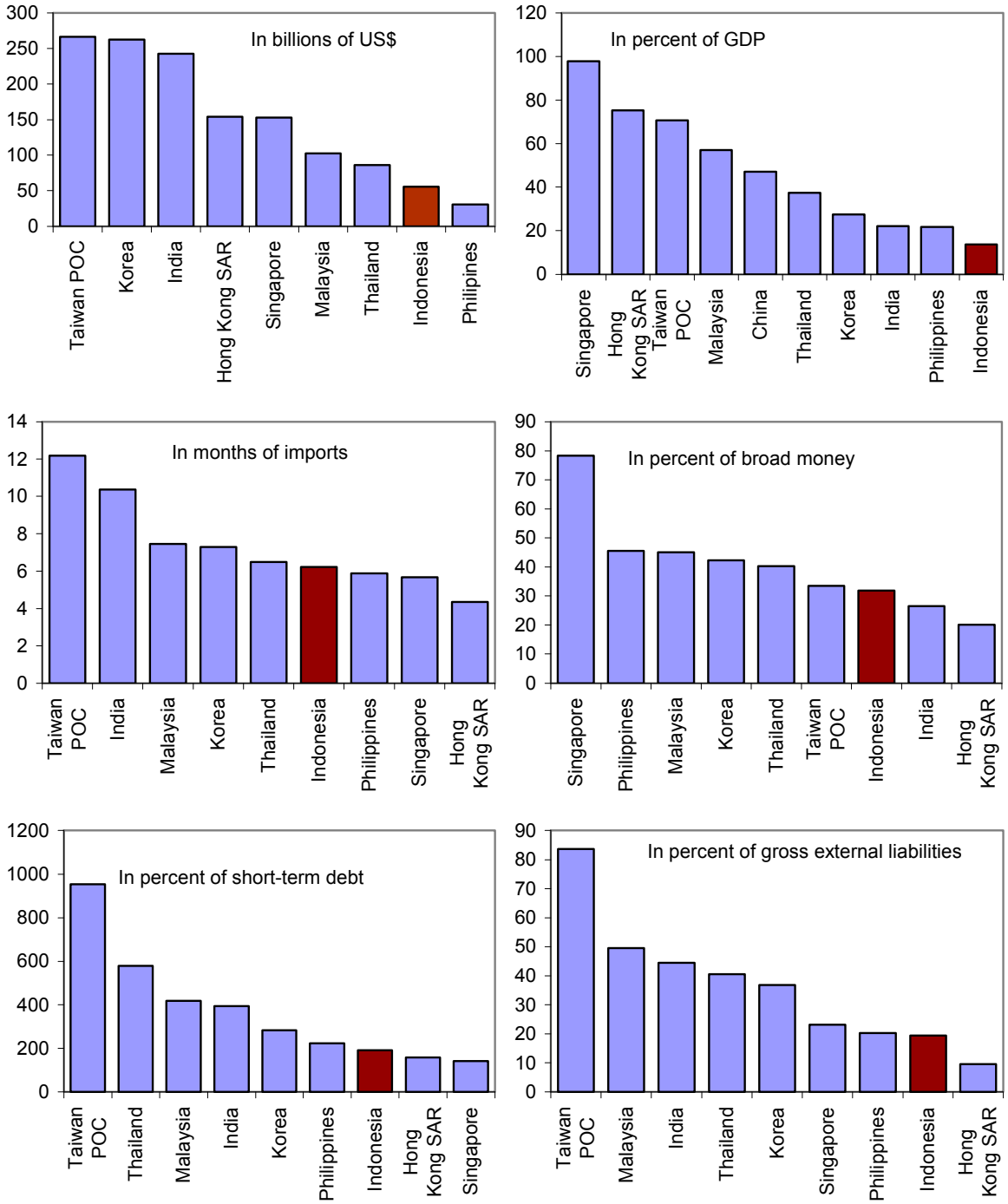
B. Developments in Reserve Adequacy Indicators

30. **Indonesia's reserves are high relative to traditional reserve adequacy indicators, but not relative to emerging Asia.** At the end of 2007, reserves covered six months of imports of goods and services, twice the traditional benchmark of three months of imports and the 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), and Indonesia's reserve level was also above the Wjinholds and Kapteyn (2001) recommended holding of 5–20 percent of broad money (Figure 2).[13]

31. **While Indonesia's reserve adequacy indicators continue to increase, those in emerging Asia (excluding China) have begun to moderate, reflecting the acceleration in global trade and capital flows over the past few years.** Despite the phenomenal increase of reserves in dollar terms, most reserve adequacy ratios in Asia (excluding China) have stabilized or declined modestly starting in 2003–04 and they are not out of line with other emerging markets. Albeit high, the ratios of reserves to imports, to short-term debt and to broad money are only modestly higher than South America's, but lower than the average for other emerging markets (Europe and the Middle East). The moderation in the pace of accumulation in some Asian economies with very high ratios along with the rapid growth in those countries with relatively lower reserves, such as Indonesia and Philippines, has resulted in some convergence (Figure 1).

[13] This is using debt at remaining maturity. The ratio of reserves to short-term debt with an original maturity of less than one year is about 150 percent.

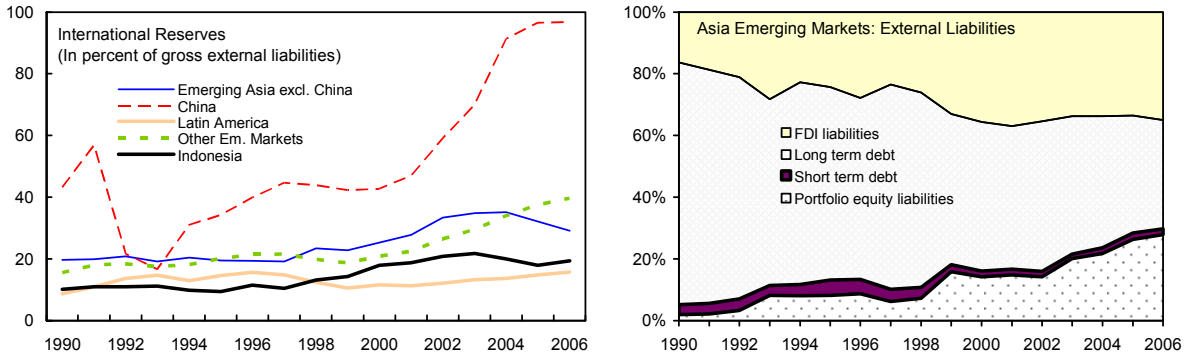
Figure 2. Indonesia: Reserve Adequacy Indicators Relative to Other Asian Countries, 2007



Sources: CEIC Data Co.Ltd; Milessi-Ferreti database; and Fund staff estimates.
Note: Taiwan POC stands for Taiwan Province of China.

32. **Reserves in Indonesia are not seen excessive against historical levels given the size of gross liabilities and the increased volatility of gross flows.** The very high levels of the traditional reserve indicators overstate the extent to which Indonesia is insured against sudden stops, especially in view of the sharp increase in portfolio and direct investment flows (Box 1). Reserves currently cover less than 20 percent of external liabilities in Indonesia compared to about one-third in emerging Asia (excluding China) (Figure 3).[14] Reflecting greater real and financial integration with the global economy, cross-border capital flows in emerging Asia—both in and out—have grown sharply over the past decade, resulting in a build-up 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 has since eased. In addition to the increase in size, the volatility of gross capital flows has risen (APD Regional Economic Outlook, September 2007, Table 1).

Figure 3. International Reserves and External Liabilities



Sources: IMF, *World Economic Outlook*; Milesi-Ferretti data; and Fund staff calculations.

[14] Data from Lane and Milesi-Feretti (2007).

Box 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 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 reflected in part the nature of the crisis in Asia and elsewhere in the 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 type of currency and maturity mismatches and was indeed a good predictor of crisis.

Capital flows to non-emerging Asia have evolved considerably since the crisis of the 1990s. The share of debt, including short-term debt, has decreased (Figure 3). Moreover, portfolio flows have proved to be the most volatile form of capital flow, and the volatility of both gross inflows and outflows has risen sharply since 2000. Indeed, in Indonesia recent episodes of global risk aversion such as May–June 2006 or August 2007 have been most felt in domestic bond and equity markets which have been volatile in many economies. While somewhat more stable, the volatility of direct investment flows has also increased (Asia and Pacific Regional Outlook, IMF, September 2007, Table 1). 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 build-up is captured by looking at the overall liability position.

Of course, it is not suggested that reserves need to cover external liabilities entirely, as in the case of the Greenspan-Guidotti rule. The appropriate coverage adequacy ratio should clearly be lower for some components (FDI, portfolio equity) than for others (short-term debt).

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

C. An Insurance Model of Optimal Reserves

33. **In assessing the appropriateness of current reserves levels, it is useful to analyze how the recent build-up of reserves compares to what would be implied by 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 reserve assets entails an opportunity cost equal to the difference between the return on capital and 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.[15]

34. **The model is calibrated on economy-specific data for the emerging market economies in Asia, including Indonesia, and results compared with actual levels of reserves at the end of 2007.**

- ***Estimating Output Loss***. The Asian crisis provides a useful benchmark to assess the size of the output loss in the event of a sudden stop in capital flows. The cost in terms of 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.[16] Results suggest that the cumulative output loss for the six Asian economies most affected by the crisis was 19 percent of GDP on average (Table 2). This was significantly higher in the case of Indonesia and Thailand, where the cumulative cost amounted to around 30 percent of GDP. These estimates may, however, underestimate the total output loss of the Asian crisis if the recession lowered the level of output permanently, rather than being a temporary deviation from trend.[17] The exercise in this paper 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.

[15] The model is explained in more detailed in the Appendix.

[16] Results are robust to using averages corresponding to different time periods. The real GDP series are detrended with a Hodrik Prescott filter.

[17] Cerra and others (2005) finds 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 the case of 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.

Table 2. Output Loss in Asian Crisis

	Average Growth	Difference between actual growth and average growth			Cumulative output loss
	1970–1996 1/	1997	1988	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	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*

1/ Real GDP series have been detrended using Hodrik Prescott filter. Results are robust to different time period averages.

- ***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.[18] 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 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. In the case of Indonesia, this is estimated to be around 6.5 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 10 percent of GDP. Nevertheless, it is worth noting that the potential size of capital flight in Indonesia could be significantly larger than 6.5 percent of GDP, as gross external liabilities exceed 50 percent of GDP. As discussed in Box 1, total foreign liabilities could capture Indonesia's vulnerability to reversals in capital flows better than short-term debt.

[18] Jeanne identifies sudden stops as those years in which net capital inflows fell by more than 5 percent of GDP.

- ***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 absence of a broad consensus over how to best capture this cost, several measures have been used in the literature. The baseline scenario in this paper assumes the opportunity cost of reserves is equal to the interest spread on foreign debt.[19] 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 n liquid foreign assets to finance the purchase of reserves. This is proxied by the sovereign risk premium (as measured by EMBI or the 10-year government bond spreads). As shown in Table 3, sovereign interest rate spreads for foreign debt have averaged less than 4 percent during 2007 in emerging Asia, and in some economies the risk premia has been negative. In Indonesia, EMBI spreads averaged slightly less than 200 bp. Nevertheless, it is worth noting that borrowing costs have increased in 2008 and EMBI spreads recently reached 400 bp. Furthermore, an alternative method of computing the opportunity cost of reserves, namely the fiscal cost of sterilizing reserves, suggests that the opportunity cost could be larger. In particular, the difference between the policy rate and the yield on the 1-year U.S. Treasury bill averaged 4.5 percent in 2007 and this spread has widened in 2008 (Table 4).

