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Indonesian Macro Policy through Two Crises

CAMA Working Paper 16/2015
May 2015

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Keywords

Indonesia, External shocks, Financial crises, Exchange rates Macroeconomic policy

JEL Classification

E32, E44, E43, E58, F43, F47, N25

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^{*} Funding for the research described in this paper is from Australian Research Council Discovery Grant No. DP0879094. Useful discussions on the topic with Ross McLeod, Budy Resosudarmo and Hal Hill are acknowledged.

^{**} The analysis and conclusions expressed here are those of the authors and do not necessarily represent those of Bank Indonesia.

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Abstract

Indonesia's open, developing economy fielded shocks due to the Asian financial crisis (AFC) and the global financial crisis (GFC) quite differently. Although the origins of both crises were external, during the AFC the coincidence of financial contagion with domestic political upheaval saw the Indonesian economy collapse. By contrast, during the decade-later GFC, when most nations slumped into recession the Indonesian economy slowed but did not recess, achieving real growth of 6.1% (2008) and 4.5% (2009) and recording one of the world's best performances for the period. This paper reviews these events and employs numerical modelling of stylized AFC and GFC shocks to show that some of the contrast stems from differences in the states of the global economy during the crises and the compositions of the external shocks in each case. This said, both shocks have capital flight elements and it is shown that the key policy responses include floating the exchange rate and fiscal expansions that are, where necessary, money financed. There is, nonetheless, evidence of evolution in Indonesian macroeconomic policy making between the crises that allowed its strong performance to be sustained.

1. Introduction

Indonesia has an open, developing economy that has been affected, occasionally dramatically, by shocks from abroad. The most substantial of these was the Asian financial crisis (AFC) which was transmitted from elsewhere in Asia via financial markets, precipitating capital flight and a full run on the Indonesian currency (McLeod 1998, Berg 1999). The result was an extraordinary currency depreciation, a loss of financial stability and a dive in overall macroeconomic performance. In spite of its external origins, and in part because of the coincidence of domestic political upheaval and associated policy uncertainty, this particular crisis left Indonesia with remarkably poor performance relative to all the countries affected by it (Djiwandono 2007).

By contrast, during the Global Financial Crises (GFC) a decade later, when most nations slumped into recession on the heels of financial collapse in the US, the Indonesian economy slowed but did not recess, achieving real growth of 6.1% (2008) and 4.5% (2009). Its major financial and macroeconomic indicators showed positive signs, as indicated by its continued real growth and the easing of its inflation from 11.1% (2008) to 2.78% (2009). Indeed, its real GDP growth in 2009 was the third strongest in the G20, after China and India (OECD, 2010).

The macroeconomic analysis applied here is based on an elemental economy-wide model that simulates interlinked changes in the labour market, the financial capital market and the markets for home money and foreign exchange. It is constructed in the Mundell (1963)-Fleming (1962) tradition as updated by McCallum and Nelson (1997), with flexible price levels and expectational shocks. This conventional technique allows the decomposition of the effects of both external shocks and domestic policy responses so that relative contributions can be estimated. The key conclusions to emerge are the inevitability and the utility of Indonesia's currency float and, consistent with the conclusions of Basri (2012), the critical importance of fiscal policy in the restoration of economic activity in both crises.

The section to follow offers a short outline of events surrounding the AFC and Section 3 provides similar background in the case of the GFC. The model used is detailed in Section 4 and the analysis of component AFC shocks and their separate impacts is presented in Section 5. The corresponding analysis of GFC shocks is presented in Section 6 and Conclusions are offered in Section 7.

2. The Asian Financial Crisis (AFC)

The crisis occurred during a period of strong performance in the advanced economies outside Asia, driven by the US information technology boom. Even in the Asian region, the Chinese economy grew strongly, as did that of Australia. As Figure 1 shows, asset markets were also strong in the lead-up and, at least for those economies not directly affected by it, even during the crisis. The apparently sound macroeconomic conditions prevailing prior to 1997 saw almost no economic experts predict that the AFC would cut the Southeast Asian economies in general, and Indonesia's economy in particular, so deeply (Hoffman et. al. 2004:49). Indeed, the World Bank had just published its spectacular tome, *The East Asian Miracle*, lionizing the policy regimes of the East and Southeast Asian governments (MacDonald 1993) and Hal Hill's detailed analysis of the Indonesian economy, again with an optimistic tone reflecting the strong performance of the earlier 90s, had emerged the year before the crisis (Hill 1996). The irony is evident in the title of the first book on the crisis to emerge afterwards: *East Asia in Crisis – From Being a Miracle to Needing One* (McLeod 1998).

The origins of the crisis were many-fold, combining weakly supported US\$ pegs in Southeast Asia and Korea with the rapid expansion of competitive Chinese exports, supported in turn by the Chinese US\$ peg since 1994 and a depreciating underlying real exchange rate due to

rapid Chinese reserve accumulation (Tyers et al. 2008). An immediate trigger was a real depreciation of the Yen relative to the US\$, which was associated with a policy switch from monetary contraction to expansion in Japan as it struggled to deal with the banking crisis that underlay its first decade of stagnation (Horiuchi 1998, Tyers 2012). The considerable effect of this switch on the value of the Yen, illustrated in Figure 2, proved important in Southeast Asia because Thailand and Indonesia, in particular, had received extensive foreign direct investment (FDI) from Japan since the 1980s. This was investment of the outsourcing type, which saw both countries depending increasingly on exports to Japan rather than to the US, notwithstanding their US\$ pegs. The strength of Indonesia's dependence on exports to Japan is evident from the export shares also shown in Figure 2. Further evidence of this can be seen from Figure 3, which, despite the beginnings of a depreciating trend against the US\$, shows a sharp appreciation of the Indonesian Rupiah against the Yen just prior to the AFC.

Despite the negative shock emanating from Japan, and the associated drop in exports destined for Japan illustrated in Figure 4, redirection to such destinations as China ensured that there was no significant net export demand shock. Instead, the Japanese depreciation and its effect on the terms of trade directed attention to fundamental problems with the Thai and Indonesian *de facto* US\$ pegs, undermining the confidence of domestic and foreign investors. Financial collapse began in Thailand and spread quickly to Indonesia, taking the form of an increase in the risk premium on Indonesian asset returns, precipitating a capital flight that developed into a run on the Indonesian currency, widespread insolvency in the manufacturing and financial sectors, followed by shut-downs and the sequestration of manufacturing capital.

Indonesia's particularly deep crisis could be seen as rooted in a combination of external and internal problems. As for other affected countries, these included adherence to the *de facto* US\$ peg. Financial yields inside the Indonesian economy were higher than those abroad, due primarily to regime risks perceived externally, as indicated in Figure 5. Yet the exchange rate peg created moral hazard, which led Indonesian investors to borrow abroad at lower rates (Corsetti 1999). The volume of this debt eventually proved too large for the central bank to protect with the foreign reserves available. A complicating factor was the rise in short-term foreign currency debt, which was mostly un-hedged and characterized by "double mismatch" (maturity and currency).

The "microeconomic reform" tradition had swept the advanced and developing world in this period and many countries embarked on the abrupt liberalization of their financial industries, inviting offshore capital movements. Indonesia was no exception, but its capital inflow was

comparatively large, causing a large surplus on the capital account, booming investment and strong consumption demand. These raised the current account deficit and brought inflationary pressure. Overall, the volatility of Indonesia's economy rose. The policy settings of the time created a capital market system that was highly volatile, subject to long-term swings and susceptible to contagion (Eatwell and Taylor 2000:5-6). This was exacerbated by the problem of crony capitalism, which cemented the triangular relations among government, industries/banks and political connections, leading to external debt accumulation and the weakening of institutional and manufacturing competitiveness. Overall, this comparatively poor performance by Indonesia is clear from Table 1.

