How Can Indonesia Maintain Creditworthiness and Noninflationary Growth?

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Indonesia — unique among middle-income oil-producing countries — adjusted rapidly to oil price shocks, and it begins a new decade with good prospects for noninflationary growth and better creditworthiness. What is the country's secret?

Despite external shocks, Indonesia has main-
tained creditworthiness through swift adjust-
ment.

Indonesia's flexible economic management
and clear policy signals have lent stability to the
economy, in contrast to the stop-and-go reforms,
uncertainty, and constant debt renegotiations in
many high-debt countries.

The gains from this stable policy environ-
ment — in avoiding capital flight, attracting
productive foreign investment, and export diver-
sification — far exceed the likely benefits of
contentious debt reduction negotiations currently
under way in several highly indebted countries.

Unlike many other developing nations,
Indonesia has focused on resolving its debt
problems by increasing exports.

Ahmed and Chhibber use an econometri-
cally estimated macroeconomic model to
analyze open-economy adjustment in Indonesia
— particularly the interaction between the ex-
change rate, the interest rate, growth, and debt
— and to analyze future policy changes in light
of Indonesia's objectives for growth, external
debt, and inflation.

Indonesia's open capital account — domes-
tic interest rates must equal foreign interest rates
plus the expected rate of devaluation – elimi-
nates one avenue for effecting internal adjust-
ment. But it lends discipline to the country's
fiscal and monetary management.

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Introduction

The recent focus on debt renegotiation and debt reduction schemes has shifted attention from countries such as Indonesia which, despite external shocks, have maintained creditworthiness through swift adjustment. Indonesia's flexible economic management and clear policy signals have provided a substantial degree of stability to the economy. Unlike many high-debt countries, Indonesia has concentrated on efforts to resolve its debt problems through efforts to increase exports. As a result, it has avoided the costs and uncertainty surrounding the stop-go nature of economic policymaking that has afflicted most high-debt countries. Moreover, despite heavy adjustment, important social gains were achieved, as reflected in a substantial reduction in the incidence of poverty. [1]

A major factor driving the future adjustment effort is the external debt situation. A successful debt strategy for Indonesia will involve both running some surpluses in the non-interest current account (reducing the current account deficit) and enhancing future debt servicing capacity by increasing growth. However, there a· · ractical limits to the extent these two objectives can be reconciled. The attempt to squeeze too large a non-interest current account surplus can, in turn, hurt Indonesia by constraining economic growth and thereby reducing debt servicing capacity over the long term. Lower real growth will also adversely affect Indonesia's ability to address the social objectives of raising labor earnings and

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[1] The percentage of people falling below the designated poverty line fell from 57.1% in 1970 to 39.8% in 1980, and from 33% in 1984 to 22% in 1987.

reducing poverty. How the current account deficit gets reduced is also important. Real exchange rate depreciation results in real income losses due to revaluation of past debt. The important policy issue now is whether the real exchange rate needs to depreciate further or will lagged response to past depreciations and efficiency improvements result in sufficient export growth as well as import substitution.

The external adjustment will have to be accompanied by a corresponding internal adjustment. The key questions here are: (a) will the required internal adjustment lead to a low level of savings and investment; (b) what will be the share of this adjustment effort borne by the public versus the private sector; and (c) most importantly, how much of the adjustment will be borne by investment versus consumption. Indonesia's future internal adjustment challenge is to substantially raise the national savings rate. The public sector and, until recently, the private sector have been running deficits, as indicated by negative net savings. This has happened even though public and private investment rates have fallen noticeably, implying a sharp reduction in the national savings rate. The incidence of lower income resulting from terms of trade loss and reduced pace of growth has fallen disproportionately on savings because government policy supported the protection of consumption.

In this paper we set out a framework to address these issues quantitatively. To this end, we present a macroeconomic model of the Indonesian economy with endogenous determination of the real exchange rate and the real interest rate. The paper is divided into six sections. In Section I we present a summary description of Indonesia's recent adjustment efforts. In Section II we discuss the analytics of open-economy adjustment, in particular

the interaction between the exchange rate, the interest rate, growth and debt. Indonesia's open capital account implies that domestic interest rates must equal foreign interest rates plus the expected rate of devaluation. The open capital account therefore reduces one degree of freedom available to the Indonesian authorities to effect internal adjustment. On the other hand, it also provides discipline to the country's fiscal and monetary management as excessive credit creation would reduce domestic real interest rates and induce capital outflows. The implications of the open capital account for Indonesia's adjustment are analysed in this section. Section III presents the empirical estimates of the macroeconomic model. The key parameters are the interest and exchange rate sensitivity of private consumption and investment and the elasticity of exports and imports to the real exchange rate.

In Section IV, the model is used to illustrate the nature of external adjustment necessary to ensure the consistency of growth with external balance and the implications for exchange rate management. Section V then examines the internal adjustment which must accompany the required external adjustment, how much of it occurs in the public versus the private sector and the role of fiscal policy in effecting this adjustment. The last section provides the conclusions.

I. Recent Adjustment Efforts

The main source of external problems has been a severe deterioration in Indonesia's terms of trade, primarily due to the collapse of oil prices. [2] The revenue losses from falling oil prices have been compounded by the adverse effects of international currency fluctuations on debt service payments since mid-1985. The Government has responded to these external shocks by implementing a broad range of adjustment measures and structural policy reforms. As a result, the macroeconomic imbalances have been significantly reduced while economic growth has remained positive in per capita terms. Although some short-term social costs have been incurred, Indonesia's long-term growth prospects would undoubtedly have been severely jeopardized and debt accumulation would have accelerated faster if these necessary adjustments had not been implemented.

During 1983-88, Indonesia's external and fiscal imbalances were significantly reduced, inflation was contained at below 10% and economic growth remained positive in per capita terms (see Tables 1 and 2). Moreover, Indonesia was able to reduce reliance on oil earnings [3] and improve economic efficiency. A range of austere macroeconomic policies and structural reforms contributed to this performance. The exchange rate was devalued resulting in a real exchange rate depreciation of 55% between December 1981 and December 1988. Major devaluations were implemented in March 1983 and September 1986 and the flexibility of the exchange rate was increased through a more actively managed float. Strong fiscal measures designed to restrain expenditure and

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[2] See Brian Pinto (1987), Alan Gelb (1988), and Sadiq Ahmed (1989).

[3] In current dollars, the share of non-oil exports in total exports increased from 21% in 1982/83 to 61% in 1988/89.

Table 1: MEASURES OF THE OVERALL DEBT BURDEN
(%)

	1980	1981	1982	19.*	1984	1985	1986	1987	1988
Indonesia									
Medium and long term debt (US$ billion)	18.1	19.9	23.0	26.8	26.9	31.6	37.6	46.8	47.5
Debt/GNP	25.2	22.3	25.2	34.9	33.5	39.2	51.9	71.0	64.7
Debt/exports	80.5	79.5	115.9	127.6	123.8	158.9	247.7	236.8	220.8
Current account balance/GNP	3.4	-3.0	-7.9	-5.8	-2.8	-2.4	-5.9	-2.3	-2.5
Non-interest current account balance/GNP	5.0	-1.3	-6.0	-3.2	0.5	0.7	-1.9	2.3	2.1
Countries with recent debt-servicing problems									
Debt/GDP	32.5	37.6	43.7	47.6	47.6	49.1	51.3	53.9	
Debt/exports	151.5	186.1	240.9	254.6	246.3	266.8	309.5	313.4	
Current account balance/GDP	-3.6	-5.9	-5.5	-2.0	-0.9	-0.5	-1.8	-1.5	
Non-interest current account balance/GDP	-0.5	-1.7	-0.5	2.8	4.1	4.2	2.5	2.6	

Note: Countries with recent debt-servicing problems are defined as those which incurred external payment arrears in 1985 or rescehduled their debt during the period from end-1983 to end-1986.

Source: Bank Indonesia; World Economic Outlook (IMF), October 1987; IBRD

Table 2: RECENT ECONOMIC INDICATORS a/

	1981	1982	1983	1984	1985	1986	1987	1988
% of GNP								
Total Consumption	7:.1	76.5	77.3	76.6	76.8	81.3	79.2	78.8
Private	59.6	64.5	65.7	65.4	64.0	69.0	67.9	68.0
Public	1:.5	12.0	11.6	11.2	12.8	12.3	11.3	10.8
Total investment	30.8	30.3	29.3	27.1	25.6	24.5	24.2	23.8
Fixed investment	25.1	26.8	27.2	23.9	22.0	21.6	21.0	21.5
Private b/	14.0	13.6	14.0	13.0	10.8	12.0	11.3	11.6
Public	11.1	13.2	13.2	10.9	11.2	9.6	9.7	9.9
Current account balance	-3.0	-8.0	-5.8	-2.8	-2.4	-5.0	-2.3	-2.5
Imports of goods and NFS	25.7	24.8	26.3	22.6	20.9	20.7	25.0	24.9
Exports of goods and NFS	26.1	20.8	26.5	25.9	23.7	19.9	28.8	28.3
Fiscal balance	-2.0	-4.9	-2.8	0.6	-3.3	-4.6	-3.4	-3.4
Non-oil GDP growth (%)	8.3	4.2	3.8	4.5	3.8	3.9	4.6	5.6
CPI inflation (%)	16.7	8.6	11.8	10.5	4.7	5.8	9.5	8.5
Terms of trade index (1974 = 100)	165.3	161.5	147.4	148.0	138.2	92.8	106.0	103.4
Exchange rate (Rupiah/US$)	631.8	661.4	909.3	1025.9	1110.6	1282.6	1644.0	1696.0

a/   National accounts are on a calendar year basis; balance of payments
      and fiscal data are on a fiscal year basis.

b/   Investment in stocks is assumed to be financed by the private sector.