Table 3. Interest Rate Spreads (basis points) 1/

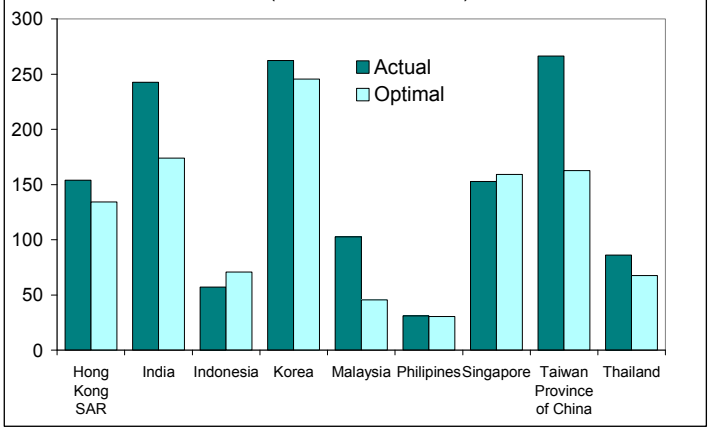
Hong Kong SAR	-44
India	332
Indonesia	197
Korea	73
Malaysia	87
Philippines	178
Singapore	-175
Taiwan Province of China	-230
Thailand	-4

1/ Average for 2007.

2/ EMBI spreads for Indonesia, Malaysia, Philippines. Ten-year government bond spreads for others.

35. **The findings of the paper suggest that a simple insurance model performs relatively well in explaining the stock of reserves in Indonesia.** By mitigating the potentially large welfare costs of crises, reserves provide benefits in terms of insurance than more than compensates Indonesia for the opportunity cost of holding liquid assets. The reserve accumulation observed so far reflects largely this favorable trade-off, which continues

Figure 4. The Optimal Level of International Reserves, 2007
(In billions U.S. dollar)



[19] Rodrik (2006), Levy Yeyati (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.

to exist even at the current high level of reserves. This is in contrast with some other countries in Asia, where according to the simple insurance model, this trade-off is less favorable or appears to have been exhausted (Figure 4).

Table 4. Estimated Sterilization Financing Costs 1/

	Domestic Financing Costs (Sterilization Rate)	Net Carry (Interest on Foreign Reserves Minus Sterelization Rate) 2/	Carry Income on Total Reserves (% GDP) 3/
India	6.00	-2.66	-0.7
Indonesia	8.00	-4.66	-0.6
Korea	5.00	-1.66	-0.5
Malaysia	3.50	-0.16	-0.1
Philippines	5.25	-1.91	-0.4
Singapore	0.98	2.36	2.5
Taiwan Province of China	3.38	-0.04	0.0
Hong Kong SAR	5.75	-2.41	-1.8
Thailand	3.25	0.09	0.0

Sources: Country authorities; IMF, *APDCORE* database and *World Economic Outlook*; Fund staff calculations.
1/ As of December 2007.
2/ The rate on foreign reserve holdings is assumed to be the yield on the one-year U.S. Treasury note (3.34 percent at the end of 2007).

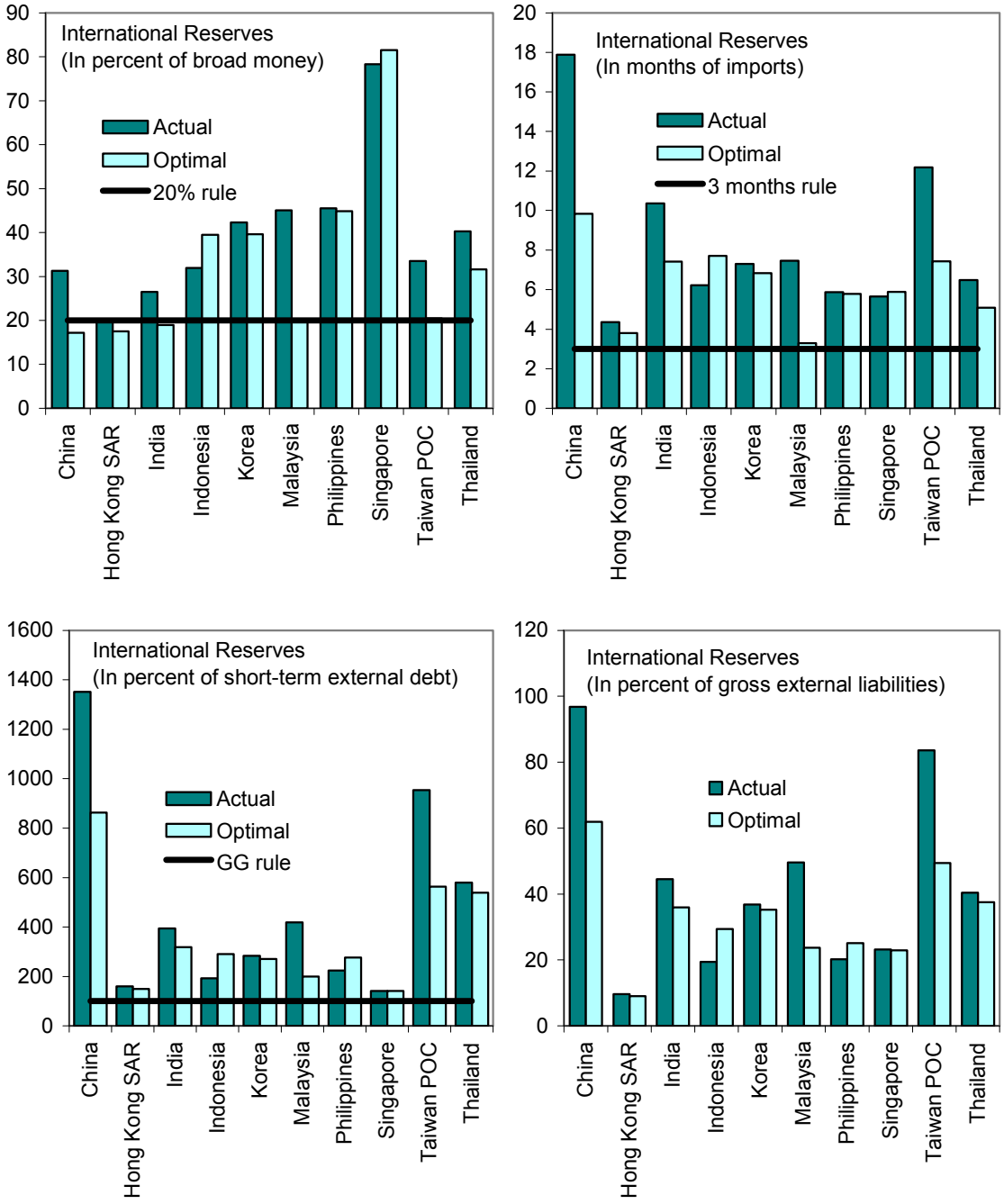
36. **The current level of reserves in Indonesia seems to be modestly lower than predicted by the model.** As discussed in the staff report, current reserve levels are comfortable and have contributed to reduce vulnerabilities in the past few years. At the same time, in the current juncture there appears to be room for the exchange rate to appreciate and support monetary policy in containing inflation, which would call for a slower pace of reserve accumulation in the near-term by recycling some of the oil proceeds. Furthermore, the use of reserves to smooth volatility in face of the current financial market turmoil appears appropriate and justifies the reserve accumulation. Nevertheless, from a medium-term perspective, a somewhat larger buffer of international reserves is desirable to continue to build resilience in the event of sizeable reversal of capital flows. The model suggests that a further build-up of USD10–15 billion over the medium-term would be desirable. However, these estimates should be interpreted with caution as the model is sensitive to the assumptions used and should therefore be only one input in determining adequate reserve levels.

37. **It is worth noting that optimal reserve adequacy ratios predicted by the model are above the standard rules of thumb.** Optimal ratios estimated by the model for Indonesia are above 7 months of imports, more than twice as large as the traditional benchmark. With regards short-term external debt, Indonesia' estimated optimal reserve level

is also above the 100 percent Greenspan-Guidotti rule. Similarly, the estimated optimal level of reserves to broad money is around 40 percent, above the 5–20 percent range usually proposed in the literature (Figure 5). This is also the case for other countries in Asia, which suggests that the traditional rules of thumb may no longer be relevant and that economy-specific indicators that take into account economy-specific vulnerabilities and opportunity costs may be preferable to standardized rules.

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

Figure 5. The Optimal Level of International Reserves and Traditional Reserve Adequacy Indicators



Sources: IMF, *World Economic Outlook,* Milessi-Feretti data; BIS; and Fund staff calculations.
Note: Taiwan POC stands for Taiwan Province of China.

D. A Threshold Model of Spreads-Reserves Elasticity

39. **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, this would increase the desired level of reserve holdings. Reserve 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 how significant this "prevention" effect is and whether current reserve levels can be justified in terms of the benefits of reduced borrowing costs.

40. **We estimate 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, we look for a non-linear relation between spreads and international reserves applying threshold estimation as in Hansen (1996, 2000). By applying this methodology, we can endogenously determine the threshold level(s) of reserves (and confidence intervals) at which the relation between reserves and spreads changes. In particular, these threshold levels will provide information about the maximum level of reserves where no further gains from lower spreads could be realized. We will then be able to compare them with the optimal levels found in the previous section as well as with the traditional rules of thumb.

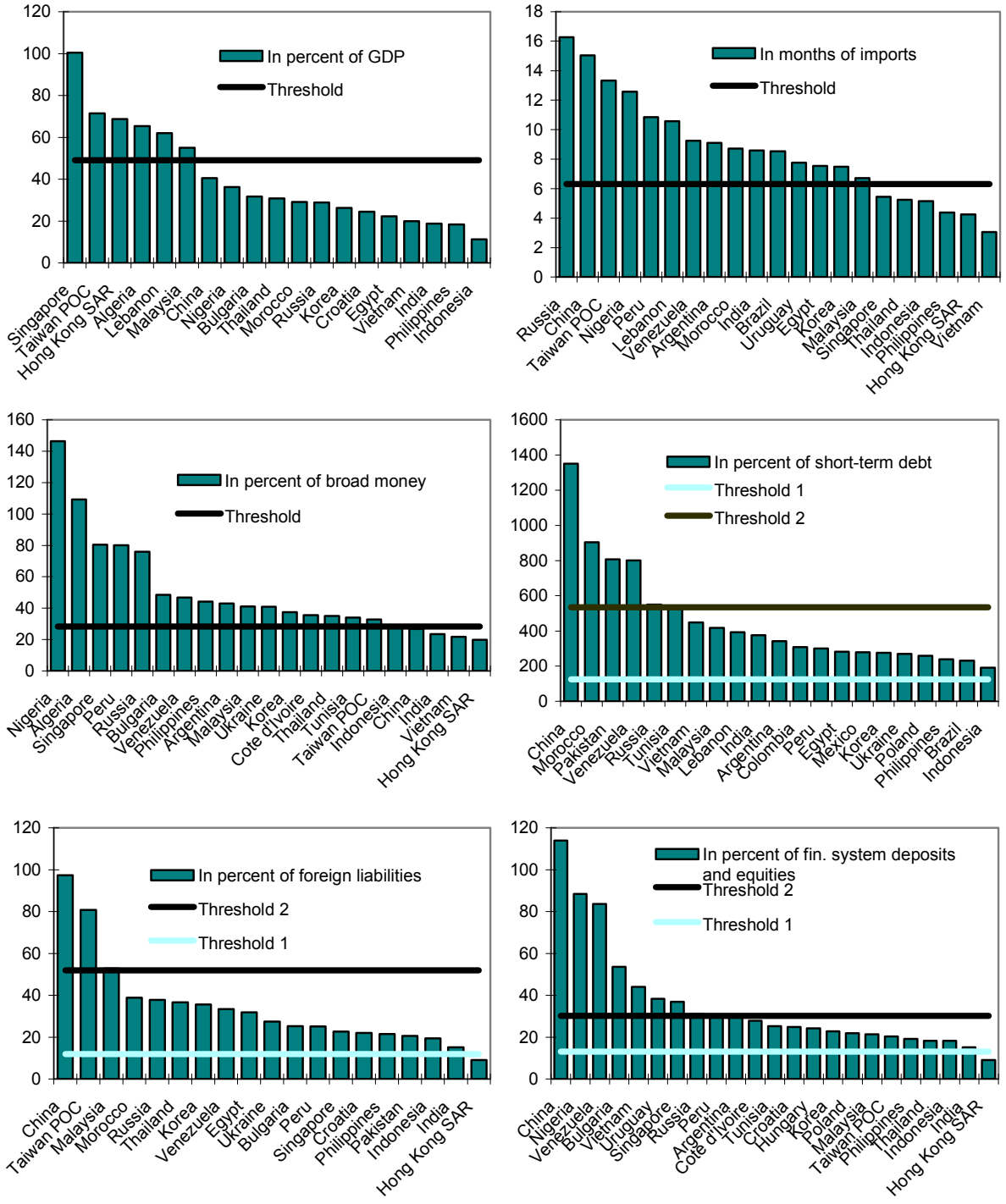
41. **Threshold estimation takes the form:**

$$S_{it} = \beta_1' X_{it-1} + \beta_2 R_{it-1} + \varepsilon_{it} \qquad \mathrm{R}_{it-1} \le \gamma$$

$$S_{it} = \alpha_1' X_{it-1} + \alpha_2 R_{it-1} + \varepsilon_{it} \qquad R_{it-1} > \gamma$$

where S is J.P. Morgan's EMBI spreads; R is a reserve ratio indicator, which is used both as a regressor and as the threshold variable that splits the sample into two groups; γ is the endogenously determined threshold level; and X is a vector of control variables. The vector of control variables includes: (i) two exogenous global factors: the international risk-free asset (proxied by the 10-year U.S. Treasury rate) and global risk aversion (proxied by the Credit Swiss First Boston's High Yield spread); and (ii) the country's GDP growth rate and the 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 the Appendix.