It has since become widely conceded that a key additional cause of the depth of Indonesia's crisis was erroneous advice from the IMF in the early stages (Wade and Veneroso 1998, Stiglitz 2002). At the time, the crisis was seen as a standard current account adjustment problem which demanded monetary tightening, a fiscal contraction (curtailment of subsidies) and the closure of insolvent banks. The Indonesian government's initial embarkation on these policies had a destructive impact on corporate profitability, including in the banking industry, and thus it intensified the crisis. The policies had to be discarded when Bank Indonesia was no longer able to defend the value of rupiah, widening the intervention band on July 11, 1997 and finally floating it on 14 August 1997 (Figure 3). At first this exacerbated the transition of the crisis from the financial sector to the real sector, since borrowers were then faced with both increased debt service costs and depreciation-enhanced outstanding debts. Insolvencies were then prominent, particularly in the heretofore expanding manufacturing sector, leading to capital sequestration and unemployment.

3. The Global Financial Crisis (GFC)

The GFC was characterized by a series of shocks, primarily to the economies of the US and UK. These followed a period of declining long bond yields (Arora and Tyers 2011), a sharp monetary tightening (upturn in US *short* yields) following the oil price shock that began in 2004 (Arora et al. 2015) and little-constrained financial innovation (credit default swaps and securitization) that ran ahead of regulation and ratings practice (Gorton 2010). Its effects were global, with some capital outflow from the US as the boom in its asset markets ended, followed by financial contraction in late 2008 and a global retreat to US\$ holdings. The short term effects on asset prices in East and Southeast Asia were proportionally larger than those

in the originating US financial market, as seen in Figure 1, due to global portfolio rebalancing that caused comparatively large changes in holdings in the smaller yet open financial markets.¹ Notwithstanding this asset market volatility, the Financial Stability Index of Indonesia during the GFC was far more constrained than it had been during the AFC, as seen in Figure 6.

While the lead-up to the GFC saw some escape from US assets and therefore financial flows into the “economies in transition”, these flows were not significant in Indonesia. With the US financial crash and the failure of US monetary policy to stem deflation, there was a global retreat to the holding of money in general, and US\$ in particular, which would offer substantial real yields so long as US deflation continued. This led to a capital flight from Indonesia, a dip in its asset prices (Figure 1) and a spike in home long bond yields (Figure 5). The outflow put downward pressure on the currency, which was allowed to float from the outset (Figure 3). This was the major consequence for Indonesia from the GFC.

Unlike the AFC, the transition to Indonesia’s real sector during the GFC did not result in vast insolvencies and capital sequestration. But the real sector was affected, this time by the corresponding transition in the US, and Europe (“from Wall Street to Main Street”), which arose from the contractionary effects of the deflation and the breakdown of financial sector services to solvent firms seeking refinance. Demand in the US then contracted and the major exporters to the US were hit hard. These included Japan, China and Korea, whose imports of manufacturing components collapsed, affecting Indonesia as it did the other economies in East and Southeast Asia whose exports were in the process of redirection toward China.² As Figure 4 shows, there was a significant negative shock total Indonesian export demand, and simultaneously across all the major export destinations.

We suggest several possible reasons why Indonesia proved able to handle the GFC better, and to become the third fastest growing country in the G20. First, its fundamentals prior to the GFC were stronger. Compared with the lead-up to the AFC it had high economic growth, low and stable inflation; a comparatively low debt to GDP ratio and fiscal deficit; higher international reserves; reformed institutional and business regulation; and strengthened

¹ The figure suggests that there might have been a financial bubble in the Chinese asset markets prior to the GFC. These were heavily influenced by capital controls and domestic change in China, prior to the GFC but show evidence of substantial outflow with its onset. Peak to trough proportional falls in stock indices were 49% for the US but, for the Asian and regional countries they were China 71%, Japan 57%, Singapore 58%, Indonesia 55% and Australia, 51%.

² The literature on the post-2000 growth of Asian trade in manufacturing components is now vast. A key early contribution is by Athukorala (2005).

corporate balance sheets. Second, although a drop in export demand was an important negative shock, the distribution of Indonesia's exports was more evenly spread across product lines (manufactures and commodities) and destinations (figure 2) and this enabled it to benefit from the strong Asian regional growth in the lead-up period. Moreover, as Figure 4 indicates, its performance was bolstered by strong growth in exports to China, particularly in the recovery phase.

Third, Indonesia had become a more advanced economy during the prior decade. Still the world's 4th most populous country, it had enjoyed a 289% increase in GNI/capita in the decade since 1999 (World Bank, 2013). This implied greater saving and a smaller proportion of its populace near the poverty boundary, providing a cushion against global turbulence. Fourth, the GFC originated from developed countries (the US and Europe) and, although there was capital flight from Indonesia, the financial contagion did not have the depth and proximity that it had during the AFC. The growth of nearby China and of Indonesia's associated exports, were a source of confidence that militated against a full-on currency run of the type that had occurred previously.

Fifth, the more flexible (dirty float) exchange rate regime was an effective buffer to domestic inflation. The IDR floating rates against the RMB, the Yen, the Euro and the USD can be seen in Figure 3. These show the importance of the trade relationships with China and Japan in that, post-GFC, a return to pre-GFC parity was permitted against the US\$ but not against the Yen or RMB, the currencies of Indonesia's principle export destinations. This path was influenced indirectly by Bank Indonesia via the accumulation of reserves. Sixth, the onset of the GFC did not coincide, as did that of the AFC, with a major political transition. A more stable and encompassing political environment provided wider participation in economic activity, the incentive for corporate innovation and room for creativity.

4. Modelling the Indonesian Macroeconomy in the Short Run

We employ an elemental small open economy macro that is calibrated to national accounts data for Indonesia in about 2011. It is constructed in the tradition of Mundell (1963) and Fleming (1962), as updated by McCallum and Nelson (1997), and it incorporates the markets for two products: differentiated home and foreign goods, and three primary factors:

production labour, skill and capital.³ A full raft of taxes is included: on labour income, capital income, consumption expenditure, imports and exports. It is designed to represent a length of run over which investment does not change the effective capital stock, so that its primary application is to comparative static analysis of shocks that cause departures from some initial long run growth path. The simulated economy is therefore not in a steady state and so the expected rates of return that drive investment need not equal the real equilibrium rates of return in simulated financial markets. Expectational variables are available in the model. These are exogenous, however, so that unless they are shocked there are no *anticipated* changes in prices, rates of return, interest rates or exchange rates. All resulting inflations, devaluations and yield changes are then surprises to all represented agents.

The supply side

Production: Output is assumed to be Cobb-Douglas in the three primary factors, so that the production of local “corn” and the local marginal product of capital are:

$$(1) \quad Y = A(\theta L)^{\beta_L} S_K^{\beta_S} K^{\beta_K} \text{ where } \beta_L + \beta_S + \beta_K = 1$$

$$(2) \quad MP_K = \beta_K \frac{Y}{K} = [A\beta_K S_K^{\beta_S} K^{\beta_K-1}] (\theta L)^{\beta_L}$$

The return on installed capital net of depreciation is then $r_C = MP_K - \delta$, where δ is the depreciation rate. Recall, from above, that the simulated economy is not in a steady state and so, in general, this net return does not equal the real return on home bonds: $r_C \neq r$.

The product real wages of production and skilled workers depend on the corresponding marginal products.

$$(3) \quad w = \frac{W}{P_Y} = MP_L = \beta_L \frac{Y}{L}$$

$$(4) \quad w_S = \frac{W_S}{P_Y} = MP_{S_K} = \beta_{S_K} \frac{Y}{S_K}$$

The unemployment rate is calculated for all workers, where the labour force is F .

$$(5) \quad u = \frac{F - S_K - L}{F}$$

³ More recent progenitors are employed by Tyers (2001) and Rees and Tyers (2004).