Source: Ministry of Finance, Bank of Indonesia and World Bank staff
          estimates.

mobilize public resources were introduced. As a result, non-oil taxes as a percentage of non-oil GDP grew from 8.3% in 1982/83 to 11.5% in 1988/89 and the overall public sector deficit declined from 4.9% of GDP in 1982/83 to 3.4% of GDP in 1988/89. Supportive monetary and financial policies were put in place to contain inflationary pressures, prevent capital flight, mobilize financial resources and improve the efficiency of use of financial resources. A major reform in June 1983 deregulated domestic interest rates. Subsequently, further measures to promote competition in the financial sector and boost capital markets were introduced in October-December 1988. Important steps were also taken to deregulate the real sector of the economy. Through a series of measures during 1985-88, non-tariff trade barriers were considerably eased, nominal tariffs were reduced and investment regulations for domestic and foreign enterprises were simplified.

Despite good external adjustment performance and the Government's cautious approach to external borrowing, the debt burden has risen sharply since the early 1980s. Many of the debt indicators for Indonesia are also above the average for all developing countries and in line with those for countries with "recent debt-servicing problems". These indicators reflect the adverse external environment faced by Indonesia since the early 1980s. Depreciation of the US dollar after 1985 added US$12.6 billion (31%) to Indonesia's public debt at end-1988 and US$1.9 billion (25%) to its debt servicing during 1988. Over the same period, oil prices fell by about one half, severely reducing Indonesia's export earnings. However, even with the rise in debt indicators, it is important to distinguish Indonesia from the countries with recent debt-servicing problems in several important respects: (a) it has maintained sound economic policies and a prudent borrowing

strategy; 4/ (b) as a result, it receives strong financial support from official sources on concessional terms; (c) it has substantial reserves available in the form of foreign exchange and undrawn lines of credit; and (d) it has retained access to new voluntary lending from commercial banks. Moreover, Indonesia's debt structure is better than in most developing countries, with a relatively high share of concessional debt and a relatively low share of variable interest debt.

Although the past achievements are impressive, Indonesia faces many important challenges for the future. Given the existing high debt service burden 5/ and uncertainties surrounding oil prices, the adjustment effort will need to continue in the short term. One of the central objectives of Indonesia's macroeconomic policy is to reduce its debt service and debt GNP ratios. On the other hand, the social objectives of providing higher-earning jobs to a growing labor force and reducing the incidence of poverty have become more pressing. In order to ensure that the pursuit of social objectives does not compromise financial stability, the consistency of macroeconomic policies will have to be maintained and the ongoing structural reform program will need to be strengthened.

Higher oil prices will no doubt help Indonesia's external position and reduce debt accumulation. A significant and additional key factor that will help reconcile the current account adjustment with enhanced debt service capacity is the growth of non-oil exports. The better the non-oil export

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4/ The Government has maintained strict limits on import-related and commercial credits, and reduced exposure to private banks.

5/ The medium and long term (MLT) debt service ratio in 1988 was 36%.

performance, the greater the success in achieving a reduction in the current account deficit. Moreover, higher non-oil exports will directly increase the current debt service capacity; this in turn will also improve long-term debt service capacity by enabling a faster growth of GDP. Therefore, the future external adjustment strategy will have to rely mainly on non-oil export promotion. There is already a recognition of this in the Government's recent policy framework. Thus, trade deregulation since 1986 is a reflection of the Government's strategy to move away from inefficient import substitution. Also, the combination of a competitive exchange rate and trade reforms has already boosted non-oil exports during 1986-89.

Until recently, the adjustment was borne largely through cuts in investment (Figure 1). Note that, despite substantial swings in income, both public and private consumption have grown smoothly (Figure 2). While sustained improvements in economic efficiency through deregulatory reforms and rationalization of public expenditure programs will benefit growth, continued reduction in investment will lower growth over the medium term. The question for the future is whether the required adjustment should continue to come from investment or should it come from increased resource mobilization.

One way to increase savings is through increased resource mobilization in the public sector. The Government's resource mobilization efforts and a recovery of economic growth since 1987 have helped raise the national saving rate, despite higher external interest payments. Given lower oil earnings, a much greater reliance on efficiency improvements will be essential to sustain the growth momentum in the 1990s than in the past. Even so, continued efforts will be necessary to increase the savings rate, so as to: (a) offset the effect of a lower rate of foreign savings (lower current

account deficit); and (b) finance a significant increase in the investment rate to support higher economic growth over the medium term. The need to effect adjustment without a cut in investment is a key adjustment challenge for the 1990s.

Figure 1.

Fixed Investment by Sector
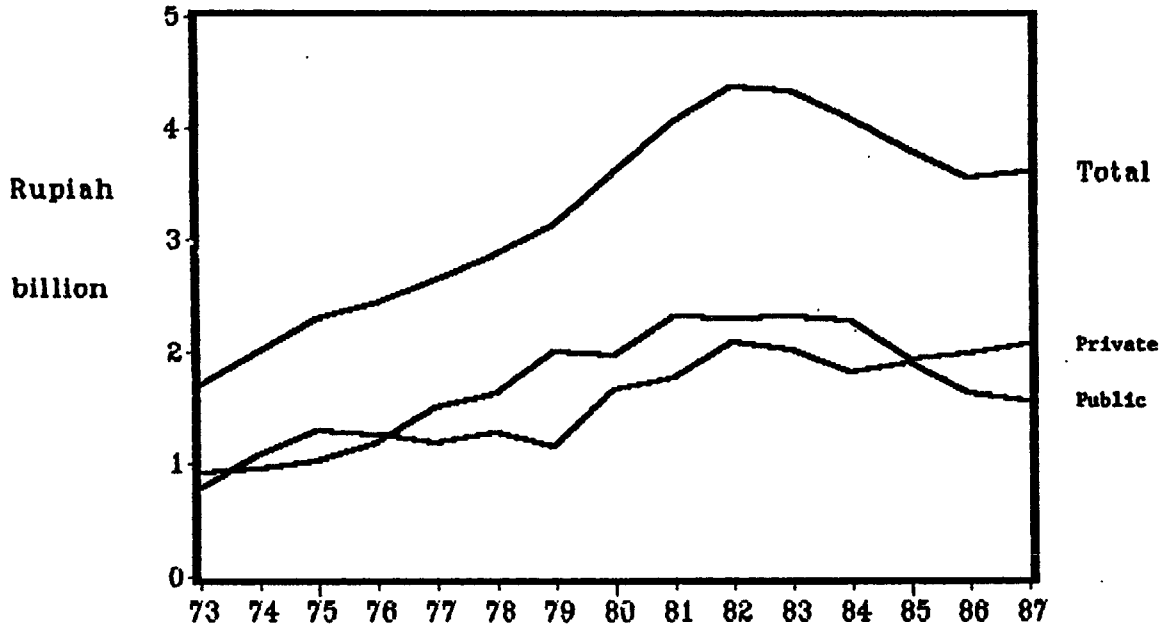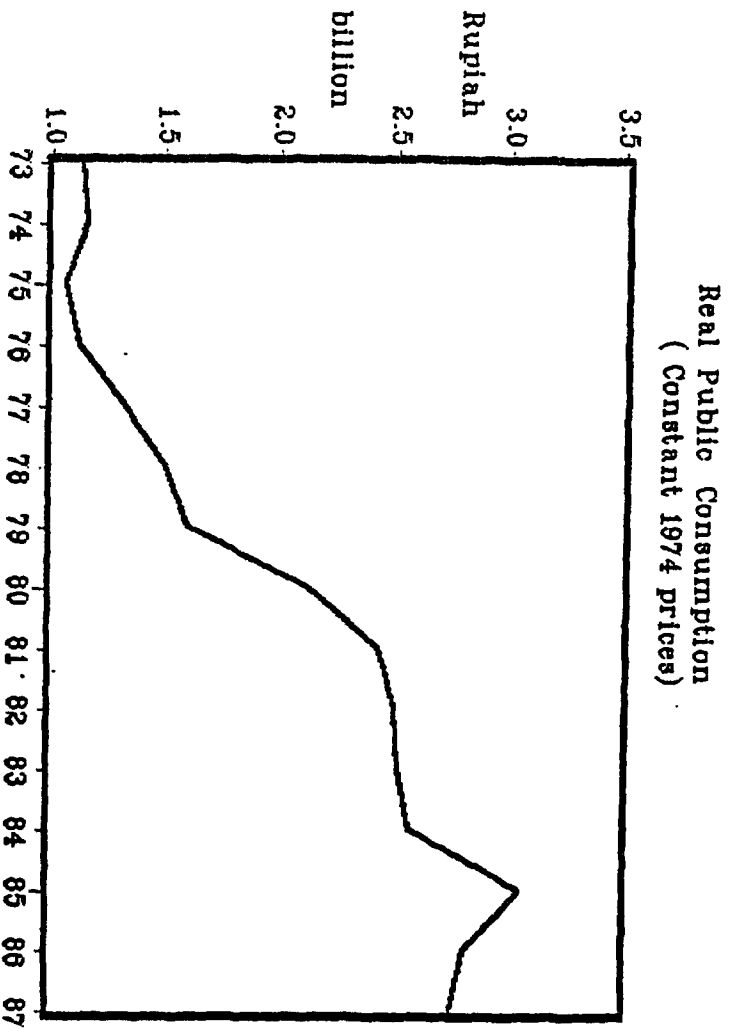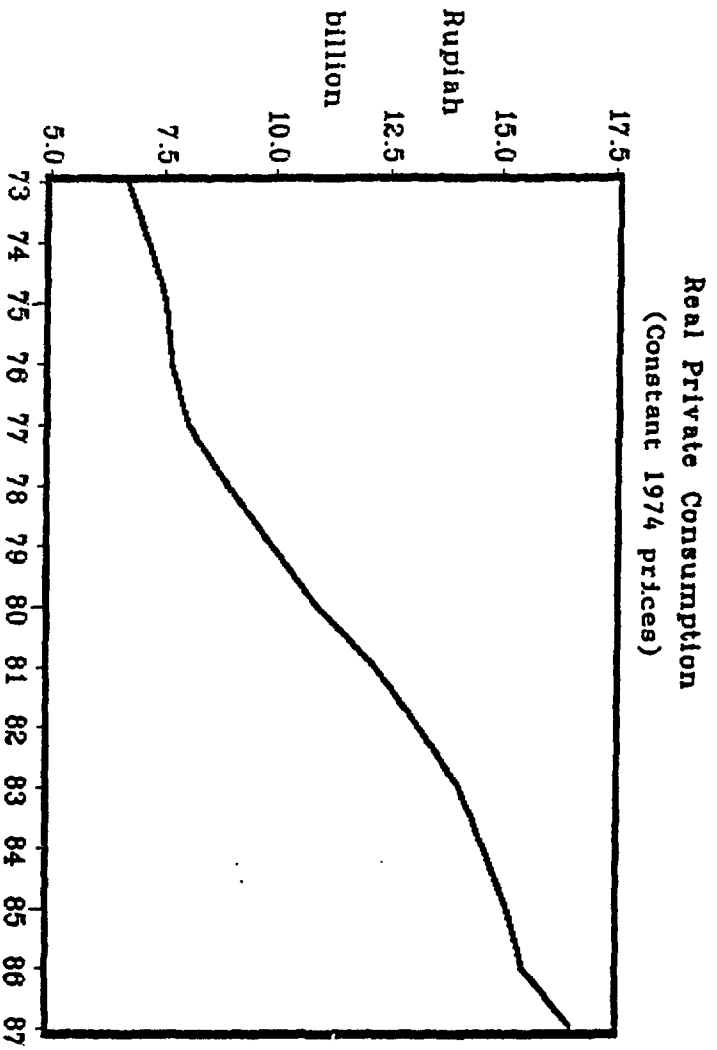(1974 constant prices)