Figure 6. International Reserves and Treshold Estimates



Sources: IMF WEO; Milesi-Feretti data; BIS, and Fund staff calculations.
Note: Taiwan POC stands for Taiwan Province of China.

42. **The objective of the analysis is to estimate the threshold level beyond which the marginal impact of reserves on spreads stops being significant.** If needed, we perform multiple threshold regressions proceeding in a sequential way. First, we fit a threshold model to the data to estimate a first reserve ratio threshold level and the least square coefficients of each subsample. We compute confidence intervals for the parameters, including the reserve threshold coefficient, and provide an asymptotic simulation test 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 we find evidence of a first threshold, we proceed to the second stage (provided the number of observations allows doing so): drop the subsample below the threshold and repeat the procedure just described but applying it to the rest of the sample in search for a second threshold. This allows us to compute estimates for the two remaining sub-samples and test the null hypothesis of no second reserve threshold.

43. **Results suggest that holding reserves has a significant impact in reducing borrowing spreads and this effect continues to be important even at relative high levels of reserves**. The elasticity of spreads with respect to reserves is estimated between 30 and 50 percent, depending on the adequacy ratio employed. That is, a 1 percent increase in the reserve ratio leads to a 0.3–0.5 percent decline in spreads. The estimated thresholds beyond which there are no gains in holding reserves in terms of reduced cost of borrowing are significantly above the levels implied by the standard rules of thumb and closer to the optimal reserve 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 reserve 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 reserve adequacy indicators are presented in Tables 5–7.

44. **Indonesia could benefit from higher reserves in terms of reduced borrowing costs.** The analysis shows that the Indonesia's current level of reserves is below the threshold estimates, suggesting that additional reserve accumulation continues to have a positive impact in reducing spreads (Figure 6). Results suggest that this benefit could be somewhat larger for Indonesia than for other emerging market countries with relatively higher reserve holdings. This exercise is likely to provide a lower bound estimate of the benefits of reserves in terms of lower financing costs, since it does not incorporate similar gains in the private sector. This is particularly relevant in the current context, where borrowing costs for corporations have increased significantly with tighter global liquidity.

45. **Finally, a word of caution regards 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 that there is uncertainty regarding their true values.

Table 5. Thresholds in the spreads-reserves relation

Reserves to	Threshold 1		Threshold 2		Reserve Adequacy Benchmark
	Estimate	Confidence interval	Estimate	Confidence interval	
GDP 1/	49	[23, 51]	...	...	...
Months of imports 2/	6	[2, 9]	...	...	3
Broad money 2/	28	[6, 85]	...	...	5–20
Short-term debt 2/	125	[112, 692]	534	[534, 535]	100
Foreign liabilities 3/	12	[12, 12.4]	52	[52, 66]	...
Fin. system deposits and equities 3/	13	[12, 14]	30	[14, 40]	...

1/ The marginal impact of reserves is negative and significant below threshold 1; there are insufficient observations to estimate the impact above the threshold.
2/ The marginal impact is negative below threshold 1 and not significant above the threshold.
3/ The marginal impact is not significant below threshold 1, negative between threshold 1 and 2, and insignificant above threshold 2.

E. Conclusions

46. **In assessing reserve adequacy in Indonesia, the empirical analysis concludes that current reserve levels are comfortable, but there is scope for some further accumulation over the medium-term.** While the estimates are sensitive to parameters and assumptions, the study suggests that current reserve levels are likely somewhat below the level predicted by a simple model of optimal reserves, suggesting that some accumulation over the medium-term could help continue reducing vulnerabilities. Furthermore, reserve accumulation continues to have a positive impact in reducing borrowing cost for both the government and the private sector.

47. **Finally, continued reserved accumulation would make the economy more resilient from a financial stability point of view.** However, the accumulation should be at a slower pace than in 2007, which would also help alleviate inflationary pressures. As discussed in the staff report, the current policy of recycling some of the proceeds from oil exports while safeguarding international reserves is appropriate.

Table 6. Threshold estimates of the elasticity of EMBI spreads with respect to international reserves
Traditional indicators

	GDP	Months of Imports		Broad Money		Short term debt		
Thresholds	< 49	< 6.3	> 6.3	< 28.3	> 28.3	< 125	[125, 534]	> 534
Spreads-reserves elasticity	-0.425***	-0.329***	-0.004	-0.463***	0.167	-0.31	-0.311*	-0.531
	(0.11)	(0.12)	(0.37)	(0.17)	(0.25)	(0.20)	(0.19)	(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

Note: Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7. Threshold estimates of the elasticity of EMBI spreads with respect to international reserves.
New indicators

	Total foreign liabilities			Financial system deposities and equities		
Thresholds	< 12	[12, 52]	> 52	< 13	[13, 30]	> 30
Spreads-reserves elasticity	-0.13	-0.419**	-0.253	0.035	-0.609*	0.259
	(0.15)	(0.19)	(0.71)	(0.18)	(0.32)	(0.24)
Observations	82	182	12	47	132	74
R-squared	0.33	0.6	0.77	0.46	0.49	0.6

Note: Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

APPENDIX

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:

$$Loss = \delta R + \pi f(R)$$

where δ is the opportunity cost of reserves; R is the reserve holdings; π is the probability of a crisis or sudden stop; and *f(.)* is the welfare cost of a crisis, which is increasing in the size of the sudden stop and the output loss (L and ΔY). Assuming constant risk aversion (σ) 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.[20]

Data for the Threshold Estimation

Table A1. Variable definitions and sources

Variable	Description	Source
Spread	JP Morgan EMBI spread in bps	Bloomberg, Datastream
10Y US T-bond	US 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 maturing withing one year	BIS
Foreign external liabilities	Gross external liabilities	Milessi-Feretti IIP Database
Fin. System deposits and equity	Total deposits and market capitalization	World Bank

[20] Risk aversion is assumed to be equal to 2, in line with the previous literature.

Table A2. Summary statistics

	Obs	Mean	Std. Dev.	Min	Max
Sovereign spread	320	514.9	823.8	-260.9	6182.0
US 10Y 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	2101.7
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	7530.8
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 fin. system deposits and equities	248	28.5	22.2	1.6	113.9

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III. CORPORATE FINANCING PATTERNS IN INDONESIA: CHALLENGES AMID CHANGING FINANCIAL CONDITIONS[21]

In parallel with a continuous reduction of leverage between 2000 and 2007, Indonesian firms have diversified their sources of funding. The paper finds that corporate leverage in Indonesia is in large part driven by market conditions, such as market-to-book value and profitability, though the legacy of the crisis still persists. Indonesian companies may now face new challenges in light of increased financing needs to support the expansion of their productive capacity, including higher financing costs as a result of volatile global financial conditions and appropriate risk management of emerging vulnerabilities.[22]

A. Background

48. **The 1997 financial crisis left important lessons regarding corporate financing.** Prior to the 1997 financial crisis, large corporate borrowing in Indonesia spurred high growth rates, with corporate groups linked to banks borrowing beyond what was economically justified. Poor risk management in firms and banks explained widespread maturity and currency mismatches. Once the crisis erupted, the impact on the cost of borrowing for the corporate sector was substantial, and serious corporate governance shortcomings compromised firms' access to bank financing in the years after the crisis (see Morales and Widyastuti, 2006). As a result, private investment and economic activity plummeted, and the ensuing increase in nonperforming loans put the financial sector at risk.

49. **Following a period of consolidation, corporate leverage in Indonesia has declined sharply while companies have diversified their sources of financing.** The debt to assets ratio has declined by about 30 percentage points since 2000, and bond and equity financing have become more important with the development of securities markets in Indonesia. In addition, the institutional framework for financial intermediation was strengthened, and this has helped improve prudential practices in the allocation of credit. Also, despite sustained de-leveraging by the corporate sector, the ratio of investment to GDP has recovered in the last three years consistent with an increase of capital expenditure to fixed assets by corporates, although it is still below the level observed before the crisis. At the same time, banks have

[21] Prepared by R. Armando Morales (APD) with the excellent research assistance of Edo Mahendra (IMF Jakarta Office) and Wiwit Widyastuti (Bank Indonesia). We thank participants in two seminars organized by the Centre for Strategic and International Studies and Bank Indonesia, respectively, for useful comments and suggestions.

[22] In this paper corporate financing is defined as the sum of equity, debt and other liabilities by which a firm or group of firms finance their assets (equivalent to the term "capital structure" often used in the literature). Corporate leverage is defined as the ratio of debt to total financing, and de-leveraging as a process of reduction in leverage ratios.

also diversified their loan portfolios, as evidenced by the stabilization of the share of corporate loans in total bank loans (Figure 1).[23]

50. **Corporate financing lies at the heart of macro-financial links.** Decisions about the timing and size of investment are influenced by financing conditions, with implications for production and employment. Corporate financing decisions have implications for monetary policy as well, as the transmission mechanism depends on the financing behavior and balance sheet structures of firms. As evidenced by the Asian crisis, the corporate sector can play an important role in transmitting financial shocks to the economy. This is particularly relevant at the current juncture, where turmoil in global financial markets could greatly affect the financing conditions for the Indonesian corporate sector.

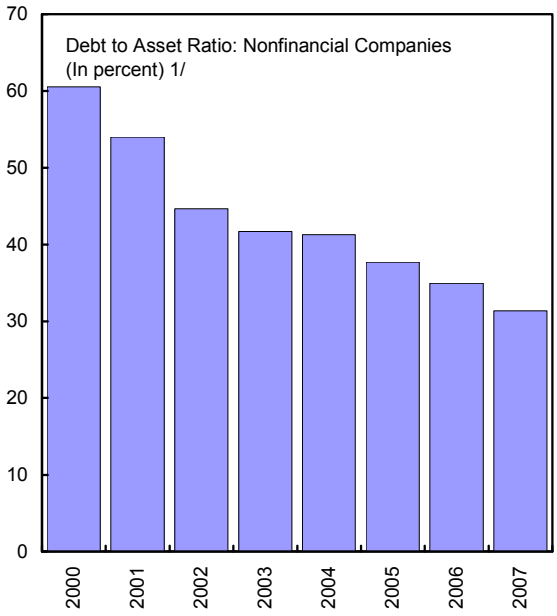
51. **In this context, this paper provides and overview of recent financing trends of the non-financial corporate sector in Indonesia and highlights main challenges and vulnerabilities going forward.** In particular, the paper addresses the following questions: (1) is corporate financing in Indonesia still affected by the legacy of the 1997 crisis?; (2) What will be the main drivers of corporate leverage going forward?; and (3) What are the main challenges arising from the current global and domestic financial conditions, given Indonesia's corporate financing structure? In attempting to answer these questions, the paper aims to identify the implications of the firms' capital structure for financial stability, macro-financial policies, and the investment outlook. Information from nonfinancial companies listed in the stock exchange is used to analyze recent trends. Also, in order to identify the determinants of corporate financing decisions, the paper estimates standard models from the corporate finance literature.