The demand side:

Here, GDP (=GNP in this case, since there are no net factor income flows on the current account) is distributed between direct tax, consumption and private savings. Start with direct tax.

Income tax: This is a dollar value. A constant marginal direct tax rate, t_W , is assumed to apply to all labour income, while the marginal tax rate on capital income is t_K . The corresponding “powers” of these rates are $\tau_W = (1 + t_W)$ and $\tau_K = (1 + t_K)$ and these appear in the coding of the model. There is no distinction between home “corn” and capital goods, so the capital goods price is P_Y .

$$(6) \quad T_Y = t_W (WL + W_S S_K) + t_K r_C P_Y K$$

Note that capital income is taxed based on its actual net (of depreciation) rate of return, r_C , rather than the market interest rate, r .

Consumption: Aggregate consumption, here volume c , corresponding with expenditure C , depends negatively on the real after-tax return on savings and positively on disposable (post direct tax) money income, $Y_D = P_Y Y - T_Y$. It also depends positively on the level of expected future disposable income, Y_D^e :

$$(7) \quad c = \frac{C}{P^C} = A^C \left(\frac{r}{\tau^K} \right)^{-\varepsilon^{CR}} \left(\frac{Y^D}{P^C} \right)^{\varepsilon^{CY}} \left(\frac{Y^{De}}{P^C [1 + \pi^{Ce}]} \right)^{\varepsilon^{CY}}.$$

To capture the home household’s substitution between home “corn”, which it consumes in volume c_H , and foreign “corn”, aggregate consumption is a CES composite of the two:

$$(8) \quad c = \left(\alpha_H c_H^{-\rho} + \alpha_M M^{-\rho} \right)^{-\frac{1}{\rho}}$$

The home household then solves the following problem: for given aggregate consumption, C , above, choose C_H and M to minimise consumption expenditure:

$$(9) \quad P_C C = P_Y (1 + t_C) C_H + \frac{P^*}{E} (1 + t_M) (1 + t_C) M = P_Y \tau_C C_H + \frac{P^*}{E} \tau_M \tau_C M$$

Here the volumes, C_H and M , are each multiplied by their respective domestic prices as augmented by the “powers” of the consumption tax and the import tariff, τ_C and τ_M . P^* is

the foreign currency denominated price of foreign “corn” before any import tariff is paid and E is the nominal exchange rate in F\$/Rupiah.

Optimum consumption yields an elasticity of substitution between home “corn” and imports of $\sigma=1/(1+\rho)$ and the initial expenditure shares of each in the composite of consumption are $s_H = \alpha_H^\sigma$ and $1-s_H = \alpha_M^\sigma$. The volumes of the two “corn” varieties consumed then depend on the “powers” of the consumption tax and import tariff and the prices:

$$(10) \quad C_H = s_H C \left[\frac{P_Y \tau_C}{P_C} \right]^{-\sigma}, \quad M = (1-s_H) C \left[\frac{\frac{P^*}{E} \tau_M \tau_C}{P_C} \right]^{-\sigma}$$

Given these consumption volumes, the composite price of all consumption emerges from the substitution of (6.8) and (6.10) in (6.9) as:

$$(11) \quad P_C = \tau_C \left[\alpha_H^\sigma P_Y^{1-\sigma} + \alpha_M^\sigma \left\{ \frac{P^*}{E} \tau_M \right\}^{1-\sigma} \right]^{\frac{1}{1-\sigma}}$$

Private savings: This is the residual after direct tax and consumption (gross of consumption tax) are deducted from the value of GDP, $P_Y Y$. We can also expand the final term by substituting from (9), above:

$$(12) \quad S = P_Y Y - T_Y - P_C C = P_Y Y - T_Y - P_Y \tau_C C_H - \frac{P^*}{E} \tau_M \tau_C M$$

Indirect tax revenue: This includes that from import and export taxes:

$$(13) \quad T_M = t_M \frac{P^*}{E} M = (\tau_M - 1) \frac{P^*}{E} M, \quad T_X = t_X P_Y X = (\tau_X - 1) P_Y X.$$

and from consumption tax, which is levied on both home goods and imports:

$$(14) \quad T_C = t_C P_Y C_H + t_C \frac{P^*}{E} (1+t_M) M = (\tau_C - 1) P_Y C_H + (\tau_C - 1) \frac{P^*}{E} \tau_M M.$$

Government (+central bank) revenue: This is government revenue less the sum of government expenditure and the annual increment to the holdings of official foreign reserves. So the dollar value of government savings is then:

$$(15) \quad S_G = T_Y + T_C + T_M + T_X - P_Y G - \Delta R.$$

To simplify the demand side, government spending is assumed to be directed only at home goods, whose price is P_Y .

Domestic savings: This is then the (value) sum of private and government savings in the home economy.

$$(16) \quad S_D = S + S_G$$

Capital and financial account flows: On the inflow side, these are associated with acquisitions of home assets by foreigners, while on the outflow side, they represent acquisitions of foreign assets by home residents. These flows are assumed to depend on the extent of the departure from uncovered interest parity, the measurement of which is based on changes in a parity ratio. This links the home after tax yield and the expected rate of return on foreign assets, which in turn depends on the current real yield abroad, r^* , a risk premium, ρ , and the expected rate of change in the real exchange rate, $\hat{e}^e$:

$$(17) \quad \lambda = \frac{r(1-t^K)}{r^* + \rho + \hat{e}^e}.$$

Home to foreign flows, SHF, and foreign to home flows, SFH, are then:

$$(18) \quad S_{HF} = S_D \phi \left(\frac{\lambda_0}{\lambda} \right)^{\sigma_H}, \quad S_{FH} = S_{FH}^0 \left(\frac{\lambda}{\lambda_0} \right)^{\sigma_F},$$

where the subscript 0 refers to initial equilibrium conditions, ϕ is the initial proportion of home saving that is directed abroad, σ_H is the elasticity of substitution between home and foreign assets, viewed from the home economy, and σ_F is the corresponding elasticity, as viewed from abroad.⁴

Investment: This comprises real break-even investment, δK , and real net investment, I^N . Net investment depends on the (expected) profitability of new machines, which depends in turn on the (expected) marginal product of capital, $MP_K = MP_K(\theta L, K)$ less its opportunity cost, the real return on bonds, r ,⁵ and depreciation cost, δ . MP_K depends, among other things, on the number of effective labour units, θL . The (expected) net return from the last machine purchased is larger the larger is the quantity of effective labour to go with it. So the (expected) return from investment in new capital must also be larger the larger is the

⁴ It is assumed that the elasticity viewed from home is smaller given the comparatively idiosyncratic nature of home assets and investors.

⁵ Note that the home bond yield is influenced by the risk premium imposed by financial investors, via (17).

expected number of effective workers in employment – that is, following technical change or an increase in employment. The expected net return on installed capital is then, as above, $r_c^e = MP_K^e - \delta$.⁶ Here this determines real net investment via a Q-style ratio in which the numerator reflects the current value of new capital and the denominator its current financing cost, $\gamma = (r_c^e / r)$.

$$(19) \quad I = I^N + \delta \bar{K} = I_0^N \left[\frac{\gamma}{\gamma_0} \right]^\varphi + \delta \bar{K} ,$$

where φ is an elasticity of response to changes in the ratio.