Rupiah

billion

Total

Private

Public

/

Figure 2.

Real Private Consumption
(Constant 1974 prices)

Real Public Consumption
(Constant 1974 prices)

II. Real Exchange Rates, Real Interest Rates and Growth: The Analytics [6]

The two key prices underlying macroeconomic management are the real exchange rate and the real interest rate. In an economy with open capital account there are restrictions on the relationship between the two:

$$r = r_f + \eta^e .$$

The real interest rate (r) is equal to the real foreign interest rate plus the expected rate of depreciation of the real exchange rate (η^e).

The real exchange rate is the price at which foreign goods are traded for home goods. The real interest rate is the price at which current goods are traded for future goods. An increase in the real interest rate (r) will raise private savings (Sp) and lower private investment (Ip) (this is verified empirically later). An increase in r therefore allows a country to run a higher fiscal deficit (FD) for the same level of the external deficit (CAS). This can be seen from the following identity.

$$CAS = Sp(r) - Ip(r) - FD \qquad \ldots(1)$$

With an open capital account, the domestic interest (r) cannot differ from the foreign interest rate (r_f) unless the exchange rate deviates from its equilibrium value. If the real exchange rate is lower (i.e., it is appreciated) than its equilibrium value, then the expectation is that it will rise (depreciate: $\dot{\eta}>0$). As a result, for any given foreign interest rate, the domestic interest rate (r) will rise, bringing about the required adjustment. As long as the exchange rate is not allowed to depreciate, real
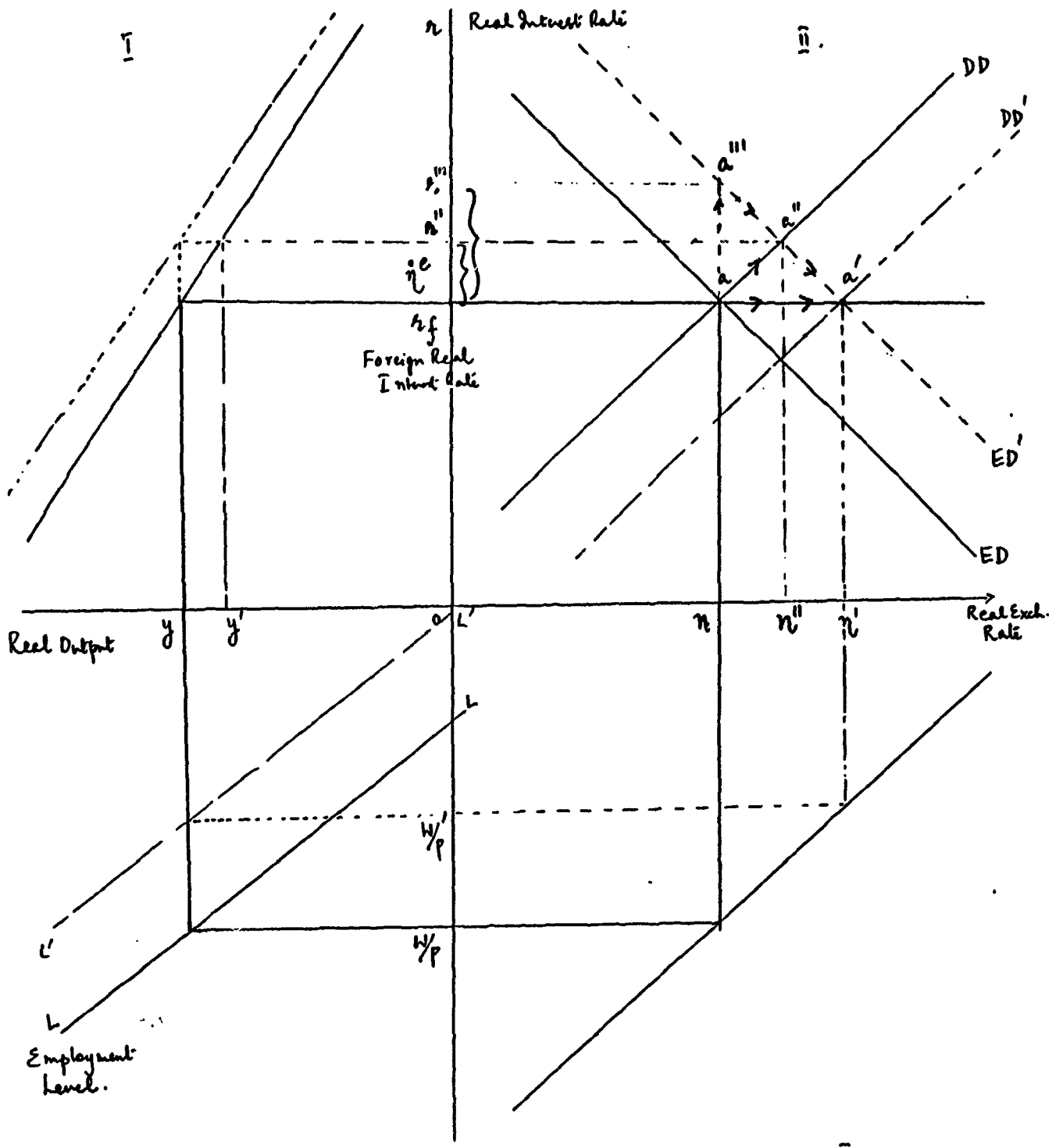
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[6] The framework is similar to one used on Mexico; see Sweder van Wijnbergen (1989). We get somewhat different results and conclusions.

domestic interest rates will remain above foreign interest rates. Over time, as the exchange rate depreciates, the domestic interest rate will fall towards the foreign interest rate (r_f). How long this adjustment process lasts depends very much on how long the exchange rate adjustment gets delayed.

In Figure 3, in the η-r space, we show the equilibrium in the external account (measured by the current account deficit) and the goods market. The ED curve shows the combination of the real interest rate (r) and the real exchange rate (η) which will maintain a certain level of current account deficit. As the real exchange rate depreciates $\dot{\eta}{>}0$, exports rise and imports fall (these are verified econometrically in the next section) and the external surplus rises. To restore balance, r will have to fall so that private consumption and investment rise (again the next section verifies the interest sensitivity of private consumption and investment) resulting in an increase in imports and a fall in exports. The ED curve therefore has a negative slope.

The DD curve shows the combination of r and η which will maintain a given level of output. An increase in the interest rate leads to a decline in both consumption and investment demand, leading to excess supply. The exchange rate would have to depreciate ($\dot{\eta}{>}0$) to restore equilibrium. An exchange rate depreciation will increase demand for home country goods by foreigners. The DD curve slopes upwards.

Let us now see what happens when the economy faces an adverse terms of trade shock, as Indonesia has since 1982. The DD curve shifts outwards to DD' (Figure 3, Quadrant II) - the economy either needs a higher interest rate or a more depreciated exchange rate or a combination of the two to restore domestic equilibrium. At the new equilibrium, the real exchange rate η' is

Real Wage Rate

depreciated, whereas the real interest rate remains the same as the foreign interest rate. [7] If the real exchange rate remains unchanged, i.e., the government does not devalue the nominal rate, then domestic interest rates must rise or the government must run a higher current account deficit and finance it by borrowing abroad or depleting reserves.

The speed and trajectory of movement from a to a' depends on the government's policy responses. If the exchange rate is flexible and the capital account is open, the movement from a to a' is rapid and along the horizontal r_f line rightwards. Slow domestic price response would hasten the adjustment because the nominal exchange rate depreciation would quickly translate into a real exchange rate adjustment. If the exchange rate is fixed, the nature of adjustment would depend on how quickly the government adjusts the nominal rate. Initially, if the nominal rate remains fixed, the real exchange rate might actually appreciate. This would happen if the terms of trade shock leads to a higher fiscal deficit as oil revenues fall but expenditures are difficult to cut. This leads to higher inflation and exchange rate appreciation.

As the DD curve shifts to the right, the equilibrium real exchange is now η' instead of η. With a fixed exchange rate, there is now an expectation of a real depreciation. As a result, domestic real interest rates rise and private investment and growth suffer. Unless real interest rates rise to r''', the current account deficit will increase and the economy will have to accumulate foreign debt. Moreover, domestic interest rates lower than

[7] We assume for simplification that the foreign interest rate (r_f) remains constant. Typically, lending to a low-income country would have a risk premium so that even in equilibrium r could deviate from r_f.

foreign interest rates plus expected depreciation will lead to an outflow of capital and a loss of reserves. If the government devalues but the resulting depreciation of the real exchange rate is insufficient say from η to η'', the adjustment path goes initially from a to a''. Real interest rates still rise but now only to r''. How long the government delays adjustment from η to η' determines the extent of debt accumulation during the adjustment phase.