52. **The paper concludes that balance sheet vulnerabilities of the Indonesian corporate sector have been reduced over the last decade, but increased exposure to external sources of funding makes firms vulnerable to global financial market conditions.** The capital structure of Indonesian firms has improved with the sharp decline in indebtedness and increased exposure to non-bank funding sources. Furthermore, firms do not appear to face financing constraints, as evidenced by their increased profitability, and their financing decisions do not seem to differ significantly from those in other emerging market countries. In contrast with the Asian crisis period, current leverage ratios in Indonesia can be largely explained by profitability indicators as well as measures of growth prospects and investment opportunities. Going forward, continued diversification of funding sources and further development of the domestic bond market could help reduce vulnerabilities from increased exposure to foreign financing as well as from spillover from the global financial market turmoil.

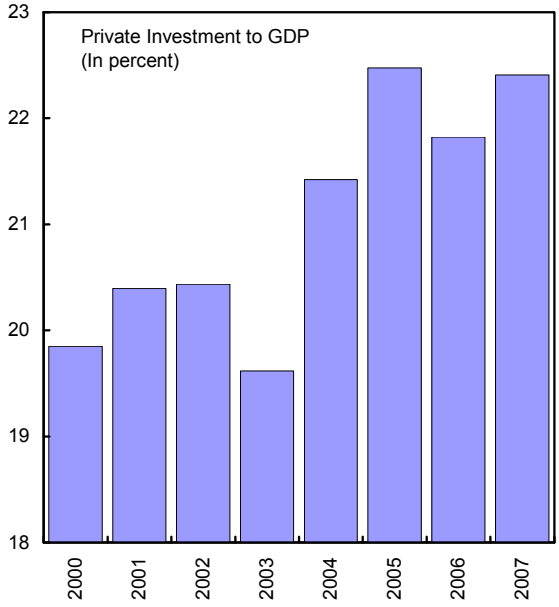
[23] Investment is limited by factors such as legal uncertainty, costly labor legislation, and inconsistent regulatory framework.

Figure 1. Indonesia: Corporate Leverage and Private Investment

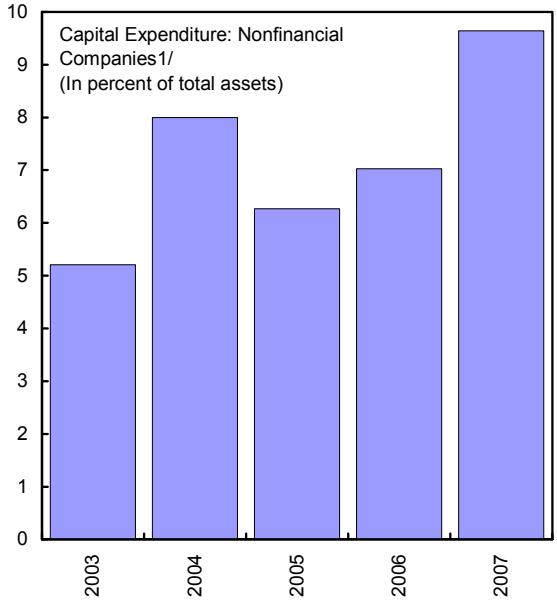
Corporate leverage has declined overtime...



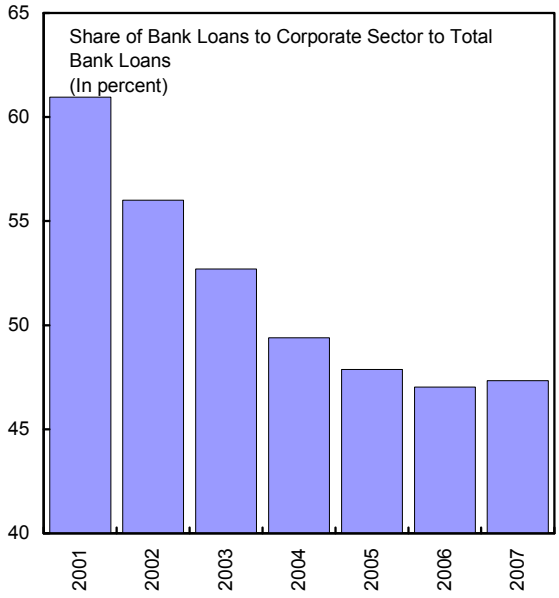
...while private investment has recovered...



...in line with higher capital expenditure.



At the same time, banks' exposure to corporate loans has stabilized.



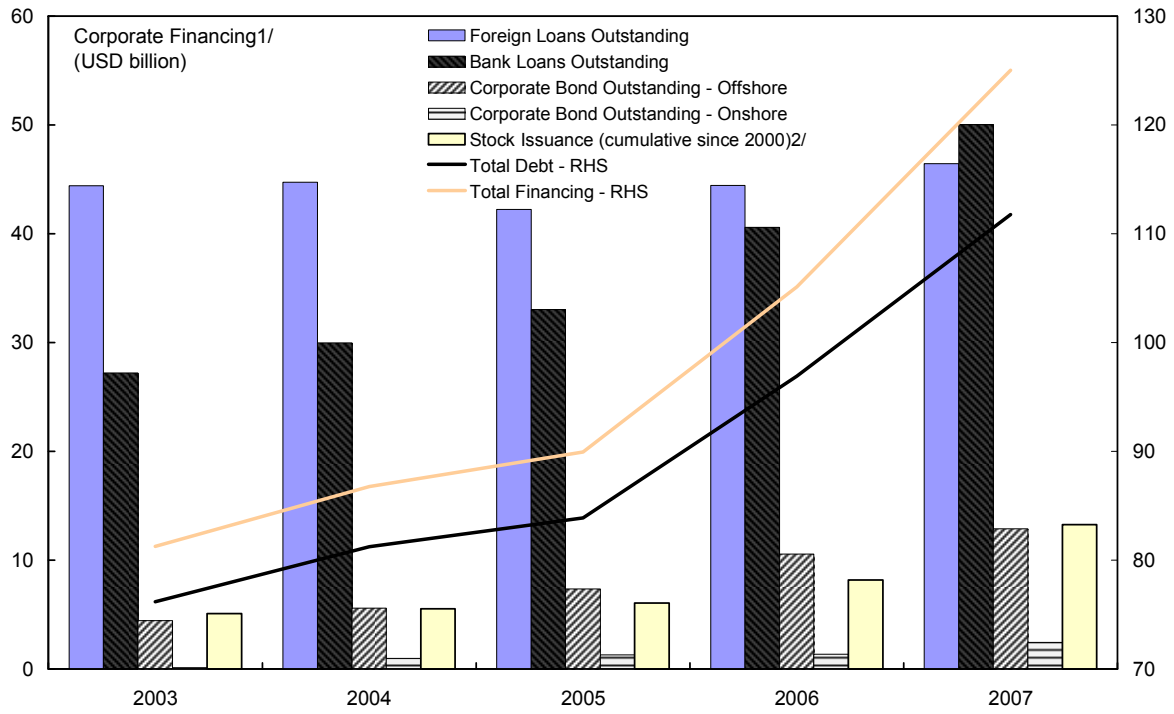
Sources: Thompson One; and Indonesian authorities.
1/ 2007 observation only includes 59 listed nonfinancial companies.

B. Corporate Financing in Indonesia

Evolution of Capital Structure

53. **The nonfinancial corporate sector in Indonesia has diversified its sources of financing over time.** Total identified sources of corporate financing (including foreign loans, bank loans, corporate bonds issued onshore and offshore, and public equity issuance) were equivalent to about 30 percent of GDP in 2007. Corporate debt —i.e., total financing minus cumulative equity financing— reached about US$110 billion in 2007 or 28 percent of GDP.[24] Figure 2 shows corporate debt growing at a slower pace than total corporate financing, especially in the last two years, consistent with de-leveraging. Additional attributes of the nonfinancial corporate capital structure in Indonesia are the following:

Figure 2. Indonesia: Composition of Financing - Nonfinancial Corporate Sector



Sources: Indonesia Stock Exchange; Bank Indonesia; and Dealogic.
1/ Nonfinancial corporate sector financing, excluding retained earnings and companies to companies borrowing.
2/ Includes financial corporations.

[24] The magnitude of nonfinancial corporate financing reported in this paper is an approximation based on available information. Reasons why the actual financing may differ from this approximation are: (i) information on self-financing and capital injection by shareholders in non-listed firms is not available; (ii) reported equity financing includes issuance by financial and nonfinancial firms; (iii) information on cumulative equity issuance starts from 2000 to show the evolution of equity financing following the crisis; and (iv) although the bulk of company-to-company loans should cancel out for the nonfinancial corporate sector as a whole, some liabilities to foreign companies may not be included in the other categories.

- **Foreign financing is a significant source of corporate financing.** Although foreign loans to nonfinancial firms reported to Bank Indonesia have increased at an average growth rate of just 1 percent between 2003 and 2007, once corporate bonds issued offshore (not included in BI's data) are incorporated into the total, the share of foreign financing exceeds 47 percent in 2007.

- **Domestic bank loans to the corporate sector have accelerated in recent years.** In US$ terms, the value of bank loans reported by Bank Indonesia increased by 17 percent annually on average between 2003 and 2007, after having declined drastically following the Asian crisis. Specifically, banks reluctance to lend to some segments of the corporate sector led to a reduction of 60 percent of bank loans to the corporate sector between 1997 and 2003. In 2007, bank lending to the corporate sector reached 40 percent of total corporate financing, up from 34 percent in 2003.

- **Equity issuance has been encouraged by rising stock prices.** Cumulative equity issuance since 2000 has reached an equivalent of 10 percent of total financing in 2007, increasing more than twofold in the last four years. In the same period, the Jakarta Stock Price Index (IHSG) increased four times, with stock market capitalization reaching 50 percent of GDP in 2007, compared with 23 percent in 2003.

- **Nonfinancial corporations show a strong preference for issuing corporate bonds offshore.** Corporate groups with access to foreign financing find that offshore bond issuance allows them to benefit from access to a larger pool of investors, lower intermediation costs and tax advantages relative to bonds issued domestically.[25] In 2007, offshore bonds were equivalent to 10 percent of total corporate financing, five times more than the share of onshore bonds. However, onshore bond issuance reached record levels in 2007, showing a substantial growth relative to preceding years (Figure 3).

C. Debt Financing vs. Equity Financing

54. **In general, borrowing seems to complement, rather than substitute for, increases in equity.** This is consistent with the simultaneous process of de-leveraging and asset expansion reported above. After the crisis, reductions in leverage resulted from debt-equity conversion operations associated with corporate debt restructuring up to 2001. After that

[25] Tax treatment is more favorable in Hong Kong SAR, Malaysia, and Singapore.

period, additional corporate borrowing has been accompanied first by resort to retained earnings and later by increasing equity issuance.[26]

55. **Equity issuance remains moderate and concentrated in a small number of firms.** Annual issuance was equivalent to just 4.4 percent of annual trading value in 2007 compared to 11.2 percent in 2003 (also because trading has increased in line with higher expected profitability). Dominant shareholders usually resort to "rights issuance" when issuing equity, by which existing shareholders keep the first preference to buy additional shares or sell the right to third parties. Rights issuance has been equivalent to around 60 percent of total equity issuance in the last four years (Figure 4).