Financing domestic investment: This is financed from domestic savings and net foreign savings. No separate capital goods category is included in the model. Instead, the capital goods sector consumes only home “corn” at price P_Y ; so that:

$$(20) \quad P_Y I = S_D + S_{NF}$$

Real exchange rate: This is defined as the ratio of the home currency price of home “corn” to the (before import tax) home currency price of foreign corn:

$$(21) \quad e = \frac{P_Y}{\left(\frac{P^*}{E} \right)} = E \frac{P_Y}{P^*} \quad (E \text{ in US\$/Rp})$$

Exports: This is the quantity of home “corn” demanded by foreigners. It depends negatively on the (after export tax) foreign currency price of home “corn” relative to the foreign currency price of foreign corn:

$$(22) \quad X = a_X - b_X \left[\frac{EP_Y(1+t_X)}{P^*} \right] = a_X - b_X e_R (1+t_X) = a_X - b_X e_R \tau_X$$

The balance of payments: This sets private and public net inflows on the capital account, KA , equal to net outflows on the current account (the current account deficit $-CA$). Note that inflows on the current account associated with exports incorporate export tax revenue since

⁶ To allow the expected net return on installed capital to be fixed exogenously (for example, reflecting a change in expectations not determined within the model) we add a slack variable, so $r_c^e = r_c \cdot RCSLK$. If expectations require an exogenous shock to the expected net return on installed capital, $RCSLK$ is made endogenous and the link between the net returns in the current and future periods is severed. If, on the other hand, the current and expected future net returns are to be the same, then $RCSLK$ is made exogenous and set to unity.

foreigners pay the export tax, at rate t_X or with power τ_X . Import tax revenue does not appear, since this is a transfer between the domestic household and the government.

$$(23) \quad KA = S_{NF} - \Delta R = -CA = \frac{P^*}{E} M - P_Y (1 + t_X) X = \frac{P^*}{E} M - P_Y \tau_X X$$

The money market (LM equations): These offer a textbook characterisation of the home money market, with transactions demand for home money driven by GDP and the opportunity cost of holding home money set at the nominal yield on home long term bonds (since the aggregate portfolio comprises mainly long term assets), which is the real yield plus the expected inflation rate, π^e . The short interest rate determines the monetary base but this lies in the background here. The principal instrument of monetary policy is the monetary base. Real money balances are measured in terms of purchasing power over home “corn”.

$$(24) \quad m^D = a^{MD} (y)^{\varepsilon^{MY}} \left(\frac{r(1 + \pi^e)}{\tau^K} \right)^{-\varepsilon^{MR}} = \frac{M^S}{P^Y}$$

⁷**Policy responses**

As the model analytics indicate, a variety of macroeconomic policies are represented and these are all available to represent responses to the external crisis shocks. They are detailed in Table 2.

Model database and operation

The model database is built on national accounts as well as international trade and financial data for the Indonesian economy in 2011. The numbers used and their compilation is detailed in the Appendix.

Solutions require a choice of shocks and closures, the latter allowing the determination of the labour market equilibrium in each region (fixed or flexible nominal wage), the fiscal policy regime (fixed nominal or real government expenditure or a fixed nominal deficit) and the monetary policy regime (whether the target is the price level, the exchange rate or the money supply itself). These options are detailed in Table 3.

⁷ The monetary base, managed by the central bank, and the nominal money supply are linked by a textbook money multiplier, which depends on the financial sector’s reserve to deposit ratio and the public’s cash to deposit ratio. In financial crises both of these rise, causing monetary contraction even while there is no change in the monetary base. Lacking data on these determinants during Indonesia’s crises, we make no use of this relationship here.

5. Simulating AFC Impacts and Responses

A stylised representation of the early AFC shocks and responses is considered. The particular shocks and closures are detailed in Table 4. The first core shock is a substantial increase in the investment risk premium demanded of assets in Indonesia. That this occurred is obvious from Figure 5, with the spread over external rates rising many-fold during the crisis. We consider the effects of the initial doubling.⁸ The second core shock is a reduction in the effective capital stock. This is a secondary consequence of the first in that the crisis saw highly leveraged manufacturing firms go insolvent as borrowing rates and home currency debt levels rose. Many of these firms closed their doors pending the reassignment of property rights over their capital, which was therefore, at least temporarily, unavailable for use.

A third shock is designed to represent the fiscal tightening imposed in the early stages as part of the IMF reform package. This policy was combined with the early defence of the currency, exacerbating the rise in domestic debt service costs. The third policy regime considered relinquishes both these policy elements by removing the fiscal contraction and allowing a currency float. In the brief period represented by this simulation no particular target of monetary policy is considered; the central bank is assumed merely to hold the monetary base constant. Finally, we consider the policy combination that arrested the crisis, which was the float combined with a money-financed fiscal expansion. During capital flights, agents eschew all domestic assets, including both home money and home government debt, and so the only possible monetary expansion at such times is facilitated by the expansion of government debt, and the only possible fiscal expansion is one that is money financed.

As suggested by the results summarised in Table 5, the raw economics of the initial crisis shocks yields a serious economic contraction. The capital flight might normally be expected to tighten home financial markets and hence to devalue home assets, including money. This causes an inflation (a devaluation of home money relative to goods). In the first case considered in Table 5 the financial tightening occurs but not the inflation, primarily because the flight is resisted by an exchange rate peg, which requires a large monetary contraction,

⁸ This is because the subsequent extreme rise in yields was a consequence of panic and overshoot in association with the abandonment mid-crisis of the US\$ peg. Our simulations set expectations over prices and exchange rates to be myopic and so changes are surprises. We might have added an extra phase in which a depreciation was then expected, which would have greatly enlarged the simulated changes in the yield and exchange rate. During our experiments it became clear that such a shock, implying pure panic conditions, would have pushed our model well beyond its behaviourally reliable range.

rendering home money so scarce that there is actually an output-sapping deflation. This is not a very credible outcome, and certainly not the one that occurred. But the results show that an effective peg would have led to the worst of the alternative outcomes shown. This outcome would have been still worse, if marginally so, were it combined with a fiscal contraction of the type advocated early in the crisis. It would have enlarged the underlying real depreciation and hence the producer-price deflation, as well as the fall in employment.

Consider next the case where the peg is relinquished but, at least temporarily, the central bank sits on its hands and holds the monetary base constant. Then the real and nominal depreciations are large but the contraction in money demand due to the higher domestic yield (indeed the flight from domestic assets including money) causes a large contraction in the value (purchasing power) of the home money stock. While ever the supply of home money is unchanged, this requires a devaluation of money relative to goods and hence the anticipated inflation, which occurs across all three price indices. This result offers an overall improvement, however, since it lessens the home financial tightening and the associated investment collapse. It also contracts the employment loss and the real GDP decline, which in turn, lessens the contraction in saving and so eases the financial tightening.

Finally, consider the ultimate response offered by the Indonesian government: the addition of a money-financed fiscal expansion. By facilitating a monetary expansion in what is already an inflationary situation, the downside to this policy response is the additional inflation it brings and the further undermining of a currency that is already under immense pressure. In the crisis situation, however, it was essential to sustain economic activity and employment, even at this increased cost.⁹ The simulation results in the final column of Table 5 support this contention, combining accelerated inflation with a significant curtailment of the GDP shortfall. Of course, neither of the policy regimes with currency floats are attractive when the criterion is the purchasing power of domestic income at consumer prices. This is because of the inflating effect the currency depreciations have on consumer prices, and hence on the cost of living. Increased poverty in Indonesia was an inevitable outcome of the AFC, whichever policy response had been implemented. The money-financed fiscal expansion at least offered the government resources to maintain emergency supplies of essentials and to manage the crisis more generally.

⁹ In addition to which the fiscal expansion, by being directed at mostly non-traded home products and services, tended to stem the real depreciation. See Froot and Rogoff (1995) and Galstyan and Lane (2009).

6. Simulating GFC Impacts and Responses

In the lead-up to the GFC, Indonesian macroeconomic indicators were more prudent and robust than they had been prior to the AFC. Of particular importance in Indonesia's resilience in the face of external shocks were its comparative fiscal balance, lower debt service ratio and lower share of foreign source loans. Unlike its first response to the AFC there was no immediate tightening of monetary policy and no fiscal contraction. Of course, these positions were made easier by the continuing glut of global saving, which saw international long rates low and large and unconventional Northern Hemisphere monetary expansions that sustained the downward pressure on these rates.