The restoration of output and interest rates to the previous level is not costless as it requires a fall in consumption or in investment, resulting in a lower standard of living for the population. There are two alternatives to this type of adjustment. The first involves greater debt accumulation, assuming foreigners are willing to finance larger external deficits. The second is to combine devaluation with policies to bring about efficiency improvements so that the incremental capital output ratio (ICOR) falls and the economy generates higher output for a lower level of investment. This is represented by a shift in the output function outwards in Quadrant 1.

Changes in efficiency of resource use are not easy to bring about and often require changes in real prices in the economy such as in the real exchange rate and the real wage. Nevertheless, the degree of macroeconomic adjustment necessary to restore equilibrium can be reduced if efficiency improvements take place. An important point to note is that under the new equilibrium the real interest rate returns to the old level unless the foreign interest rate changes in the meantime. The real exchange rate is however depreciated under the new equilibrium a' in comparison to the old equilibrium a. Unless foreigners are willing to finance the external deficit perpetually, the adjustment to the new equilibrium is inevitable. Delays in adjusting will however lead to higher debt and a fall in output growth,

jeopardizing creditworthiness. The movement from a to a' can be slow and painful or smooth and quick. These are the choices faced by policy makers.

Under the new equilibrium, real wages are also lower, declining from $W/_p$ to $W/_{p'}$ (Quadrant III). In Quadrant IV, we show the equilibrium in the labor market. The LL schedule shows the combination of real wages and output that will generate the volume of labor demand for each specified labor participation rate. Under the new equilibrium with lower real wages, the labor participation rate rises, leading to reduced unemployment.

Has Indonesia's real exchange rate adjustment been sufficient to bring the economy from η to η'? Are trade reforms and domestic deregulation leading to shifts in the output curve in Figure 1 sufficient to avoid the need for further real exchange rate adjustment? We come back to these issues in Section IV. Before that we need to get empirical estimates of the central behavioral relationships in Indonesia - private consumption, private investment, exports, imports and inflation. We turn to these in the next section.

III. Empirical Estimates of the Model

Domestic Demand

Domestic demand (DD) is composed of private fixed investment (IP), private consumption (CP), public fixed investment (IG), public consumption (CG) and stock changes (ΔS).

$$D = IP + CP + IG + CG + \Delta S$$

Public investment and public consumption are considered policy variables; stock chan.ges are considered as exogenous to the model. There is a strong relationship between public expenditure and oil revenues, as one would expect. However, Indonesia used its oil revenues flexibly, thereby facilitating the coordination of monetary and fiscal policies in support of economic development. Thus, during the oil boom period (1978-81), the Government accumulated large oil surpluses which in turn allowed the expansion of domestic liquidity for private activities, without creating major inflationary pressures. Subsequently, when oil prices plummeted, the Government was able to drawdown a part of this surplus to finance expenditure and avoid severe recession. The other components of aggregate demand are treated as endogenous variables. In the rest of this section, the equations determining these variables are derived from theory and are estimated using Indonesian time-series data for the period 1973-87.

Real Non-Oil Private Investment (IP) [8]

The investment equation is derived from a capital stock adjustment model. The desired capital stock (K^*) is a function of expected demand (y^e),

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[8] Detailed work on Indonesian investment is based on Chhibber and Shafik (1989).

the rental cost of capital (r_L) and the real cost of imported inputs. The real cost of imported inputs (m_c) incorporates the effect of the exchange rate and therefore allows for the negative short run impact of a devaluation on the desired capital stock. The negative short-run effect of m_c on K^* is due to the higher real cost of imported capital goods which are not easily substitutable at home and the higher real cost of intermediate goods required for production, reducing the incentive to invest.

$$Kp^* = f(r_L, m_c, y^e) \qquad \qquad ...(2)$$

which can be specified in linear form as

$$Kp^* = a_0 + a_1 y^e + a_2 r_L + a_3 m_c \qquad \qquad ...(3)$$

where $a_1 > 0$, $a_2 < 0$, $a_3 < 0$

In steady state $a_1 = K/Y$, the average capital output ratio of the private sector.

The capital stock adjusts to its desired level with an adjustment lag λ, which takes a value between 0 and 1.

$$KP_t - KP_{t-1} = \lambda[KP_t^* - KP_{t-1}] \qquad \qquad ...(4)$$

The change in the capital stock is equal to gross fixed investment (IP_t) less the depreciation in last year's capital stock

$$KP_t - KP_{t-1} = IP_t - \delta KP_{t-1} \qquad \qquad ...(5)$$

δ is the depreciation rate.

Substituting (3) and (5) into (4) gives us

$$IP_t = a_0 \cdot \lambda + a_1 \lambda \cdot y^e + a_2 \cdot \lambda r + a_3 \lambda m_c + (-\lambda + \delta) KP_{t-1} \qquad \qquad ...(6)$$

We use lagged total GDP (y_{-1}) as a proxy for expected demand [9]. The interest rate (r_L) is defined as $(1+i_L)/(1+yDEF^e)-1$, where i_L is the nominal lending rate and $yDEF^e$ is the expected change in the GDP deflator. [10] The real cost of imported and intermediate capital goods is expected to have a negative impact on real private investment. As separate import price indices were not available for consumer goods and intermediate and capital goods, the overall non-oil goods import price index (MPI) deflated by the GDP deflator was used as a proxy for m_c. Since consumer goods make up only about 15% of total non-oil imports, movements in the MPI are a good proxy for the imported costs of production. The private capital stock is generated by the perpetual inventory method described by Equation (5), using an estimate of the private capital stock in 1972 and a depreciation rate of 5%. The estimated private sector investment function [Equation (6)] gave the following results:

$$IP = \underset{(2.41)}{3.0341} + \underset{(5.62)}{0.5137} \ y_{-1} \underset{(3.59)}{-3.4307} \ r_L$$

$$\underset{(3.87)}{-0.0038} \ m_{c-1} \underset{(3.06)}{-0.2109} \ KP_{-1}$$

$$\bar{R}^2 = 0.94$$
$$D.W. = 2.64$$

TSLS instruments: Lagged GDP, Singapore interest rate, Lagged private capital stock, terms of trade, public investment, lagged real import costs.

The variables all have the right sign and are statistically significant. The most notable result is the strong negative relationship

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[9] This can be justified as a simple version of the adaptive expectations hypothesis. See Dornbusch and Fischer (1987).

[10] The expected GDP deflator is the predicted value of the GDP deflator with lagged changes in the GDP deflator for 3 years and lagged changes in rice prices as the predictor.

between interest rate and private investment. From this equation we can derive the structural coefficients which are:

$$\lambda = 0.26, \; a_1 = 1.97, \; a_2 = -13.20, \; a_3 = -0.0146.$$

The adjustment of capital stock to its desired level is slow, taking about 4 years $(1/\lambda)$. The long run semi-log elasticity of investment to real interest rate is -7.3. This implies that a 1% point increase in the real interest rate reduces private investment by 7.3 percent.

The investment equation can also be specified in log-form if the relationship between capital and output is presumed to be quadratic. In this case the desired capital stock can be written as

$$KP_t^* = Aoy_t^{ea_1}.e^{a_2 r_L}.e^{a_3 mc} \qquad \qquad ...(7)$$

$$a_1 > 0, \; a_2 < 0, \; a_3 < 0$$

We now specify the adjustment to the desired capital stock in logs

$$(\ln KP_t - \ln KP_{t-1}) = \lambda[\ln KP_t^* - \ln KP_{t-1}] \qquad ...(8)$$

Substituting 7 into 8 gives us

$$\ln KP_t = \lambda \ln Ao + \lambda a_1 \ln y_t^e + \lambda a_2 r_L + \lambda a_3 mc_{-1} + (1-\lambda) \ln KP_{t-1} \; ...(9)$$

This equation gave the following result for the real private capital stock, with lagged output used as a proxy for expected output.

$$\ln KP = -0.3536 + -0.4560 \ln y_{-1} -0.1790 \; r_L$$
$$\qquad \quad (3.71) \quad \;\; (5.47) \qquad \qquad (3.42)$$

$$\qquad -0.00019 \; m_{c-1} + 0.7148 \ln KP_{-1}$$
$$\qquad \;\; (3.80) \qquad \qquad (12.74)$$

$$\bar{R}^2 = 0.999$$
$$D.W. = 2.32$$

TSLS instruments: Lagged log GDP, Singapore interest rates, terms of trade index, lagged log Private Capital Stock, public investment, lagged real import costs.

This equation corroborates the linear equation estimated above. The effect of real interest rates on the growth of capital (investment) is significantly negative.

Private Consumption

Private consumption (CP) is specified as a function of permanent disposable income (y^P) temporary disposable income (y^T) and the real interest rate (r). Under the strict version of the permanent income hypothesis, the coefficient on permanent income should be one and on temporary income zero. Here we relax these assumptions and allow for a positive consumption propensity out of temporary income. We follow Dornbusch and Fischer (1987) by assuming that permanent disposable income is related to current and lagged disposable income.

$$Cp = co + c_1 y^P + c_2 y^T + c_3 r \qquad \ldots(10)$$

$$y^P = \theta y_d + (1- \theta) y_{d-1} \qquad \ldots(11)$$

and $$y^T = y_d - y^P \qquad \ldots(12)$$

Substituting (11) into (12) we get:

$$y^T = (1- \theta) [y_d + y_{d-1}] \qquad \ldots(13)$$

Substituting (11) and (13) into (10) gives the following reduced form equation:

$$Cp = a_0 + a_1 y_d + a_2 y_{d-1} + c_3 r \qquad \ldots(14)$$

where

$$a_1 = c_1 \theta + c_2 (1- \theta),$$

$$a_2 = (1- \theta)(c_1 + c_2) \text{ and}$$

Disposable income is defined as

$$y_d = GDP - NT + NPFI - PERE$$

where

NT = Net taxes (Total tax revenue-transfers and subsidies)

NPFI = Net private factor income from abroad

PERE = Public enterprise retained earnings

The estimated equation is:

$$Cp = \underset{(4.10)}{0.0162} + \underset{(3.97)}{0.4891y_d} + \underset{(2.12)}{0.2687y_{d-1}}$$

$$\underset{(4.89)}{-0.0022} r_f$$

$$\bar{R}^2 = 0.994$$
$$D.W. = 1.70$$

TSLS instruments: Lagged disposable income, lagged investment rate, terms of trade, Singapore interest rate, real public investment.