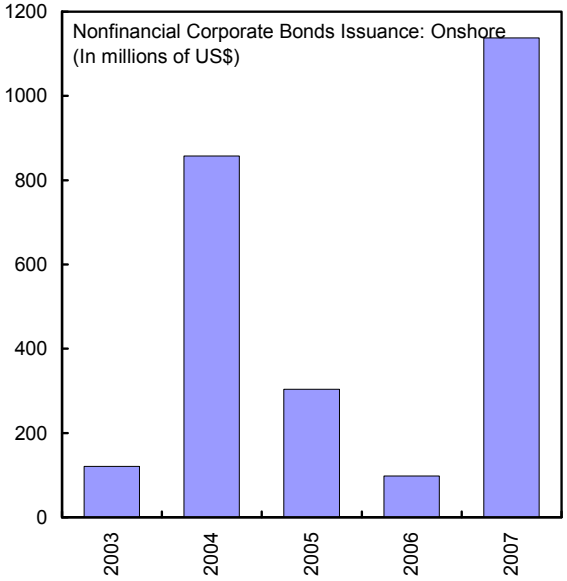
56. **Several large corporate groups remain unlisted in the stock exchange.** Based on information for the largest 20 corporate groups, non-listed companies held 32 percent of total assets in 2006. Excluding Astra, the largest conglomerate operating in a number of sectors in Indonesia, the share of listed companies is only 44 percent.[27] Reasons for this include reluctance to release information and concerns regarding control. To reduce the scope for regulatory arbitrage the government has introduced new reporting requirements to large firms whether they are listed or not in the stock exchange.

[26] The loss of control entailed in debt-to-equity conversions may have been a factor explaining a decision of surviving shareholders to pursue further reductions of leverage over time.

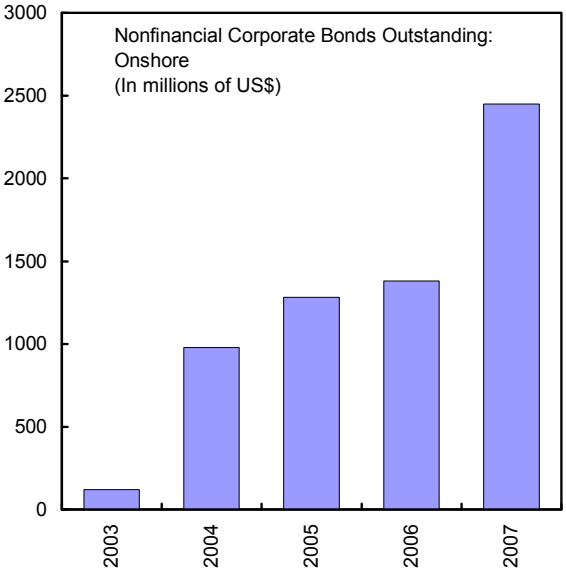
[27] Astra's main shareholder is Jardines Cycles and Carriage, a group domiciled in Hong Kong SAR. Astra's main business activities include the manufacturing and sale of automobiles, motorcycles, and agriculture machinery and equipment.

Figure 3. Indonesia: Offshore and Onshore Corporate Bond Issuance

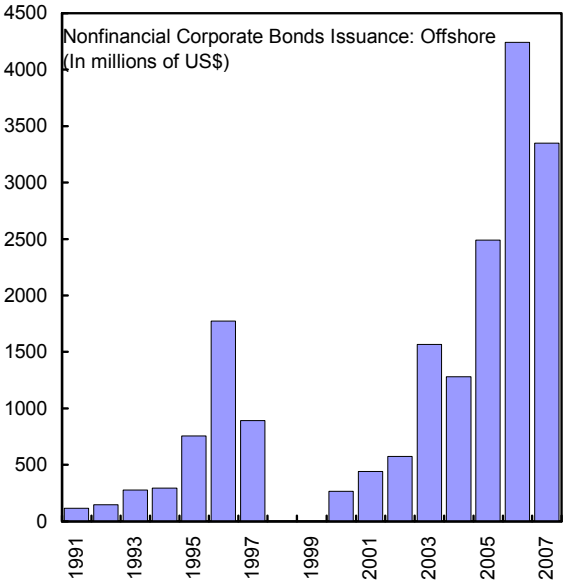
Onshore corporate bond issuance has increased...



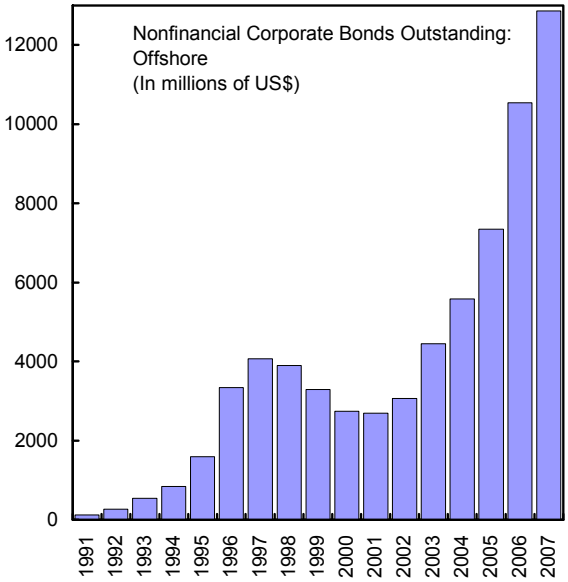
…and outstanding bonds doubled in the last three years.



But Indonesian firms prefer offshore bond financing...



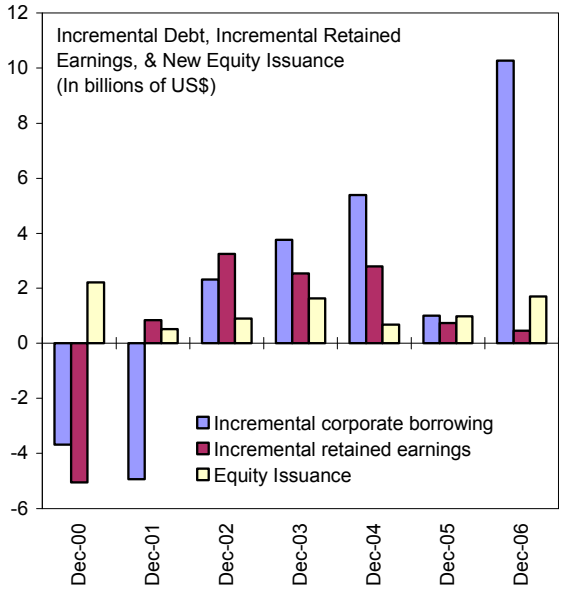
…which had accelerated up to 2007.



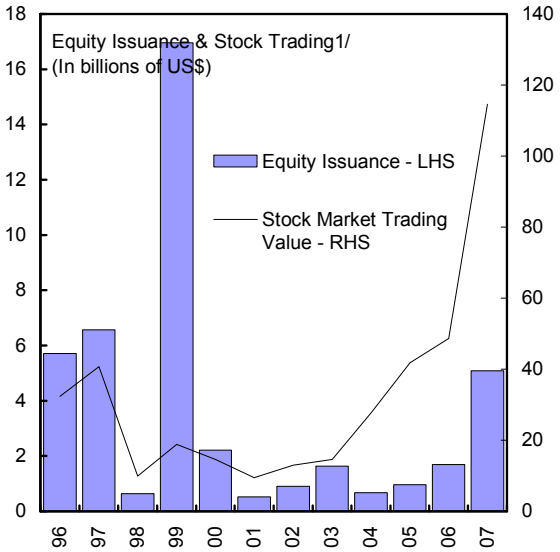
Sources: Indonesia Stock Exchange; Dealogic; Bank Indonesia; and CEIC Data Co., Ltd.

Figure 4. Indonesia: Corporate Sector's Retained Earnings & Equity Issuance

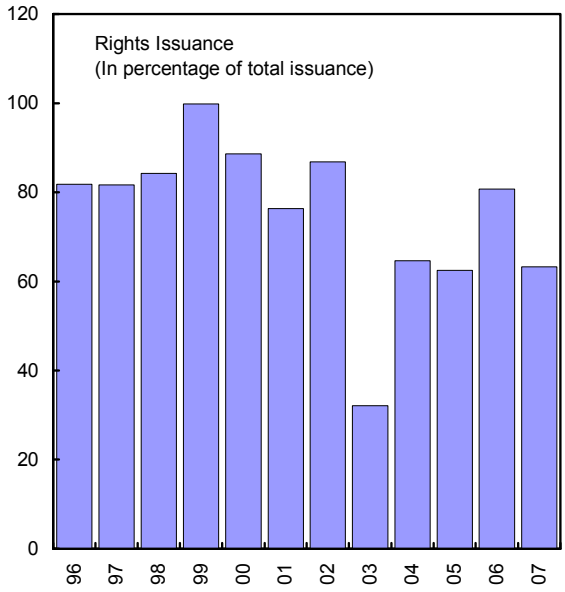
Corporate borrowing and capital expansion has increased...



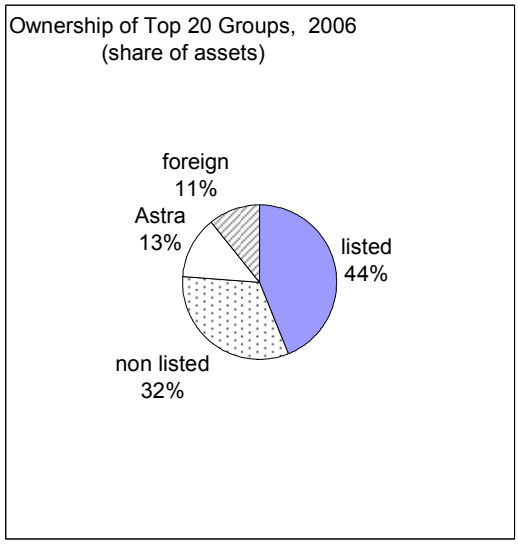
…and equity issuance is starting to pick up.



But existing share holders aim at keeping control...



…and the share of non-listed firms is still significant.



Sources: Indonesia Stock Exchange; and Thomson One.
1/ Includes financial corporations.

D. Determinants of Corporate Leverage

57. **Investment decisions are affected by firms' capital structure.** Modigliani and Miller (1958) identified a set of strict conditions that make a firm's value independent of its capital structure, namely the absence of transaction costs, taxation, inflation, and bankruptcy costs as well as independence of financing and investment decisions. A substantial body of literature has found that the relaxation of one or more of these conditions is sufficient to reach the opposite conclusion. Because the valuation of firms has implications for investment decisions, it is important to identify the drivers of corporate leverage going forward.