Northern Hemisphere economies had become increasingly indebted and, following the US financial collapse in 2008, the wealthy private agents who had been the beneficiaries of higher government spending and reduced taxation were then able to force governments to carry the burden under the rubric of "too big to fail". Private sectors deleveraged while governments faced debt crises, with servicing facilitated by monetary expansions. But the monetary expansions were insufficient and eventually constrained by the zero interest rate lower bound. This had two effects. First, transitions to unconventional monetary policy notwithstanding, monetary expansions would henceforth offer weaker defence against deflation and so global portfolios rebalanced toward money holdings in general and US\$ in particular.¹⁰ Second, the deflation, combined with prospects for its continuation, led to a substantial drop in Northern Hemisphere aggregate demand, reducing global trade. Indonesia therefore faced two key consequences: a rise in its risk premium as financial flows fled the country for US\$ assets and a drop in foreign demand for Indonesian products (Figure 4). The former caused substantial financial tightening, as indicated in Figure 5.

Indonesia's first line of defence was to run down foreign reserves. These had risen steadily during the decade since the AFC, in part so as to sustain parity with other Asian currencies, and particularly the RMB, and in part to sterilise substantial growth in financial inflows after 2009, peaking in 2010¹¹. Foreign reserves were contracted in 2008, generating an inflow on the balance of payments to offset the GFC-driven outflows (Figure 7), though this inflow only partially mitigated the financial shock and the exchange rate depreciated against the US\$

¹⁰ The initial, anticipatory, effect in the Northern Hemisphere had been an outpouring of financial flows from the US and so a brief influx to economies in transition during the lead-up to the GFC. When the US crash occurred, however, there was a global rush to hold US\$ and so there was a reversal of the lead-up flows. We focus here in the latter period.

¹¹ Bank Indonesia accumulated \$30 bn in international reserves in 2010 alone.

(Figure 2). Home yields rose substantially (Figure 5) and domestic investment fell. To compound this negative financial shock, the demand for Indonesian exports then fell.

Our modelling considers the stylised representation of these two negative shocks, along with the short run effects of offsetting policy responses, as indicated in Table 6. On the monetary side, these included the reserve run-down, and a “dirty float” that partially sterilised the reserve run-down but still allowed the currency to depreciate. Initially, this is simulated as having the same effect as a pure float with consumer price target, the achievement of which requires significant monetary contraction. Subsequently, the monetary contraction is softened, allowing some consumer price inflation and relieving the pressure on domestic firms.

Also included in the response is a substantial fiscal expansion and a surge in investment confidence. The evidence for the latter shock is supported by the growth of foreign direct investment during the period and the continued expansion of exports to China (Figure 4). China’s very brief contraction and strong resurgence to benchmark growth (well ahead of the other large economies) would have sustained optimism amongst investors supplying to the Chinese economy, including from Indonesia.

Simulation results are summarised in Table 7, which shows that the primary external shocks, though smaller than those during the AFC, were remain negative for Indonesian performance. Without policy responses the combined shocks would have caused effects reminiscent of those in the first phase of the AFC, indicated in Table 5. The two sets of simulations differ in that the AFC caused liquidity problems that were much less a feature of the GFC experience and so we have not included any sequestered capital. The initial effects of the unmitigated AFC were therefore more severe in real terms. Financial resiliency had greatly improved and growth in exports to China was very likely a source of business confidence during this period.

The run-down in reserves during 2008 offered a minor offset to the overall impacts but the most significant countervailing effect is seen to be due to the fiscal expansion, which is large enough to help stem the currency depreciation.¹² Further mitigation stems from the softer monetary policy and sustained business confidence, which we see has being enhanced by the government’s more decisive action in the face of the crisis, thus avoiding the policy re-direction mid-crisis that plagued the AFC experience.

¹² As during the AFC, the fiscal expansion, by being directed at mostly non-traded home products and services, tended to stem the real depreciation. See Froot and Rogoff (1995) and Galstyan and Lane (2009).

7. Conclusion

Although the origins of the AFC and the GFC were external, during the AFC the coincidence of financial contagion with domestic political upheaval saw the Indonesian economy collapse. By contrast, during the decade-later GFC, when most nations slumped into recession the Indonesian economy slowed but did not recess, recording one of the world's best performances for the period. Here, numerical modelling of stylized AFC and GFC effects on Indonesia is carried out to investigate the separate effects of component shocks and policy responses. The strengthening of the economy's capacity to absorb external shocks is evident from its reduced dependence during the GFC on external financing and associated policy prescriptions, not to mention its increased size following a decade of growth in the shadow of the larger and more rapidly expanding Chinese economy. Nonetheless, its performance during the GFC is remarkable considering that both crises precipitated capital flights from Indonesia, yet its economy out-performed the rest of East and Southeast Asia, where most countries suffered not only major asset price collapses but, contrastingly, periods of stalled or negative growth.

The analysis suggests that some of the contrast between Indonesia's performance during the AFC and the GFC stems from differences in the external shocks, with an export contraction being the distinguishing feature of the GFC. This contraction is more readily offset by domestic demand growth from a fiscal expansion than the insolvencies and the sequestering of capital that restricted output during the AFC. Nonetheless, in the end, a similar policy prescription applied in both cases: a real and nominal depreciation combined with a fiscal expansion. Implementation differences during the GFC were, first, that no mid-stream change of macroeconomic policy response invited investor panic. Second, the fiscal expansion was more readily financed and so high inflation was avoided. Third, foreign reserves were more substantial and a rundown during 2008 helped limit the negative financial impacts to be offset, and fourth, greater optimism prevailed over investment given the very significant trading relationship that was building with a Chinese economy that had expanded miraculously in the preceding decade and which recovered quickly following the initial GFC shocks.

Importantly, there is evidence of a clear evolution in Indonesia's capacity to implement competent macroeconomic policy between the crises that is partly responsible for its strong

performance through the GFC. This bodes well for its prospects of adjustment in the face of the multitude of external shocks that remain on the horizon.