The interest rate relevant for consumption and savings decisions in Indonesia is the real interest rate in the Singapore market (r_f). The domestic deposit rate only determines where savings will be held in the short-run. Prior to the financial sector reform of June 1983, domestic interest rates in Indonesia were regulated. Recognizing the unsustainability of this situation in an open capital account economy, the Government substantially decontrolled interest rates through the June 1983 reforms. Since then, the domestic rate has generally moved in line with the Singapore deposit rate plus the expected rate of real depreciation. [11] In the annual model here, which includes periods of regulated and deregulated domestic interest rates, the Singapore rate is used because money can move freely

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[11] For supporting evidence based on a quarterly model, see Ahmed and Kapur (1989).

between Indonesia and Singapore and the marginal savings decision is based on changes in the Singapore rate. Both private consumption and disposable income are deflated by the domestic CPI.

From the estimated equation, it is not possible to determine the precise values of the structural coefficients. Note, however, that $c_1 = b_1 + b_2 = 0.8578$. This is the long-run propensity to consume out of permanent disposable income. This implies that the steady-state private savings rate in Indonesia is around 14 - 15 percent. It is not possible to determine the individual value of a and c_2. However, $c_2 < c_1$ as predicted by theory as long as $b_a > 0$. This means that the propensity to consume out of permanent income is greater than the propensity to consume out of temporary income. An important feature of the results is the significant negative interest elasticity of private consumption. These results corroborate the findings of Boskin (1978) and Gylafson (1983) for the U.S. and Anand, Chhibber and van Wijnbergen (1988) for Turkey which show a negative (positive) effect of interest rates on consumption (savings).

The same equation estimated with private consumption and disposable income in logs gave the following fit:

$$LC_p = -0.2353 + 0.6389 \, LY_d + 0.3118 \, LY_{d-1}$$
$$\quad\quad (7.17) \quad (5.26) \quad\quad (2.62)$$

$$-0.0193 r_f$$
$$\quad (6.23) \quad\quad\quad\quad \bar{R}^2 = 0.997,$$
$$\quad\quad\quad\quad\quad\quad\quad\quad D.W.= 2.11$$

TSLS instruments: Lagged disposable income, lagged investment rate, terms of trade, Singapore interest rate, real public investment.

This equation shows that a 1 percent point increase in the real interest rate in the Singapore market reduces private consumption in Indonesia by 1.93%.

These results do not hold up when we substitute the real interest rate on deposits in Indonesia (ri). The overall fit of the equations is reduced and the real interest rate term has the wrong sign and is statistically insignificant. The estimated equations are as follows.

$$Cp = 0.0107 + 0.2768 \ Yd + 0.4530 \ Yd-1 + 0.0354 \ ri$$
$$(1.33) \quad (1.26) \quad\quad (1.83) \quad\quad\quad (1.28)$$

$$\bar{R}^2 \ = 0.98$$
$$D.W. = 1.18$$

TSLS instruments: Nominal Interest Rate in Singapore, Lagged Investment Rate, Terms of Trade, Real Public Investment.

And with private consumption and disposable income in logs we get the following equation.

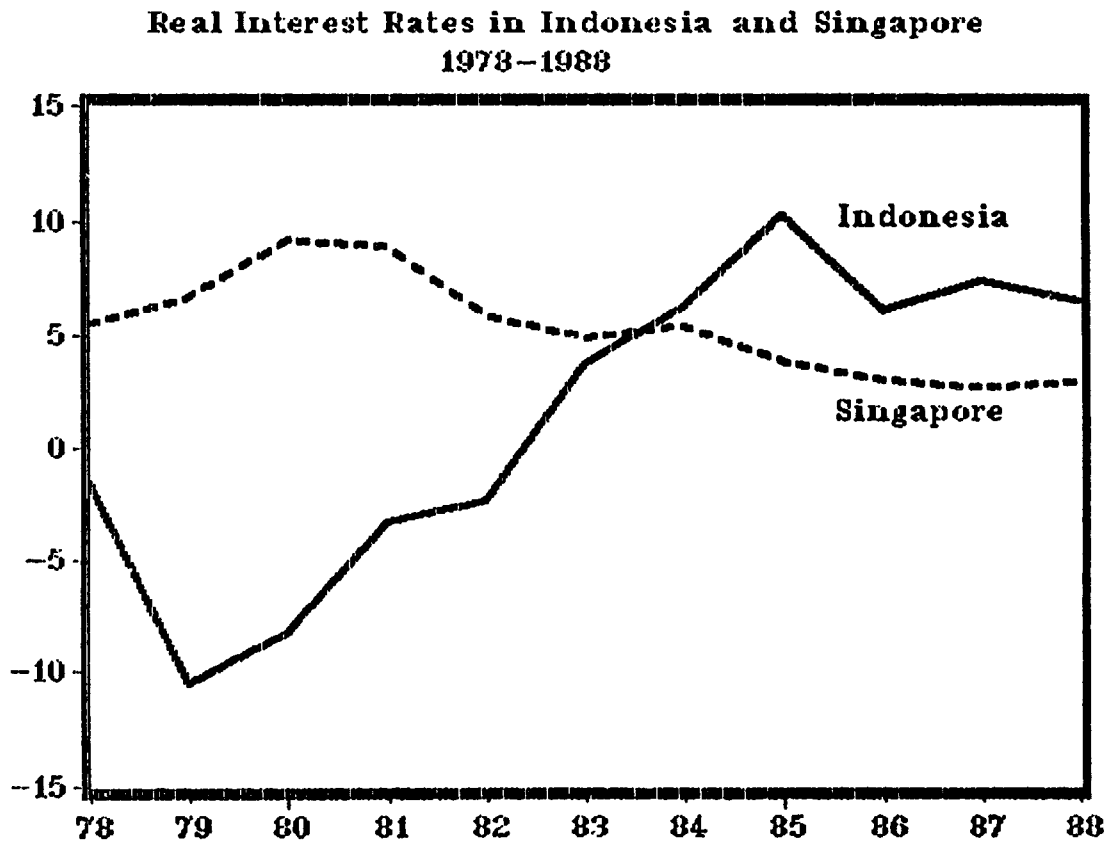$$LCp = -0.4503 + 0.4588 \ LYd + 0.4255 \ LYd-1 + 0.3984 \ ri$$
$$(4.33) \quad\quad (1.78) \quad\quad\quad (1.50) \quad\quad\quad (1.83)$$

$$\bar{R}^2 \ = 0.99$$
$$D.W. = 1.49$$

TSLS instruments: Nominal Interest Rate in Singapore, Lagged Investment Rate, Terms of Trade, Log of Real Public Investment.

The reasons for the differences are apparent from trends in private consumption, the real interest rate on deposits in Singapore and the real interest rate on deposits in Indonesia. Since 1983 the private savings rate has been falling in Indonesia despite a rise in real domestic interest rates. Part of the fall in savings is due to the fall in income resulting from declining oil prices. According to our model, as temporary income has declined private consumption has not declined as much. Moreover, the real Singapore interest rate which drives consumption behavior has fallen relative to the domestic real rate (Figure 4). The domestic real interest rate has been rising despite a fall in the Singapore real rate. This puzzle is explained by consumers' expectations on the real exchange rate. In an economy

Figure 4.

Real Interest Rates in Indonesia and Singapore
1978—1988

with an open capital account, domestic real interest rates are approximately
equal to the foreign real interest rate plus the expected change in the real
exchange rate.

$$ri = r_f + \eta^e \qquad \qquad ...(15)$$

Ahmed and Kapur (1988) have analysed this arbitrage condition for
Indonesia in a recent paper. Using quarterly data, they show that the
difference between the Singapore deposit rate and the Indonesia deposit rate
can be explained by variables which measure the expected rate of depreciation
of the Indonesia rupiah.

Imports

Imports are broken into two categories: oil (M_o) and non-oil
(MNO). Oil imports are treated as exogenous to the model. Non-oil imports
depend on income growth and the real exchange rate (η).

$$\ln MNO = b_0 + b_1(\ln Yn) + b_2(\ln\eta) \qquad \qquad ...(16)$$

where $b_1 > 0$, $b_2 < 0$.

The equation when estimated yielded the following results.

$$\ln MNO = 2.5128 + 1.0884 \ (\ln Yn) - 0.7726 \ \ln(\eta)$$
$$(4.21) \quad (7.83) \qquad \quad (4.67)$$

$$\bar{R}^2 = 0.81$$
$$D.W. = 0.87$$

TSLS instruments: Lagged investment rate, lagged non-oil imports,
terms of trade index, population growth.

The estimated elasticity of non-oil imports to output growth is 1.
Changes in the real exchange rate have a negative effect on import growth with
an elasticity of -0.77.

Exports

Exports are classified into three categories: (i) oil; (ii) non-oil manufactured (XNOM); and (iii) non-oil non-manufactured (XNNM) or traditional exports.