58. **More than 10 years after the crisis, are the determinants of corporate leverage in Indonesia consistent with experience in comparable countries?** This paper uses annual data from nonfinancial companies listed on the stock exchange to analyze recent trends and estimate standard models from the corporate finance literature in order to identify the drivers of corporate leverage decisions across firms and over time. Some other specific questions are:

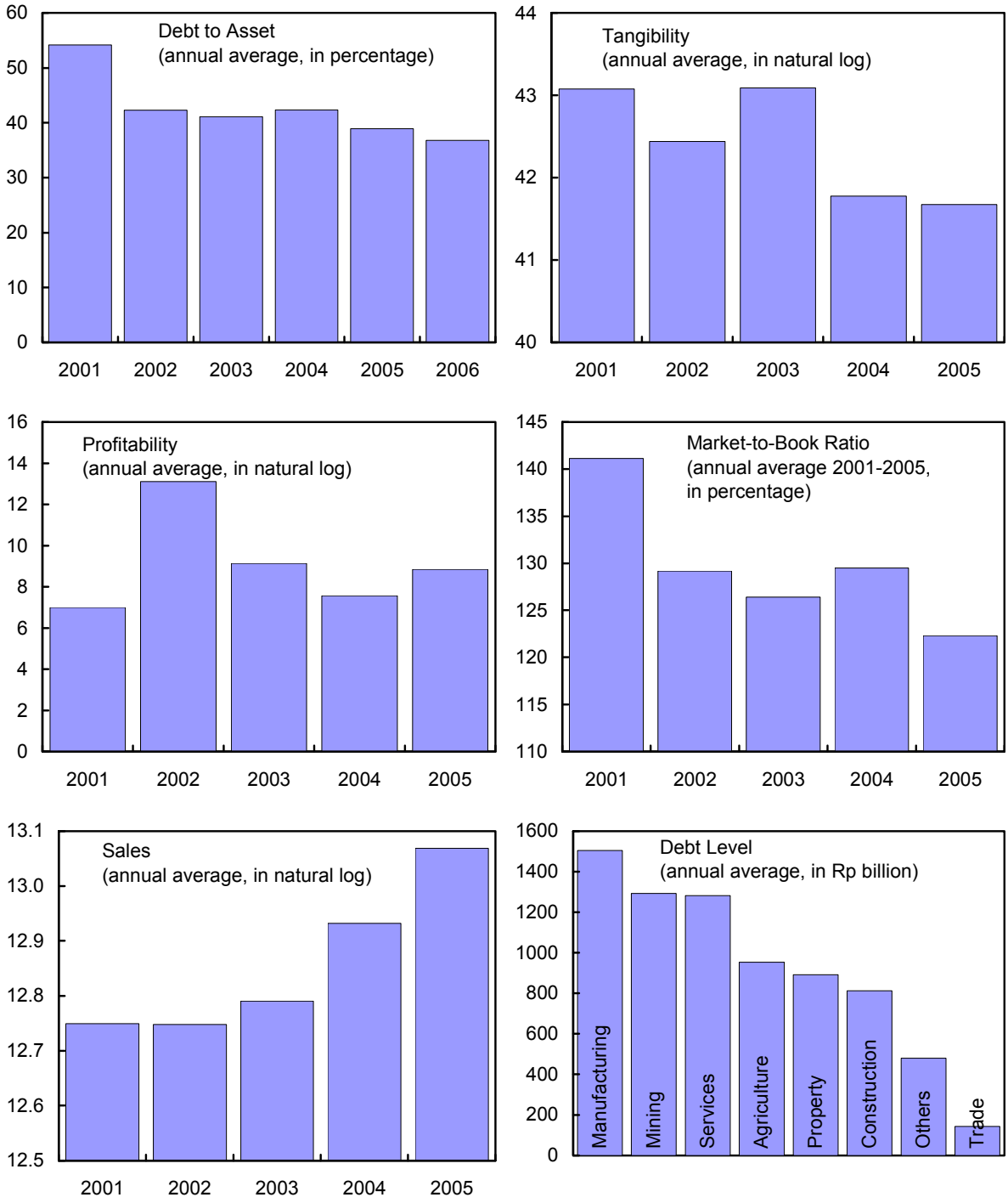
- Are the determinants of corporate leverage and their coefficients comparable with other countries? Or do the lingering effects of the crisis period still play a role?
- What explains the process of de-leveraging since the crisis? Have Indonesian firms faced financial constraints when making decisions related to leverage?
- Is there evidence of appetite for control that may have led shareholders to bypass investment opportunities?

59. **The approach used in the paper to identify the determinants of corporate leverage is consistent with conventional empirical work.** Following Rajan-Zingales (R–Z), the paper uses as explanatory variables measures of tangibility of assets (the ratio of fixed to total assets); the market-to-book value of equity (usually used as a proxy for investment opportunities); firm size (measured by the logarithm of sales) and profitability (return on assets).[28] The summary charts below show the evolution of the variables used for the regression analysis in this section (Figure 5). The justification for the use of these variables in the case of Indonesia is as follows:

- The greater the proportion of tangible assets on the balance sheet of firms, the more willing are lenders to supply loans, and leverage is higher.

[28] Rajan and Zingales (1995).

Figure 5. Indonesia: Evolution of Main Variables Used in Regressions



Source: Thomson One and Companies' Annual Reports.

- Firms expecting high future growth (measured by the ratio of market capitalization to the book value of assets, MtB) should use greater equity finance to benefit from the higher market valuation of shares (lower leverage).

- Larger firms tend to be more diversified and less prone to failure, therefore size may be used as an inverse proxy for the probability of bankruptcy perceived by creditors (allowing for higher leverage).

- In line with Myers and Majluf (1984), a negative relationship between profitability and leverage would be explained by a preference to finance firms' activities with internal funds rather than debt. Thus, a negative sign would reveal the absence of financial constraints.[29]

60. **Profitability and equity valuation are quite significant in explaining corporate leverage.** The paper uses the R–Z model as a benchmark to identify the determinants of corporate leverage. First, an OLS cross-section regression is run with the Debt-Capital ratio as the dependent variable, defined as debt divided by debt plus equity, as in R–Z. Two other regressions using the Debt-Asset ratio (D/A) instead of the Debt-Capital ratio are also estimated. The lag structure used in this section is consistent with R–Z: the data for leverage ratios correspond to the year 2006 while the data for explanatory variables correspond to the period to the average for 2002–05.[30] Table 1 shows that, using the pure R–Z approach (equation 1), tangibility and profitability are found significant and show the expected sign. By contrast, MtB is strongly significant but with the opposite sign. Size does not appear to be very significant. Using the more conventional D/A ratio (equations 2 and 3), significance improves, but the overall results remain the same. In the rest of the paper, the D/A ratio is therefore used as the dependent variable, consistent with many other empirical applications of the R–Z framework.[31]

[29] This is consistent with Korajczyk and Levy (2002), who show that leveraging is pro-cyclical for constrained firms and counter-cyclical for unconstrained firms. A positive sign would be more difficult to interpret, since creditors and debtors may be interested in expanding credit at times of higher profits. However, creditors are unlikely to respond to lower profitability by increasing lending, which is the reason why a negative sign must reflect the prevalence of borrowers' financial decisions in the absence of financing constraints.

[30] R–Z use this approach to minimize the possibility of reverse causality affecting the results.

[31] See for example Shuetrim and others (1993).

Table 1. Determinants of Corporate Leverage in the United States, Canada, Japan and Indonesia

	Debt to Capital 1/				Debt to Asset 1/	
	United States	Canada	Japan	(1) Indonesia	(2) Indonesia	(3) Indonesia (no constant)
		1987–1990			2002–05	
Tangibility	0.50 ***	0.26 ***	1.41 ***	0.81 *	0.28 ***	0.27 ***
	(0.04)	(0.10)	(0.18)	(0.49)	(0.09)	(0.08)
Market-to-book	-0.17 ***	-0.11 ***	-0.04	-0.27 **	0.16 ***	0.15 ***
	(0.01)	(0.04)	(0.04)	(0.13)	(0.06)	(0.06)
Sale	0.06 ***	0.08 ***	0.11 ***	3.78	2.06	1.3 **
	(0.01)	(0.01)	(0.02)	(2.45)	(1.45)	(0.51)
Profitability	-0.41 ***	-0.46 **	-4.26 ***	-1.98 ***	-1.04 ***	-1.01 ***
	(0.1)	(0.22)	(0.60)	(0.48)	(0.26)	(0.24)
Observations	2079	264	316	206	213	213
R square	0.21	0.19	0.29	0.13	0.26	0.26

Note: *, **, and *** denote significance level at 10%, 5%, and 1%, respectively.
Standard errors are in parantheses.
1/ For R–Z equations, the dependent variable corresponds to 1991, and for Indonesia to 2006.

61. **A positive response of leverage to increases in MtB is not an uncommon finding in empirical applications of the R–Z framework in emerging markets.** Three possible explanations are: (i) issuance may not increase more rapidly than borrowing when stock prices go up because of shareholders' concerns regarding control; (ii) stock prices are too volatile to be relied upon for issuance decisions; and (iii) creditors may be ready to finance firms showing high MtB at better terms—encouraged by potential growth opportunities—inducing firms to increase borrowing. However, it is important to assess whether there are idiosyncratic effects regarding firm and sector-specific factors; and/or specification problems, with important explanatory variables being left out from the equation.

62. **Idiosyncratic effects associated with individual firms improve the results of the regression.** The results are compared with a similar exercise performed by Booth and others (2001) for other countries in the region.[32] Consistent with Booth and others, the analysis finds that idiosyncratic effects are important (generally consistent with a high R square). For Indonesia, the sign and significance of MtB and profitability remain high. By contrast, although tangibility shows a positive sign, the results are not significant, while size is not significant and shows the wrong sign. A limitation of using panel regressions to assess the R–approach is that the impact of variables such as size and tangibility (which is the reason why the R– prefer a cross-section regression) is assumed not to change over time. However, for

[32] Booth, Aivazian, Demirguc-Kunt, and Maksimovic (2001). Unlike Booth and others, price-adjusted sale values are used in this paper. Results for other variables tested by the authors, generally non-significant, are not included.

some countries for the period 1980–1990 size shows the right sign and is significant, which suggests that the low significance of size in the regressions for Indonesia may be related to the lingering effects from the crisis—i.e., creditors mistrust large firms following the bad experience at the time of the crisis.

Table 2. Determinants of Corporate Leverage in Emerging Marekts: Fixed Effects 1/

	Debt to Asset				
	India	South Korea	Malaysia	Thailand	**Indonesia**
		1980–90			2001–05
Tangibility	-0.261 ***	0.013	0.062	0.326 ***	0.01
	(0.03)	(0.03)	(0.05)	(0.11)	(0.11)
Market-to-book	0.015 ***	0.014 **	0.014 ***	0.019 ***	0.1 ***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Sale	1.186	1.801 ***	6.64 ***	3.855	-3.41
	(0.89)	(0.64)	(0.80)	(4.88)	(2.17)
Profitability	-0.664 ***	-0.934 ***	-0.52 ***	-0.539 **	-0.16 ***
	(0.05)	(0.07)	(0.08)	(0.21)	(0.06)
Observations	880	965	693	191	1096
R square	0.75	0.74	0.8	0.71	0.74

Note: *, **, and *** denote significance level at 10 percent, 5 percent, and 1 percent respectively. Standard errors are in parenthesis.
1/ Fixed-effects estimation results shown in BADM (2001).

63. **Changes in leverage are significantly explained by relative indebtedness at the beginning of the period.** An alternative specification is used to explore the post-crisis process of de-leveraging while introducing sector-specific effects. This specification is still consistent with the R–Z framework, while incorporating idiosyncratic effects at the industry level, which are likely to contain information that may have been left out in the original regression. The dependent variable is now the change in D/A between 2000–05 (change in leverage), and the additional explanatory variable measures the deviation of D/A from the sectoral mean for each firm at the beginning of the sample period. Firms showing high leverage relative to the sectoral mean at the beginning of the period would be expected to reduce leverage over time regardless of the evolution of other variables. Table 3 shows that the results from this exercise are highly significant, with the coefficients for size and tangibility showing the right sign and being significant at the 85 percent confidence level.

Table 3. Determinants of Corporate Leverage in Indonesia: Alternative Specification

	Change in Debt to Asset Ratio Between 2000 and 2005 Indonesia 2001–05
Constant	-50.7 ***
	(18.42)
Tangibility	0.16
	(0.10)
Market-to-book	0.17 ***
	(0.03)
Sale	2.07
	(1.42)
Profitability	-1.14 ***
	(0.21)
D/A initial deviation	0.83 ***
	(0.04)
Observations	211
R square	0.69

Note: *, **, and *** denote significance level at 10 percent, 5 percent, and 1 percent, respectively.
Standard errors are in parenthesis.

64. **In conclusion the empirical assessment of the determinants of corporate leverage in Indonesia suggests the following:**[33]

- **Determinants of corporate leverage in Indonesia are broadly consistent with comparable countries, but some lingering effects from the crisis persist.** High leverage after the crisis contributes significantly to explain de-leveraging. For every percentage point that D/A was above the corresponding sectoral average in 2000, firms reduced their D/A ratio by 0.8 percentage points in the following five years.

- **Overall, Indonesian firms do not seem to face financial constraints.** The high significance and the high absolute value of the coefficient of the profitability variable suggest a strong preference by firms to use their funding before resorting to borrowing. However, at the beginning of the sample period, both creditors and borrowers may have been discouraged to contract loans in light of high debt levels inherited from the crisis.

[33] These conclusions apply to listed firms. Lack of access to information for non-listed firms and on reliable medium-sized companies' financial statements are limitations to applying this empirical framework.