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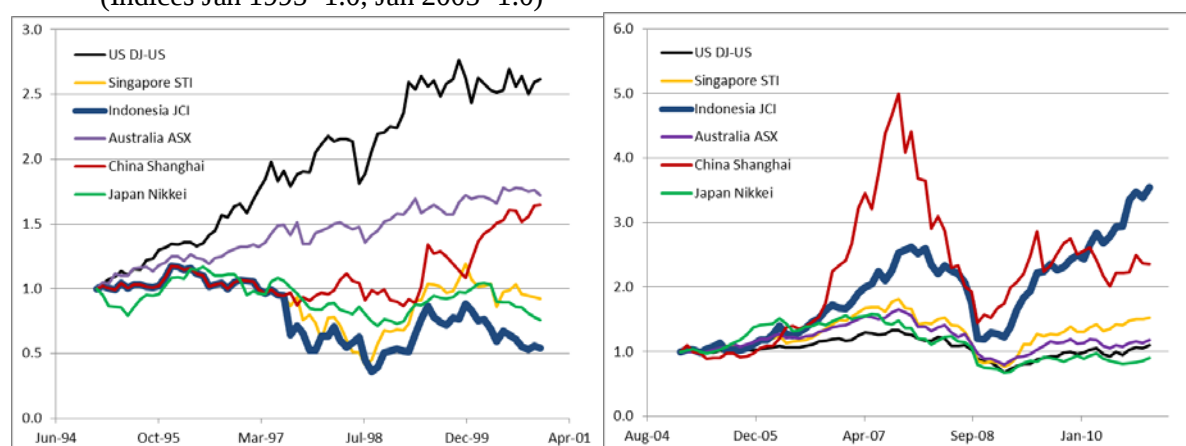
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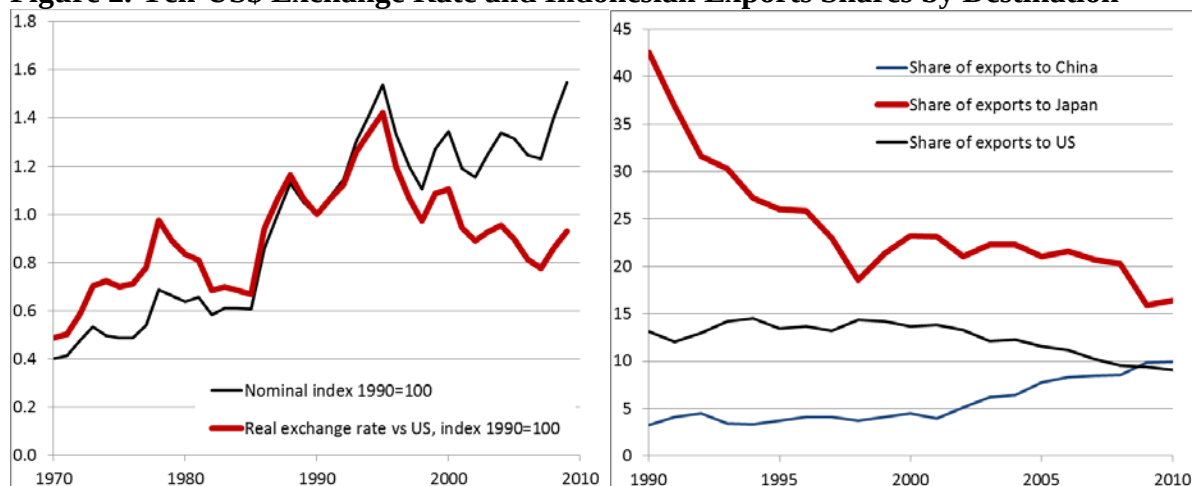
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Figure 1. Asset Price Indices During the AFC and the GFC
(Indices Jan 1995=1.0, Jan 2005=1.0)



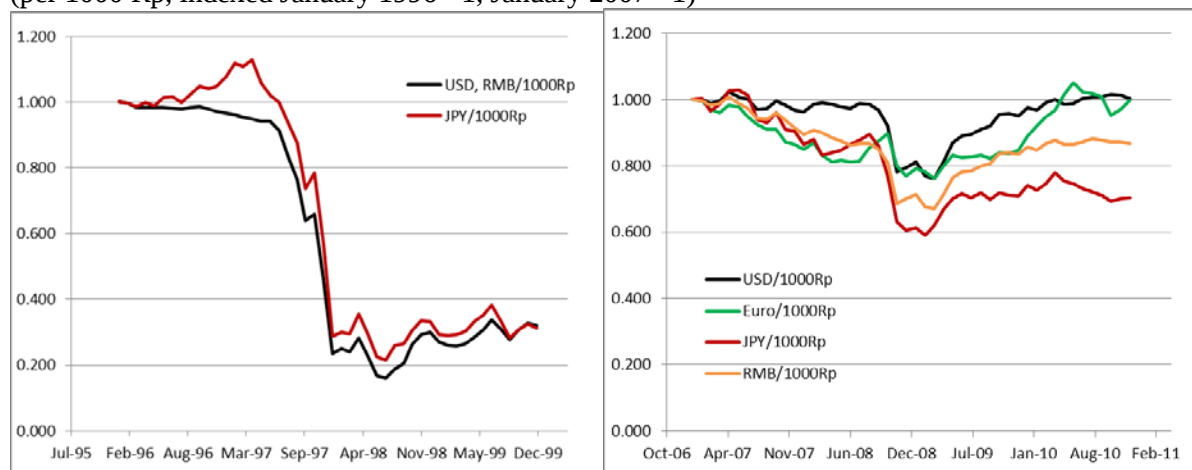
Source: FRED, Quandl and Bloomberg.

Figure 2. Yen-US\$ Exchange Rate and Indonesian Exports Shares by Destination



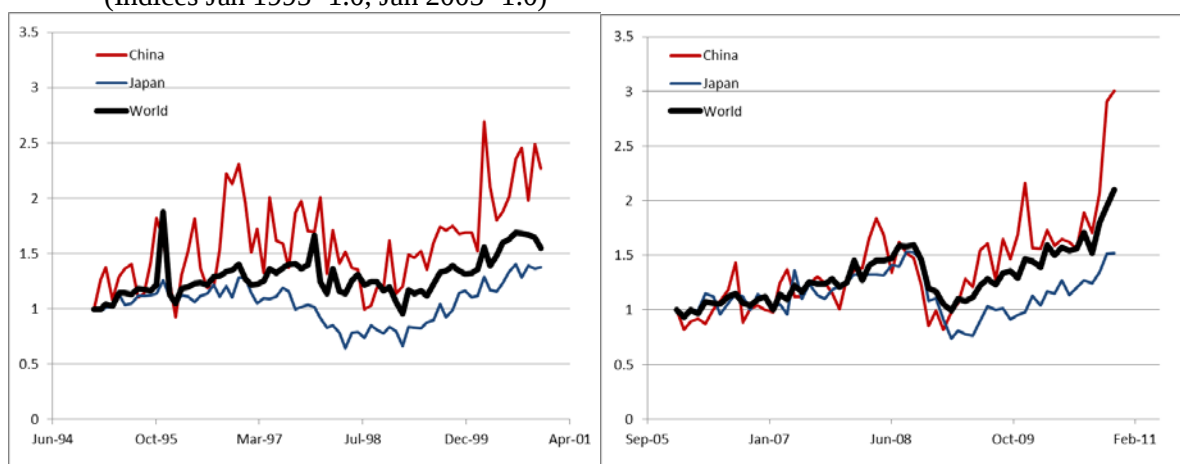
Source: Nominal and real exchange rates are from Tyers (2012). Trade shares are derived from UN Comtrade data by Bank Indonesia.

Figure 3. AFC and GFC Exchange Rates, against US\$, RMB, Yen and Euro
(per 1000 Rp, indexed January 1996 =1, January 2007 =1)



Source: Bank Indonesia, Oanda and Federal Reserve Bank

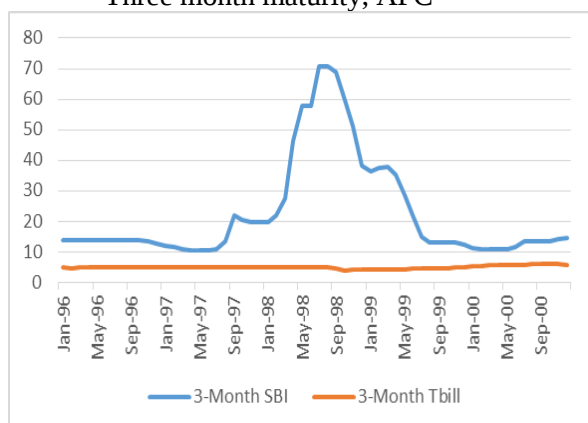
Figure 4. Monthly Indonesian Export Revenue by Key Destination
(Indices Jan 1995=1.0, Jan 2005=1.0)



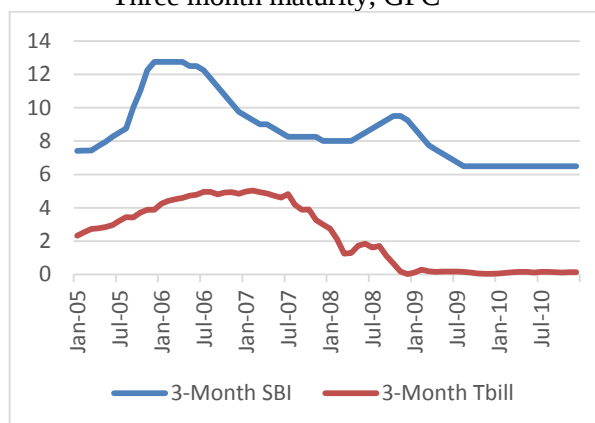
Sources: UN Comtrade, Bank Indonesia.