Oil exports are treated as exogenous in the model as they are a function of complex pricing rules, OPEC quotas and world demand. Non-oil manufactured exports (XNOM) are constrained by domestic manufacturing capacity measured by value added in manufacturing (GDPM). Indonesia's manufactured exports constitute a very small (0.3%) share of world trade in manufactured goods so that world demand is unlikely to be a constraining factor for the present, although it may become important in the future. The real exchange rate also enters the equation as a price variable, as it affects the competitiveness of Indonesian manufactures with respect to other competing exporters given world manufactured prices. [12]

$$\ln (XNOM) = -0.4117 + 1.0021 \ \ln (\ \eta \ ) + 2.6067 \ \ln (GDPM)$$
$$(0.19) \quad (2.00) \qquad\qquad (7.97)$$

$$\bar{R}^2 = 0.95$$
$$D.W. = 1.37$$

The linear equation gave the following results.

$$XNOM = -900.93 + 6.6539 \ \eta + 367.4626 \ (GDPM)$$
$$(5.85) \quad (2.71) \qquad (3.29)$$

$$\bar{R}^2 = 0.86$$
$$D.W. = 0.70$$

TSLS instruments: Lagged manufactured exports, lagged terms of trade, lagged value added in manufacturing, world demand.

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[12] For the quantitative evidence on the important role of exchange rate policy on exports, see Balassa (1985). For a review of past export performance of East Asian countries and the role of exchange rate and other policies, see Bhattacharya and Linn (1988).

The elasticity of manufactured exports with respect to the real exchange rate is close to one. The coefficient on manufactured capacity is high—over 2. This is because manufactured export growth rates have been very high, increasing rapidly from a very small base. In a developing country, manufactured exports typically follow an S-shape curve, rising slowly initially, then expanding very rapidly and eventually slowing down. Indonesia's manufactured exports currently appear to be in the steeply rising segment of the S-curve. The elasticity of exports with respect to capacity output therefore is likely to decline in the future.

Non-manufactured non-oil exports (XNNM) are assumed to be a function of real world demand (Yw) and the real exchange rate (η). In the case of non-manufactured non-oil exports, primarily traditional agriculture-based exports, the main constraint is likely to be world demand because of Indonesia's significant share in the world market for many of these commodities. The real exchange rate is used as a price variable in this equation also, unlike standard export demand functions where the real international export price is used. This is done for uniformity with the rest of the model and to get an estimate of the effect of a change in the real exchange rate on traditional exports. A dummy variable (DLGB) is introduced after 1981 to capture the impact of the ban on log exports.

$$\ln XNNM = -0.1693 + 0.2198 \ (\ln \eta) + 1.5399 \ (\ln Yw)$$
$$ (0.16) \quad (2.07) (5.14)$$

$$ -0.3617 \ (DLGB)$$
$$ (7.47)$$

$$\bar{R}^2 \ = 0.86$$
$$D.W. \ = 2.46$$

The linear version of this equation gave the following result.

$$XNNM = -1453.94 + 3.8093 \ \eta + 38.0359 \ Yw$$
$$(2.25) \quad (1.83) \quad\quad (5.70)$$

$$-830.62 \ DLGB$$
$$(8.16)$$

$$\bar{R}^2 = 0.89$$
$$D.W. = 2.65$$

TSLS instruments: Lagged manufactured exports, lagged terms of trade, lagged value added in manufacturing, world demand.

The elasticity of non-manufactured exports with respect to the real exchange rate is a little over 0.2 and with respect to world income around 1.5. Both coefficients are statistically significant. The dummy variable representing the ban on log exports is also highly significant.

Non-Oil Output Growth

The total fixed investment rate (lagged) determines non-oil output growth (gy). This includes both public and private investment. A dummy variable (DY) is entered after 1982 to account for a permanent decline in the growth rate of the non-oil economy from an average of 8% p.a. during 1973-81 compared to 3.9% p.a. during 1982-87. This is obviously related to the decline in oil revenues leading to adjustment and a slowdown in growth. The estimated equation yielded the following results.

$$gy = 0.3130 \ (I/y)_{-1} - 0.0355 \ DY$$
$$(13.76) \quad\quad\quad (4.33)$$

$$\bar{R}^2 = 0.58$$
$$D.W. = 1.46$$
$$OLS.$$

Note that the incremental non-oil capital-output ratio (ICOR) is the inverse of the coefficient on $(I/y)_{-1}$. The average non-oil ICOR during 1973-1981 is therefore 3.1 rising to an average of 3.5 during 1982-87.

A major question arises as to how we model efficiency changes arising from the structural changes and real exchange rate adjustments that are underway in Indonesia. The ICOR is traditionally used as a crude indicator of efficiency changes. The above equation tells us what the average ICOR has risen during 1982-87. However, a further breakdown of the ICOR shows that much of the rise happened in 1982-85, as slowdown in demand reduced capacity utilization. Since 1985, responding to structural reforms, the ICOR has been falling. Estimates of total factor productivity change also support the hypothesis of efficiency improvements since 1985 (see Ahmed (1989)).

One important variable which is targetted for improving the efficiency of capital and foreign exchange use is the real exchange rate. Therefore, we introduce the real exchange rate as an efficiency variable in the output growth equation and get the following results.

$$gy = 0.1767 \; (I/y)_{-1} \; -0.0552 \; DY \; + \; 0.00042 \; \eta$$
$$(4.23) \qquad\qquad (8.36) \qquad (3.81)$$

$$\bar{R}^2 = 0.82$$
$$D.W. = 1.90$$
$$OLS.$$

This equation shows that, controlling for the investment rate and the permanent terms of trade shock to the economy in 1982, growth is enhanced by depreciation of the real exchange rate. More realistic exchange rate policy has enhanced growth by moving resources from relatively inefficient capital intensive activities to export-oriented and less capital intensive industries. We come back to this issue in Section V.

Inflation [13]

A key variable linking the exchange rate to the interest rate in Indonesia is the rate of domestic inflation. Thus a high rate of domestic inflation (due to high fiscal deficits or excessive credit expansion) relative to world inflation will create expectations of an exchange rate depreciation and fuel capital flight. This in turn will tend to increase the domestic interest rate to restore external balance. Inflation as measured by the consumer price index (CPI) is considered a weighted average of inflation in traded goods not subject to mark-ups (p_1) and other commodities (p_2). [14]

$$\overset{o}{p} = \lambda \, (\overset{o}{p_1}) + (1-\lambda) \, (\overset{o}{p_2}) \qquad \qquad ...(17)$$

Inflation in goods not subject to markups is equal to the change in foreign prices plus the change in the nominal exchange rate (Chhibber et al (1989)).

$$\overset{o}{p_1} = \overset{o}{p_f} + \overset{o}{e} \qquad \qquad ...(18)$$

For goods with trade restrictions and non-tradeables, prices are determined through a mark-up over unit labor costs ($\overset{o}{wp}$) and the cost of imported inputs ($\overset{o}{mc}$) (Bruno (1979) and Corbo (1985)).

The degree of mark-up will depend upon demand pressures in the economy (ED) and inflationary expectations ($\overset{o}{p_e}$).

$$\overset{o}{p_2} = a_1 \overset{o}{wp} + a_2 \overset{o}{mc} + a_3 \, (ED, \overset{o}{p_e}) \qquad \qquad ...(19)$$

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[13] A detailed specification of the inflation model, with alternative specifications and implications is available in Chhibber (1989).

[14] The inflation model used here is a variant of the inflation model developed for a study on Sub-Saharan Africa and is presented in Chhibber et.al (1989).

Following Corbo, the change in the cost of imported inputs is assumed to equal foreign inflation in domestic prices, as in the case of p_1 above.

$$\dot{mc} = \dot{p}_f + \dot{e} \qquad \qquad \ldots(20)$$

The change in unit labor costs is primarily a function of lagged rice prices. We follow Dornbusch and Fischer (1988) in specifying monetary growth ($\dot{M2}$) as an indicator of inflationary expectations. Excess demand in turn is specified as a function of two variables--the rate of capacity utilization and the fiscal deficit as a share of GNP (DEFY). The rate of capacity utilization is defined as the ratio of capacity output and actual output. The former is assumed to be a fixed function of the capital stock which is measured by the perpetual inventory method, as described in Equation 5.

$$CU = 1.K/y \qquad \qquad \ldots(21)$$

where 1 is the average output-capital ratio

$$\ln CU = \ln 1 + \ln K - \ln Y \qquad \qquad \ldots(22)$$

Substituting Equations 16, 17, 18, 20 into 15 gives

$$p = \lambda(\dot{p}_f + \dot{e}) + (1-\lambda)\,[a_1\,\dot{p}_1 + a_2(\dot{p}_f + \dot{e})$$
$$+ a_3\,[b_1\,\dot{M2} + b_2\,DEFY + b_3 \ln 1 + b_3\,(\ln K - \ln Y)] \qquad \ldots(23)$$

$$= C_0 + C_1\,(\dot{p}_f + \dot{e}) + C_2\,\dot{p}_{r-1} + C_3\,\dot{M2} + C_4\,DEFY$$
$$+ C_5\,[\ln K - \ln Y] \qquad \qquad \ldots(24)$$

where
$$C_1 = \lambda + (1-\lambda)a_2 > 0;$$
$$C_2 = a_1(1\;\lambda) > 0;$$
$$C_3 = a_3 b_1 > 0;$$
$$C_4 = a_3 b_2 > 0;$$
$$C_5 = a_3 b_3 < 0.$$

The estimation of Equation 24 yielded the following results:

$$\overset{o}{p} = 0.0226 + 0.2345\ (\overset{o}{e}+\overset{o}{p}_f) + 0.3392\ (\overset{o}{p}_{r-1})$$
$$\ (0.47)\quad (3.81)\qquad\qquad (4.62)$$

$$+\ 0.3946\ \overset{o}{M}_2 + 0.0152\ DEFY - 0.2173\ [\ln K - \ln Y]$$
$$\ (3.82)\qquad (4.26)\qquad\quad (2.98)$$

$$\bar{R}^2 = 0.91$$
$$D.W. = 1.93$$

TSLS instruments: Lagged rice price inflation, lagged investment rate, lagged non-oil GDP, terms of trade index, fiscal deficit/GNP and M2 growth.