- **Shareholders of Indonesian firms attach substantial importance to control.** The significance and the value of the MtB coefficient are relatively high by regional standards, showing that firms are quite sensitive to changes in stock valuation in making borrowing decisions (i.e., increasing leverage when the market valuation of their equity increases).

E. Corporate Financing and Global Financial Conditions

65. **The nonfinancial corporate sector in Indonesia seems financially strong, but will face new challenges in coming months.** Tighter liquidity conditions in global markets and increased risk aversion has resulted in a sharp rise in corporate bond spreads in recent months, affecting emerging markets, including Indonesia. However, abundant liquidity in domestic financial markets has allowed for a shift toward domestic sources of financing.

66. Under these circumstances, the following new potential vulnerabilities need to be closely monitored (Figure 6):

- **Offshore corporate bond issuance has been greatly reduced since September 2007.** Reportedly, some other sources of offshore financing such as private placements have also dried up, though external bank loans and equity issuance seem to be holding up.

- **High market volatility and uncertainty may affect equity issuance plans in the future.** However, issuance remains high compared to historical levels, and expansion plans associated with announced initial public offerings are expected to continue, although some delays have been reported.

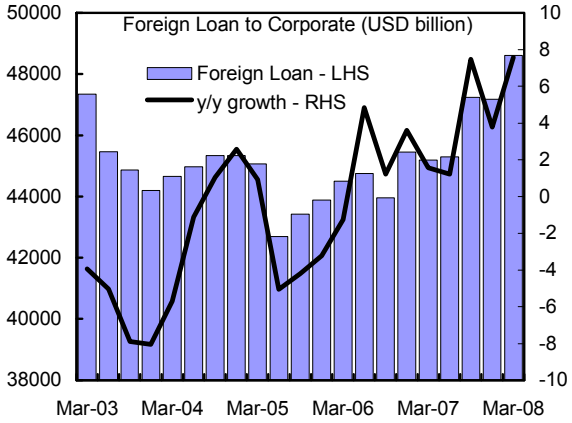
- **Bank loans to the corporate sector have exceeded average loan growth in recent months.** Also, lending in foreign currency to nonfinancial corporate groups has at times grown more rapidly than lending in domestic currency, which may result in borrowers' currency mismatches, though many of these loans are reported to be to the export orientated commodity sector.

- **Banks may eventually face constraints on raising funds abroad that so far have affected only the nonfinancial corporate sector.** Given that the loan-deposit ratio is much higher than for foreign than for domestic currency intermediation, banks may eventually need to borrow abroad to satisfy increasing corporate demand for foreign currency loans.

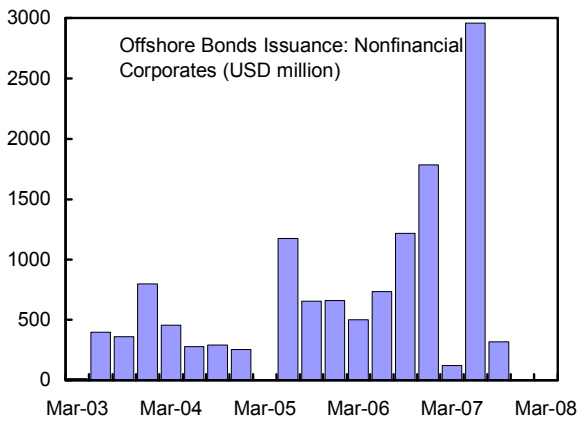
- **If global liquidity tightens further, the corporate sector may face a trade-off between borrowing at higher costs or postponing investment projects.** If tight liquidity globally and domestically lead to financial constraints, only firms that maintain high profitability and high market stock valuation would continue enjoying access to borrowing from foreign and domestic sources.

Figure 6. Indonesia: Recent Developments on Corporate Financing

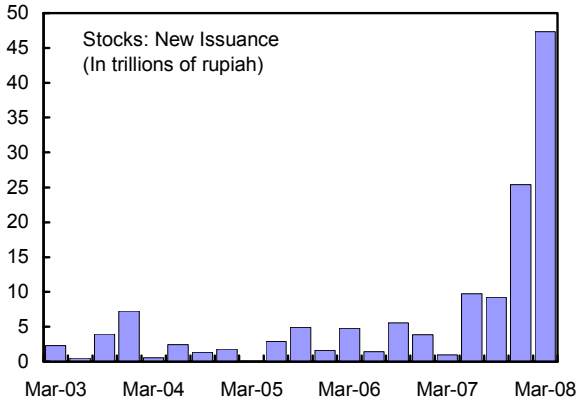
Corporate borrowing from abroad is still increasing...



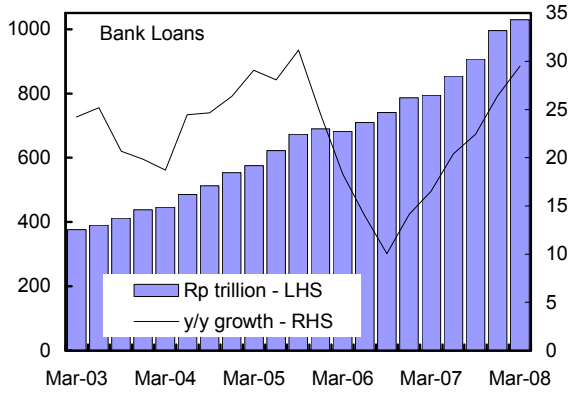
…but offshore bond issuance has dried up.



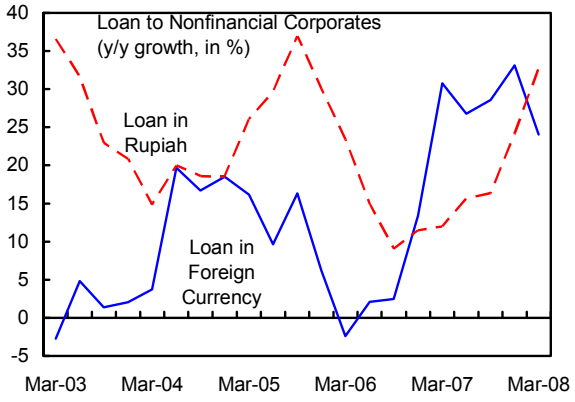
Stock issuance has accelerated...



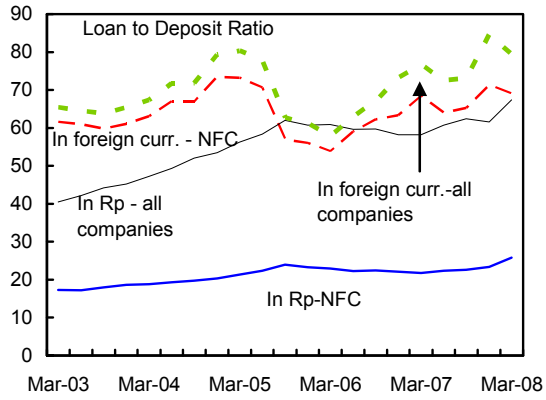
…as well as borrowing from banks.



Foreign currency loans have picked up...



…bringing LDR in foreign currency close to full capacity.



Sources: Bank Indonesia; Indonesia Stock Exchange; and Dealogic.
NFC: Nonfinancial Corporate Sector.

F. Conclusions and Policy Implications

67. **Are Indonesian corporations still affected by the legacy of the 1997 crisis?** On the one hand, large firms do not seem to enjoy a clear advantage in access to financing as is the case in comparable countries. Also, high indebtedness inherited from the crisis has induced a process of de-leveraging that has continued until very recently. However, these lingering effects now appear to have largely subsided in light of increasing bank intermediation and low leverage ratios.

68. **What will be the main drivers of corporate leverage going forward?** Favorable market valuation of equity and possibly some narrowing in profit margins may result in some increase in corporate leverage in the future. However, this may not take place in the event of a slowdown accompanied by financial constraints in credit markets.

69. **What are the main challenges arising from the current global and domestic financial conditions, given Indonesia's corporate financing structure?** A shift from foreign sources of financing to domestic bank financing raises the possibility of maturity mismatches because of the short maturity of bank liabilities, and could become a concern if medium-term resources are not widely available to banks. The apparent preference of firms for long-term financing in foreign currency may lead to currency mismatches, including for banks if they have limited access to foreign credit.

70. **Regulators and market participants need to be watchful of emerging vulnerabilities to ensure financial stability and a favorable investment outlook.** In view of already rapid credit growth, measures to encourage further lending to the corporate sector are not necessary and may be counterproductive. Undue incentives to increase bank lending may result in problems of inadequate monitoring by supervisors, reduced risk aversion by borrowers, and deterioration of credit quality (maturity/currency mismatches, increased credit risk, excessive leveraging by some firms). Surveillance by regulators and financial authorities must be strengthened to monitor corporate financing developments and encourage the preparation of contingency plans by creditors and firms in case financial conditions remain adverse for a prolonged period of time.

71. **The authorities should take the necessary steps to preclude eventual financial constraints from becoming an obstacle to investment.** In this regard, it seems appropriate to assess differential tax and legal treatment regarding equity issuance against competing jurisdictions. Also, steps to encourage a diversification of ownership, such incentives and elimination of opportunities for regulatory arbitrage, would reduce shareholders' preference for control over time, reducing the possibility of delayed investment decisions because of control considerations. Consistent with this, recent measures to improve corporate transparency and encourage firms to list in the stock exchange, such as tax incentives and stricter reporting requirements for non-listed firms, are steps in the right direction.

Complementary measures should aim at removing obstacles for institutional investors to allocate medium- and long-term resources to the corporate sector.

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IV. INDONESIA: PROGRESS IN FISCAL INSTITUTION BUILDING[34]

Over the past few years, Indonesia has embarked on a program of reforms aimed at strengthening its fiscal institutions with a view, ultimately, to improve its economic competitiveness. This paper describes these recent achievements and outlines area where progress still needs to be made.

A. Introduction

72. **Institutions, and fiscal institutions in particular, have an important bearing on economic outcomes.** Recently, a bulging literature, both theoretical and empirical, has found that institutions have a fundamental impact on economic growth and development (Acemoglu and others 2001, 2005), volatility and crises (Acemoglu and others 2003), the size of government (Kirchgaessner, 2002; Debrun and Kumar, 2007), the financing costs of government (Johnson and Kriz, 2005; Hallerberg and Wolff, 2006), and governance and corruption among others.

73. **Over the past few years, Indonesia has successfully undertaken a wide range of reforms to improve the efficiency and effectiveness of its fiscal institutions.** An assessment of the strengths and weaknesses of these institutions was undertaken under the fiscal transparency Review of Standard and Codes (ROSC) in 2006.[35] That document reported that significant progress had been made in recent years to establish a sound legal and administrative system for central government fiscal management and to improve transparency. This progress included the adoption of financial legislation that greatly clarified the budget process, establishment of a budget classification broadly consistent with international standards, and introduction of clear rules governing the management of transactions, assets, and debts at all levels of government. However, it was also noted that a substantial reform agenda remained, especially to (1) consolidate central government reforms and (2) extend them to the rest of the general government. Since the publication of the ROSC, significant additional progress has been made in building fiscal institutions, and their transparency has been improved further

74. **This paper provides an overview of reforms aimed at improving fiscal institutions in Indonesia since the completion of the Fiscal ROSC in 2006.** Section II provides a factual review of progress, including the status of proposed reforms or draft laws mentioned in the ROSC. To the extent possible, the paper also indicates on how new laws and regulations are observed in practice. Section III concludes.

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[34] Prepared by Eric Le Borgne (FAD).

[35] The Indonesia fiscal ROSC is available at http://www.imf.org/external/pubs/ft/scr/2006/cr06330.pdf

B. Description of Progress

75. **Progress has been made in strengthening technical capacity at the central government level.** Within the Ministry of Finance (MoF), the Fiscal Policy Office (FPO) is now fully operational with a mandate for macro-fiscal projections and analysis, including assessments of fiscal risks. The FPO now prepares fiscal risk statements that are included in the annual budget documents—making Indonesia one of the pioneers in fiscal risk analysis among emerging market economies.[36] Operational management of debt-related risks is undertaken by the Directorate General (DG) for Debt Management, which is responsible for both domestic and external debt management.