Figure 5. Bond yields through the AFC and the GFC

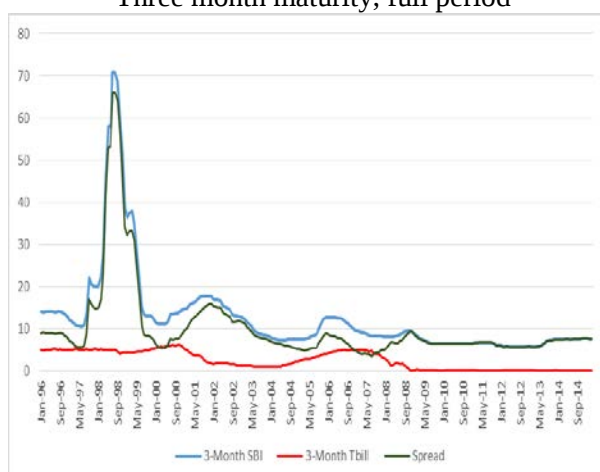
Three month maturity, AFC



Three month maturity, GFC



Three month maturity, full period

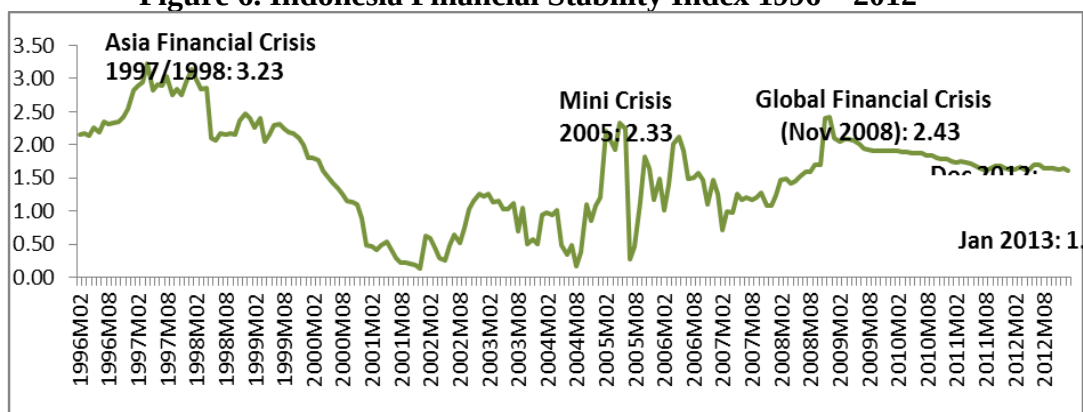


10 year maturity, GFC



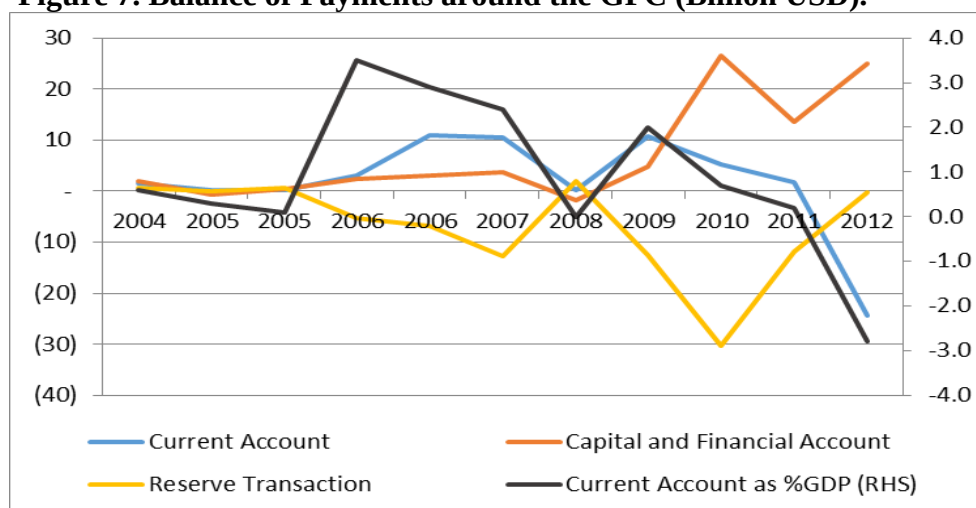
Source: Bank Indonesia and Federal Reserve Bank

Figure 6. Indonesia Financial Stability Index 1996 – 2012



Source: [Bank Indonesia \(2012\)](#)

Figure 7. Balance of Payments around the GFC (Billion USD).



Source: Economy and Finance Statistics, Bank Indonesia

Table 1. Indonesia and ASEAN Countries Economic Performance (AFC)

	Indonesia	Malaysia	Singapore	Thailand
<i>GDP Growth</i>				
1991-5	7.8	8.7	8.5	8.6
1996	8.0	8.6	6.9	5.5
1997	4.7	8.0	7.8	-0.4
1998	-13.6	-6.7	1.3	-6.5
<i>Inflation</i>				
1991-5	8.9	3.6	2.6	4.8
1996	6.5	3.5	1.4	5.8
1997	11.6	2.6	2.0	5.6
1998	65.0	5.4	-0.2	8.1
<i>CA/GDP</i>				
1991-5	-2.4	-7	12.9	-6.2
1996	-3.3	-4.9	15.0	-7.9
1997	-2.9	-5.2	15.4	-2.0
1998	5.4	7.5	17.8	8.1
<i>Budget/GDP</i>				
1991-5	-0.2	0.3	12.4	2.8
1996	1.2	1.1	13.9	2.4
1997	1.2	5.5	6.0	-0.9
1998	-5.5	-1.0	-1.0	-4.5

Source: Hill (1999:24).

Table 2: Government Policy Instruments Represented in the Modelling:

Policy	Instrument	
Fiscal policy	Government spending	G
	Labour income tax	Tax rate, t^L
	Capital income tax	Tax rate, t^K
	Consumption tax (GST)	Tax rate, t^C
	Import tariff	Tax rate, t^M
	Export tax	Tax rate, t^X
Monetary policy (application depends on the target of monetary policy) ^a	Monetary base, \$ bn	M^B
	Rate of increase of official foreign reserves, \$ bn/year	ΔR

a For the alternative targets, see the closures available in Table 4.

Source: See the analytical description of the model in the text.

Table 3: Simulation Closures^a

Closure	
Labour market:	Exogenous nominal production (unskilled) wage with endogenous production employment
Fiscal policy:	Exogenous nominal government spending and endogenous government revenue at fixed rates of tax on income, consumption and trade
Monetary policy targets^{b,c}	1. Monetary base ^d , M^B
	2. Producer price level, P^P
	3. Consumer price level, P^C
	4. Production employment, L

a Since the model is a system of non-linear simultaneous equations and more variables are specified than equations in the system, there is flexibility as to the choice of those to make exogenous. This choice mirrors assumptions about the behaviour of labour markets, fiscal deficits and monetary policy targets.

b Money supplies can be set to target any of the three price levels (consumer, producer and GDP), nominal exchange rates against the US\$ or nominal GDP levels.

c No changes in commercial bank reserve behaviour are assumed so that money multipliers remain constant.