All variables have the expected signs and are statistically significant. Both cost-push and demand-pull factors have contributed to inflation in Indonesia. The ability to restrain the pace of inflation in recent years, despite substantial cost-push pressures emerging from two large discreet devaluations (by 28% in March 1983 and by 31% in September, 1986) has been possible because of austere budgetary policies and relatively cautious monetary management pursued by the Government of Indonesia.

The estimated equation is stable. Under steady state general inflation ($\dot{p}$), depreciation ($\dot{e}$), monetary growth ($\dot{M}_2$), and inflation in rice prices ($\dot{p}_r$), which is a proxy for nominal wage growth, would be equal. The equation is stable if the coefficients on $\dot{e}$, $\dot{M}_2$ and $\dot{p}_{r(-1)}$ add up to unity. This is confirmed by the estimated coefficients whose sum is 0.97.

IV. Growth of Debt and the Real Exchange Rate

At the macroeconomic level, Indonesia's fundamental medium-term imperative is to absorb the large increment to the labor force (about 2-3 million people p.a.) at higher levels of productivity at the same time that the debt service burden is reduced to a more manageable level. The Government's target is to achieve a growth rate of the non-oil economy by at least 6% p.a. over the next five years (1989-94) in order to meet the employment challenge. The Government also aims at reducing the debt service burden substantially. The reconciliation of the growth and the debt targets in turn defines sustainable levels of current account deficits.

The real exchange rate, as we have seen in Section II, is a key price variable in the adjustment process. Its importance for Indonesia's external adjustment is amply demonstrated by the empirical estimates of the export and import equations presented in Section III. We saw there that the magnitude of the export and import elasticities to a change in the real exchange rate was large. The results showed that the non-oil trade balance would improve by over 1% for every percentage depreciation in the real exchange rate.

Indonesia has already undergone substantial depreciation in the real exchange rate. For example, the real effective exchange rate depreciated by about 55% between December 1981 and December 1988. An important issue is whether Indonesia needs further real exchange rate depreciation to reconcile its external objectives with growth. One obvious way to meet the external targets is to reduce growth. With slower growth, imports are expected to fall. Exports may or may not fall depending on the composition of output cuts and accompanying demand management policies. In the case of Indonesia,

empirical evidence presented above shows that manufactured exports are constrained by manufactured output growth. Therefore, if a cut in output growth falls heavily on manufactures the loss in exports may be high and may even exceed the reduction in imports. In this situation reduced growth may not necessarily improve external targets.

Increases in productivity can also help to meet growth targets without a substantially larger external deficit. With productivity improvements less reliance has to be placed on real exchange rate depreciation to maintain profits in the export industries. Similarly, the import intensity of production can be reduced. Productivity improvements, however, take time to have an impact and are likely to work best when combined with an appropriate exchange rate policy. In general, changes in the real exchange rate provide the quickest way to achieve external targets.

How much further real exchange rate adjustment is necessary to achieve external targets in Indonesia? Alternatively, can Indonesia's external and growth targets be met without further real exchange rate depreciation? In order to answer this we first attempt to get an estimate of the likely impact of changes in the real exchange rate on tnc current account. We develop a reduced-form model to estimate the determinants of the current account, which uses the export and import functions presented in the previous section.

Current Account and the Real Exchange Rate

In order to get an estimate of the likely impact of the real exchange rate on the current account the following equation for the current account is derived as a reduced form, using the export and import equations. The overall

export equation (the sum of oil exports, non-oil manufacturing and non-oil other exports) can be written as:

$$XNOM + XNNM + XOIL = a_0 + a_1 Yw + a_2 Yn + a_3\eta + XOIL \qquad ...(25)$$

Imports can be specified as:

$$MNOIL + MOIL = l_0 + b_1 Yn + b_2\eta + MOIL \qquad ...(26)$$

Subtracting (2) from (1)

$$X-M = (a_0-b_0) + a_1 Yw + (a_2-b_1)Yn + (a_3-b_2)\eta + XOIL-MOIL \qquad ...(27)$$

The left hand side can be transformed into

$$CA-X\left|\frac{Px}{Pm} -1\right| = (a_0-b_0) + a_1 Yw + (a_2-b_1)Yn + (a_3 b_2)\eta + (X-M)_{oil} + NFI \qquad ...(28)$$

where CA is the current account surplus and NFI is net factor income from abroad, and $X\left|\frac{Px}{Pm} - 1\right|$ is the income terms of trade (TOTy).

Therefore the current account equation can be written as:

$$CA = C_0 + C_1 ToT_y + C_2\eta + C_3 Yw + C_4 Yn + C_5(X-M)_{oil} + NFI \qquad ...(29)$$

$$C_1 > 0, \ C_2 > 0, \ C_3 > 0, \ C_4 < 0 \text{ if } |b_2| > a_2, \ C_5 > 0$$

Note that the sign of Yn will be positive if the elasticity of imports is greater than the elasticity of exports with respect to income. The sign of Yw will be unambiguously negative because higher world income leads to higher exports. The sign of the terms of trade variable (TOTy) is unambiguously positive.

In the estimation it was found that there was high collinearity between terms of trade changes and net oil exports. The latter was dropped from the equation. Terms of trade changes are largely due to oil price fluctuations. The reduced-form current account equation performs remarkably well, with highly significant coefficients.

The equation for the current account gave the following results and follows the predicted theory very well.

$$CA = -60.7131 + 0.1193 \text{ ToT} + 0.9495 \text{ (Yw)}$$
$$\quad\quad (4.11) \quad\quad (5.44) \quad\quad (3.51)$$

$$-4.4151 \text{ (Yn)} + 0.1163 \text{ (η)}$$
$$\quad (5.44) \quad\quad\quad (2.65) \quad\quad\quad \bar{R}^2 = 0.81$$
$$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad \text{D.W.} = 1.32$$

TSLS instruments: Terms of trade index, world income, lagged investment rate, population growth rate, lagged real exchange rate, lagged non-oil GDP.

In order to assess the impact of the fiscal deficit on the current account deficit we distinguish between the effect of changes in the nominal exchange rate and the fiscal deficit. The fiscal deficit has a direct and indirect effect on the current account. The direct effect is the impact of higher expenditures on imports financed directly by government borrowing. The indirect effect comes from the impact of a higher fiscal deficit on inflation (this was verified empirically in Section III), and leads to an appreciation in the real exchange rate. The latter in turn, as shown by our empirically verified equations, leads to higher imports and lower exports and therefore a higher current account deficit. Accordingly, we enter the nominal exchange rate and the fiscal deficit as a share of GNP (DEFY) separately in the current account equation.

$$CA = -37.6308 + 0.1104 \text{ ToT} + 0.7337 \text{ (Yw)}$$
$$\quad\quad (2.50) \quad\quad (3.47) \quad\quad\quad (3.00)$$

$$-4.2184 \text{ (Yn)} + 0.0121 \text{ (e)} + 0.4566 \text{ (DEFY)}$$
$$\quad (4.59) \quad\quad\quad (3.53) \quad\quad\quad (2.01)$$

$$\bar{R}^2 = 0.87$$
$$\text{D.W.} = 1.54$$
$$\text{OLS}$$

The results show that the current account deficit increases by about half a percent for every 1% increase in the fiscal deficit. This can be avoided by a nominal devaluation but the combined effect of a higher fiscal deficit and exchange rate depreciation is, ceteris paribus, higher inflation in the economy. This issue is discussed in more detail in the next section where the combined model is used to look into the question of trade-offs between debt, inflation and output growth.

Would Indonesia Need Further Real Exchange Rate Depreciation?

We now turn to the question whether Indonesia would need further depreciation of the real exchange rate in order to meet external targets. The projected current account targets are based on reducing the public sector debt service ratio by 10 percentage points by the year 1993; a stated objective of the Indonesian authorities.

Figure 5 presents the target current account deficit as a percentage of GNP necessary to meet the external debt target. Using Equation 29 estimated in the previous section and given domestic output growth and world demand growth, we derive the required real exchange rate depreciation (Figure 5) necessary to meet the target current account levels. The corresponding debt/GNP ratios are also presented in Figure 5. Note that for the moment we are assuming output growth rates as exogenous. This requires a certain level of investment and gains in economic efficiency. Whether the internal adjustment necessary to ensure the required domestic savings and investment rate is compatible with this growth rate will be taken up in the next section. Here we assume that the fiscal policy package necessary to ensure this is in place.

We could also invert Equation 29 and estimate a real exchange rate equation. This gives the following results.

$$\eta = 423.11 - 0.9086 \text{ TOT} + 31.6469 \text{ Yn} - 6.4465 \text{ Yw}$$
$$(2.10) \quad (3.50) \quad\quad (2.52) \quad\quad (1.86)$$
$$+ 7.3784 \text{ CAGNP}$$
$$(3.07)$$

$$\bar{R}^2 = 0.80$$
$$\text{D.W.} = 1.27$$

TSLS instruments: Terms of trade index, lagged investment rate, lagged real exchange rate index, world income, population growth and lagged non-oil GDP.
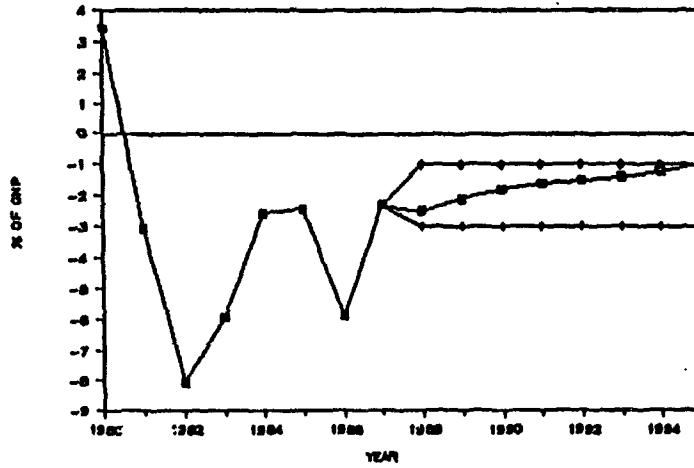
This equation indicates the relationship between the real exchange rate and the current account deficit for a given level of terms of trade, world income growth and domestic non-oil growth. A larger current account deficit leads to a greater appreciation of the real exchange rate as one would expect. According to this equation, a 1% point increase in the current account deficit leads to a decline in the real exchange rate index (appreciation) by 7.4 points.