76. **Despite some progress, parliament's technical capacity for fiscal policy analysis is still limited.** Parliament's (DPR) budget committee plays an important role in the budget approval processes, though with excessive emphasis on details which are usually seen as being within the province of the executive (such as close scrutiny of macroeconomic assumptions and detailed review of expenditure items—as opposed to scrutiny at a more aggregated level found in other countries).[37] In contrast with this wide ranging mandate, the DPR had limited qualified technical staff and few with specializations. Some improvement in these areas has been achieved through: (1) increasing the number of technical staff; and (2) greater specialization of staff through the establishment of specific parliament commissions (e.g., the economic commission). These commissions are now able to provide some analytical and technical support to members of parliament, though the DPR's effectiveness in budget scrutiny and oversight is still inadequate. Intense involvement of the DPR at the pre-budget presentation stages remains (6–7 months before the new fiscal year), but there is only limited focus on medium-term budget issues and on the results of policies embedded in the annual budget. The 2003 State Finances Act calls for an unusually early date for approval by parliament of the annual budget law (2 months before the new fiscal year); nonetheless, DPR committees continue to be involved in budget approval after the annual budget law has been adopted in plenary session. The DPR's follow-up on the external audits of the Supreme Audit Institution (BKP) remains weak.

77. **Tax legislation and administration has been revised and improved.** The "General Provisions and Tax Procedures" (KUP) law adopted in July 2007—and effective since January 2008—improved the balance between taxpayers rights and the Directorate General Tax's (DGT) ability to collect taxes. For example, the revised law requires banks to provide the DGT with information on a taxpayer's banking transactions in the context of a bona fide

[36] The fiscal risk statement covers sensitivity of the budget projections, and the risks associated with the key assumptions of the budget, public debt, civil service pensions, contingent central government expenditures, public-private partnerships, state-owned enterprises (SOEs), and sub-national governments.

[37] See Box 3 of the Fiscal ROSC for a description of the budget preparation process and relations between the executive and the DPR.

audit and it also gives DGT the authority to freeze and seize tax debts. On the other hand, improvements in tax payer rights include: (i) the removal of DGT's authority to detain a taxpayer, except in cases where the taxpayer has tax arrears and is not complying with requests to pay outstanding taxes; and (ii) taxpayers are allowed to defer "full payment" of a disputed tax while the case is under objection or appeal.

78. **Despite major reforms, some tax legislation and administration issues remain to be addressed.** The laws on the value-added tax and income tax submitted to parliament in 2005 are yet to be approved, though the government is hopeful of early approval. The delay may be creating uncertainty in the business community. The current VAT law is complex and includes widespread exemptions and would benefit from streamlining. The draft income tax law aims at boosting the investment climate and competitiveness through cuts in the corporate income tax (from the current 30 percent to 25 percent) and tax incentives. On the tax administration side, the major remaining concerns are: (i) the need for the DGT to obtain a tax debtor's permission to seize the debtor's accounts receivable; (ii) restrictions in the methods used by the DGT to determine a tax liability (e.g., it cannot use indirect methods to determine underreported income and cannot prepare estimated assessments); and (iii) the MoF's Inspectorate General (IG) investigations unit staff lack unrestricted access to taxpayer information available to the DGT.[38] The IG's effectiveness is also limited by lack of full criminal law enforcement powers, and by slow implementation of disciplinary actions against DGT staff proven to have acted illegally.

79. **Steps have been taken to improve tax officers' conduct.** First, the code of conduct for tax officers now applies to all tax offices and new provisions in the law on General Provisions and Tax Procedures will renew the code of conduct and significantly strengthen sanctions for violations.[39] Second, tax officers acting beyond their authority, as stated in tax regulations, can be reported to the internal inspection and investigation unit in the MoF, and can eventually be sanctioned. To implement these regulations, the DGT established Internal Audit and Criminal Investigation units in January 2007 in order to strengthen internal controls and to complement the MoF IG's efforts to fight corruption.

80. **However, existing practices limit incentives for the strong performance of tax officials.** Frequent rotation of skilled and specialized DGT staff to comply with the general civil service commission policy is diluting the job specific expertise accumulated by staff.

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[38] It must submit data requests to the MoF on a case-by-case basis which, in practice, has led to extensive delays in treating these requests and can impair the IG's ability to gather evidence of misconduct by DGT staff).

[39] Provisions in the law include (i) requiring the MoF to establish a DGT code of conduct and a Committee for the Code of Conduct to supervise its administration and review all violations; (ii) placing extortion or taxpayer abuse for personal gain under the criminal code and bribery under the anti-corruption law; (iii) extending the Inspector General's responsibility to investigate tax officers who intentionally act beyond their authority; and (iv) clarifying that criminal and civil sanctions will not apply where the tax officer has acted in goodwill and within the provisions of tax legislation.

For example, in large taxpayer offices, large taxpayer audits require employees with advanced auditing skills in specialized areas, such as international taxes, computer audit or the financial sector. These skills may take several years to develop, and staff rotation to unrelated positions results in the loss of expertise that replacements will take substantial time to develop.

81. **Civil service personnel reform is beginning.** Within the Indonesian civil service, the Ministry of Finance is pioneering personnel reform. It has introduced a number of measures to improve human resource management with the ultimate aim of introducing a performance-related pay component.[40] So far, the reforms have already resulted in significant pay increases for some jobs, with higher rates for more complex positions.

82. **Transparency of the oil and gas sector has not improved materially.** Despite expressions of interest, the government has yet to participate in the Extractive Industries Transparency Initiative (EITI). Participation in EITI would improve governance as all actors (buyer and sellers) in the industry would be required to publish what they pay and what they receive. Through this initiative, all transactions could be traced and double checked. These steps are undertaken by an independent third party and compiled into an EITI country report. The public disclosure of oil and gas revenue flows and assurance that all such flows are properly accounted for in the budget would be further increased should regular EITI reports be produced and made public; BPK, the state audit agency, stated in its 2007 annual government audit that oil and gas revenues are not transparent and not deposited directly to the state treasury as per the budget mechanism. Also, no progress has been made in publishing externally audited accounts for Pertamina since 2003.

83. **Progress has been made in improving the quality of government accounts, but is still incomplete.**[41] The adoption of government cash management regulations in July 2007 was an important step in improving the transparency of government banking arrangements. The regulations strengthen the Minister of Finance's powers to consolidate government bank accounts. On this basis, the MoF conducted a census of government bank accounts operated by ministries and budget users outside treasury control. The ensuing ministry-by-ministry analysis of accounts revealed that over 20,000 government accounts existed. Some of these off-budget bank accounts have either been closed or integrated with the treasury.[42] This was

[40] The MoF issued ministerial decree in 2007 outlining the following reforms: (i) a major reorganization within the Secretary General's office to improve the human resource management function; (ii) a systematic review of business processes to ensure more effective service delivery to the clients; (iii) a comprehensive process of developing new standard operating procedures, work load analysis, and job descriptions and classifications; (iv) improvement of overall human resource management in the MoF; and (v) creation of a remuneration system linking remuneration more directly to job responsibilities and workloads to improve incentives, transparency and fairness in compensation across the MoF.

[41] See also "Indonesia—Public Expenditure and Financial Accountability," October 2007 (draft), World Bank.

[42] The census is an ongoing activity but, as of May 2008, it is nearly completed.

a sizeable step towards establishing an operational treasury single account (TSA). However, there are still a few impediments to the establishment of a TSA. In particular, government deposits held at Bank Indonesia (BI) are poorly remunerated, which impedes the development of active cash management (since the opportunity cost of idle government deposits is small). Transparency also improved following the incorporation of the regional development and investment accounts into financial reports and budget documents. Progress in integrating the operation of other extrabudgetary funds in the budget has been limited.[43]

84. **The disclosure of fiscal information to the public has improved significantly.** Several recent amendments to ministerial decrees should help improve fiscal data quality and transparency. In particular, the chart of accounts now requires that the budget, in-year fiscal reports, and annual financial statements use the same terminology, which should simplify budget monitoring. The publication of a comprehensive fiscal risk statement accompanying the annual budget document significantly improves the transparency of fiscal policies and associated risks. In this context, improved reporting of information by SOEs should enable the FPO's risk management unit to better assess risks for selected key SOEs. The reporting of information on central government debt is now comprehensive and timely, and key contingent liabilities are also disclosed in the annual fiscal risk statement (including those related to public-private partnerships). However, little progress has been made on reporting general government debt (though local government debt remains negligible), and debt accumulated by public enterprises.

85. **Early progress has been achieved in strengthening internal and external audit bodies and in fighting corruption among public officials.** The BPK mandate has been strengthened by the adoption of a 2006 law (and associated decrees in 2007). BPK staff headcount has been significantly increased (currently 6,000 staff covering 28 provinces) and training has been improved in both the IG and BPK, though needs remain significant. However, both the MoF's IG and BPK are experiencing difficulties in accessing taxpayers data needed to investigate potential misconduct of tax officials owing to taxpayers privacy concerns, even though the law provides both institutions such access. Memorandum of understandings between the MoF and the internal and external auditors to address this issue are under discussion. Finally, the role of the Financial and Development Supervisory Agency (BPKP) as an internal audit body has not been reviewed—BPKP is part of the president's office and has jurisdiction on central government finances. However, it shares internal audit responsibilities related to ministries with the IG, with an unclear distinction between their mandates.

86. **Recently, the Anti-Corruption Commission (KPK) has become more vigorous in its investigations and prosecutions of corruption cases, including those dealing with**

[43] The Directorate General of the Treasury has recently listed 76 extrabudgetary units that obtain funds from the central government budget but whose operations are not included in full in the budget accounts.

senior government officials. The KPK, established in 2002 as an independent State agency, coordinates with other entities combating corruption, conducts investigations and prosecutions, performs preventative actions against corruption, and monitors state governance. Its mandate also includes the examination government officials wealth reports. Reflecting its efforts to combat corruption, the number of public complaints corruption received by KPK has increased noticeably since 2004.

87. **Steps have been taken to improve transparency at the general government level but much remains to be done.** The expenditure assignments of different levels of government were clarified by a new government regulation in 2007, but the regulation is not being implemented systematically across ministries. Budget reporting by regional governments has improved considerably over the past year due to the application of legal sanction mechanism provided in a 2005 Government Regulation. As an example, by end-January 2007, only 24 percent of local governments had submitted their 2007 budgets to the MoF, while for the 2008 budget that proportion had reached 64 percent by end-January. However, reporting from local governments to MoF on budget execution is still subject to long delays, the reporting quality varies between regions, and does not follow GFS reporting; local governments do not have homogenous functional classifications which makes it impossible to derive any standard functional statistics. Although regions so far borrow little, it will also be necessary to strengthen the borrowing framework.

C. Conclusions

88. **Improvements in Indonesia's fiscal institutions over the past few years have been notable.** A fiscal policy office has been established, tax legislation has been substantially revised, tax administration is improving, legal and administrative measures have been adopted to improve public sector governance, and important steps have been taken to improve the comprehensiveness and quality of government accounts. To complement these measures, significant improvements in the disclosure of fiscal information, and in particular the coverage of fiscal risks, has improved fiscal transparency.

89. **However, further reforms are needed to improve fiscal institutions and transparency.** The disclosure of oil and gas revenue flows through EITI and its principles would significantly improve fiscal transparency and would align Indonesia with the numerous oil producing countries that participate in the initiative. Transparency would also benefit from reforms of the role that the parliament plays in the budget process, such as improving the legislative-executive budget process with a less time-intensive, more focused and more transparent parliamentary procedures, and training of parliamentarians on budgeting. Efforts should be increased to strengthen the integrity of fiscal institutions (both through internal and external audit), such as by strengthening ministerial IGs, the abilities of BPK to perform its external audit functions for all levels of government; and undertaking intensive training for IG and BPK staff, particularly in investigative and risk-based audits. Finally, there is a large but crucial agenda to improve the monitoring of subnational

budgetary and debt developments, so as to improve the transparency and quality of fiscal policy at the general government level.

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