Table 4: Stylised AFC Shocks, Closures and Policy Responses^a

Scenario	Shocks, %, and closure elements	
1. AFC with no response	Change in yield spread as proportion of ex ante foreign yield, ρ	90
	Sequestering of physical capital, K	-15
	Monetary closure: exchange rate peg, E	
	Fiscal closure: fixed nominal expenditure, G	
	Labour market closure: fixed nominal wage, W	
2. AFC with fiscal tightening	Change in yield spread as proportion of ex ante foreign yield, ρ	90
	Sequestering of physical capital, K	-15
	Nominal government spending, G	-30
	Monetary closure: exchange rate peg, E	
	Fiscal closure: exogenous nominal expenditure, G	
	Labour market closure: fixed nominal wage, W	
3. AFC with float	Change in yield spread as proportion of ex ante foreign yield, ρ	90
	Sequestering of physical capital, K	-15
	Monetary closure: float with target P^C	
	Fiscal closure: fixed nominal expenditure, G	
	Labour market closure: fixed nominal wage, W	
4. AFC with float and money financed fiscal expansion^b	Change in yield spread as proportion of ex ante foreign yield, ρ	90
	Sequestering of physical capital, K	-15
	Nominal government spending, G	66
	Monetary target M^B , shocked to match ΔG	15
	Labour market closure: fixed nominal wage, W	

^a Closures vary with cases, as indicated, but are selected from the list in Table 3.

^b In this experiment the fiscal expansion is matched to the increase in the monetary base associated with the coincident monetary expansion.

Source: Simulations of the model described in the text.

Table 5: Effects of Stylised AFC Shocks and Policy Responses^a

% changes	AFC with peg and no other no response	AFC with peg and fiscal contraction	AFC with float, M^B target	AFC with float and money financed fiscal expansion
Domestic real long yield, r	77	75	38	25
Consumer price level, P^C	-5	-5	26	42
Producer price level, P^P	-9	-11	11	22
Exchange rate vs US\$, E	0	0	-37	-53
Real exchange rate vs US, e_R	-9	-10	-27	-34
Real investment, I/P^P	-36	-35	-20	-19
Production employment, L	-22	-24	3	17
Real output (GDP), Y/P^Y	-14	-14	-8	-4
Real income Y/P^C	-18	-19	-21	-21

^a These results are from the model described in the text with the closures and shocks as for Table 5. Note that all results and policy responses refer to the immediate short run. A physical capital contraction is included, due to sequestered capital, which recovered in the longer run with eventual property rights reassignment in a manner not represented here.

Source: Simulations of the model described in the text.

Table 6: Stylised GFC Shocks, Closures and Policy Responses^a

Scenario	Shocks, %, and closure elements
1. GFC with float and no other policy response	Change in yield spread as proportion of ex ante foreign yield, ρ 100 Export demand contraction, a_X -20 Monetary closure: float with target, P^C Fiscal closure: fixed nominal expenditure, G Labour market closure: fixed nominal wage, W
2. GFC with float and a run-down of foreign reserves	Change in yield spread as proportion of ex ante foreign yield, ρ 100 Export demand contraction, a_X -20 Foreign reserve rundown, ΔR (%GDP) -4.8 ^b Monetary closure: float with target, P^C Fiscal closure: fixed nominal expenditure, G Labour market closure: fixed nominal wage, W
3. GFC shocks with float, reserve run-down and fiscal expansion	Change in yield spread as proportion of ex ante foreign yield, ρ 100 Export demand contraction, a_X -20 Foreign reserve rundown, ΔR (%GDP) -4.8 ^b Government spending expansion, G (%GDP) 10.6 Monetary closure: float with target, P^C Labour market closure: fixed nominal wage, W
4. GFC shocks with reserve run-down, fiscal expansion and softer monetary policy^c	Change in yield spread as proportion of ex ante foreign yield, ρ 100 Export demand contraction, a_X -20 Foreign reserve rundown, ΔR (%GDP) -4.8 ^b Government spending expansion, G (%GDP) 10.6 Monetary closure: target M^B with contraction -12 ^c Labour market closure: fixed nominal wage, W
5. GFC shocks with reserve run-down, fiscal expansion, softer monetary policy^c and stronger business confidence	Change in yield spread as proportion of ex ante foreign yield, ρ 100 Export demand contraction, a_X -20 Foreign reserve rundown, ΔR (%GDP) -4.8 ^b Government spending expansion, G (%GDP) 10.6 Monetary closure: target M^B with contraction -12 ^c Investment confidence, r_c^e 20 Labour market closure: fixed nominal wage, W

a Closures vary with cases, as indicated, but are selected from the list in Table 3.

b This is the difference between the level of reserves *had the original rate of accumulation been sustained* and the level after the run-down. It is therefore larger than the actual run-down.

c With the original float, defending the price level would have required a monetary contraction amounting to 22 % of the original monetary base. This shock is easier by half.

Source: Simulations of the model described in the text.

Table 7: Effects of Stylised GFC Shocks and Policy Responses^a

% changes	<i>GFC shocks with float and no other policy response</i>	<i>GFC shocks with float and a run- down of foreign reserves</i>	<i>GFC shocks with float, reserve run- down and fiscal expansion</i>	<i>GFC shocks with reserve run-down, fiscal expansion and softer monetary policy</i>	<i>GFC shocks with reserve run-down, fiscal expansion, softer monetary policy and stronger business confidence</i>
Domestic real long yield, r	81.1	63.2	90.3	70.7	80.1
Consumer price level, P^C	0.0	0.0	0.0	11.0	9.1
Producer price level, P^P	-20.1	-18.4	-10.7	-4.2	-3.8
Exchange rate vs US\$, E	-22.3	-20.2	-11.2	-25.1	-21.2
Real exchange rate vs US, e_R	-40.9	-37.6	-22.2	-29.7	-25.5
Real investment, I/P^P	-28.2	-23.8	-29.2	-24.1	-19.4
Production employment, L	-26.0	-23.8	-13.9	-5.6	-4.9
Real output (GDP), Y/P^Y	-6.5	-5.9	-3.4	-1.3	-1.2
Real income Y/P^C	-26.8	-24.7	-14.8	-16.6	-14.4

^a These results use the closures and shocks as for Table 5. Note that all results and policy responses refer to the immediate short run.

Source: Simulations of the model described in the text.

Appendix:

Table A1: Database and Parameters

Variables and base values ^a		Key parameters	
Variable	Base value	Parameter	Value
<i>Volumes:</i>		<i>Production shares:</i>	
GDP, Y	770	β_L	0.238
Consumption, C	457	β_S	0.212
Investment, I	267	β_K	0.550
Government spending, G	34	<i>Money market parameters:</i>	
Exports, X	220	Elast of money demand to	
Imports, M	208	Y	1.00
<i>Values:^a</i>		r	-0.10
Tax revenue	150	Reserve to deposit ratio	0.05
Direct	104	<i>Powers of marginal tax rates</i>	
Consumption	31	$(1 + t_w) = \tau_w$	
Import	15	$(1 + t_k) = \tau_k$	
Export	0	$(1 + t_c) = \tau_c$	
M_S	500	$(1 + t_m) = \tau_m$	
M_B	150	$(1 + t_x) = \tau_x$	
K stock	3000	<i>Consumption parameters:</i>	
Private saving, S	270	Elasticity of consn to Y^D	
Government saving, S_G	-9	Elasticity of consn to r	
Total domestic saving, S_D	290	Elasticity of exports to e_R, σ	
Financial outflow, S_{HF}	14	<i>Trade parameters:</i>	
Financial inflow, S_{FH}	32	Elasticity home-foreign substn	
Reserve growth, ΔR	30	Elasticity of exports to e_R	
<i>Price, initial levels:</i>		<i>Financial flow parameters:</i>	
r	0.141	Elasticity S_{HF} to parity ratio λ	
r^*	0.080	Elasticity S_{FH} to parity ratio λ	
P_C	0.893	<i>Investment parameters:</i>	
P_P	0.974	Elasticity of I_N to (r_c^e/r)	
P_Y	1.000	Depreciation rate, δ	
P^*	0.811	<i>Labour:</i>	
E	1.000	Skill share of L	
e_R	1.232	Initial skill premium, W_S/W	
		Participation rate, L/N	
		Population ^b , N	

a Values are in US\$ billions. b Population in millions. c The effective consumption tax rate is negative due to food and energy consumption subsidies.