Note also that the coefficient on the terms of trade index (TOT) is not significantly different from unity. A terms of trade improvement by 10% therefore leads to a real exchange rate appreciation of 10%, ceterus paribus.
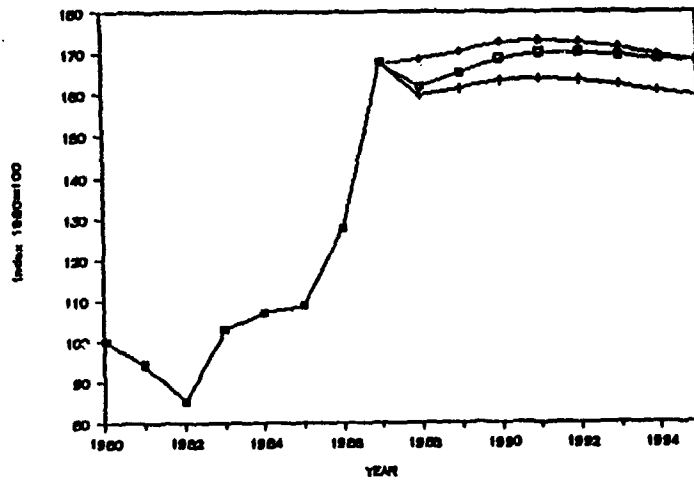
Figure 5.

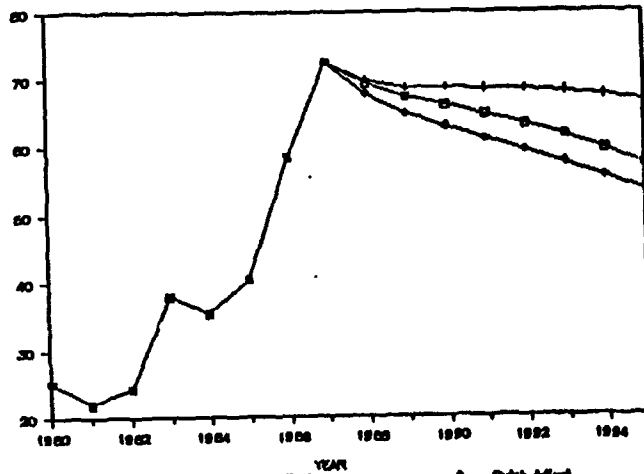# Indonesia: External Adjustment to 1995
(Alternate Scenarios)

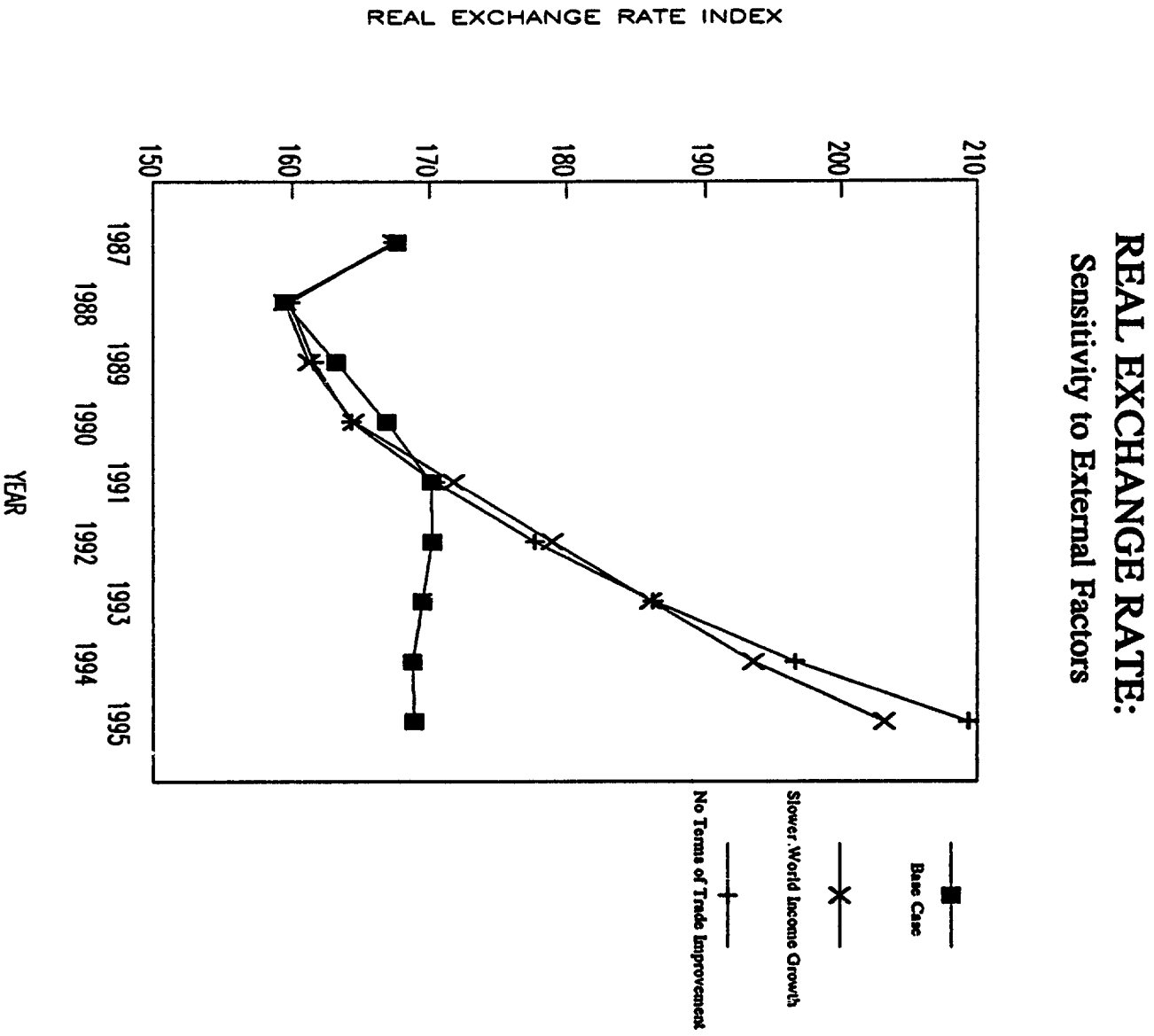### CURRENT ACCOUNT DEFICIT

REAL EXCHANGE RATE

DEBT GNP RATIO

Figure 6.

REAL EXCHANGE RATE:

Sensitivity to External Factors

YEAR

Base Case

Slower World Income Growth

No Terms of Trade Improvement

Using the estimated real exchange rate equation, for the "base case" current account target (e.g., the current account deficit falling from 3.0% of GNP in 1987/88 to 1.0% of GNP by 1991/92), the real exchange rate remains roughly constant upto the year 1995 at the projected domestic non-oil growth rate of about 6% p.a., world output growth of about 3% p.a. and terms of trade improvement of about 19% during 1989-95. Under this scenario, the debt/GNP ratio declines from over 70% in 1987 to about 55% by 1995.

Three factors account for Indonesia's ability to adjust without further changes in the real exchange rate. The first element is the very large real exchange rate adjustment Indonesia has undergone since 1982. The second factor is the improvement in the terms of trade due to recovery in the price of oil and the third is continued world income growth at the rate of 3% per annum.

Under these assumptions, Indonesia's external position appears fairly comfortable. In fact, even if Indonesia runs a current account deficit of 3% of GNP p.a. up to 1995, the external debt indicators do not deteriorate further (see Figure 5). Moreover, the real exchange rate appreciates. The real issue, however, is whether Indonesia can obtain financing to run a current account deficit of 3% of GNP.

If assumptions concerning terms of trade and world demand do not materialize as expected, then further external adjustment will be necessary. Figure 6 shows the extent of real exchange rate depreciation necessary to achieve the targeted current account and external debt indicators if external factors deteriorate. In one scenario world income growth slows down to only 2% p.a. as against 3% p.a. in the base case. In the second scenario there is no improvement in the terms of trade after 1988. In both cases the required

real exchange rate adjustment is of the order of about 20% between 1988 and
1995. This of course has implications for real wage growth. However, failure
to bring about this adjustment will reduce growth, because the external
adjustment will be forced by the external financing constraint which in turn
will reduce import capacity and growth.

V. The Current Account and Growth: The Role of Fiscal Policy

In the previous section we looked at the trade-off between the real exchange rate and the rate of debt accumulation or the current account deficit. For a given rate of world income growth, domestic output growth and the terms of trade (price of oil) a higher current account deficit allows a country to maintain a higher or more appreciated real exchange rate. In Figure 3, it implied a higher real wage rate. Thus, one aspect of exchange rate depreciation that policymakers worry about is its impact on real wages. Depreciation in the real exchange rate implies a cut in the real wage rate, which is one element contributing to the reduction in domestic consumption that is necessary to bring about the external adjustment without sacrificing growth.

There are limits to real exchange rate and real wage adjustment that can be sustained in practice. Current consumption can only be cut so far and no further without threatening social and economic stability. If the real exchange rate, and consequently the real wage rate, cannot be cut any further, the trade-off between debt accumulation and growth emerges strongly. Reduction in foreign savings now requires cuts in the investment rate which in turn affect future growth. [15/] This can be avoided only by improvements in the efficiency of capital use, which in turn requires deregulation, trade policy improvements and the like.

[15/] Note that in the short run, a depreciation of the real exchange rate will also lead to a cut in private investment and growth. This is verified empirically for Indonesia by Equation 6, where the cost of imported inputs has a negative effect on private investment.
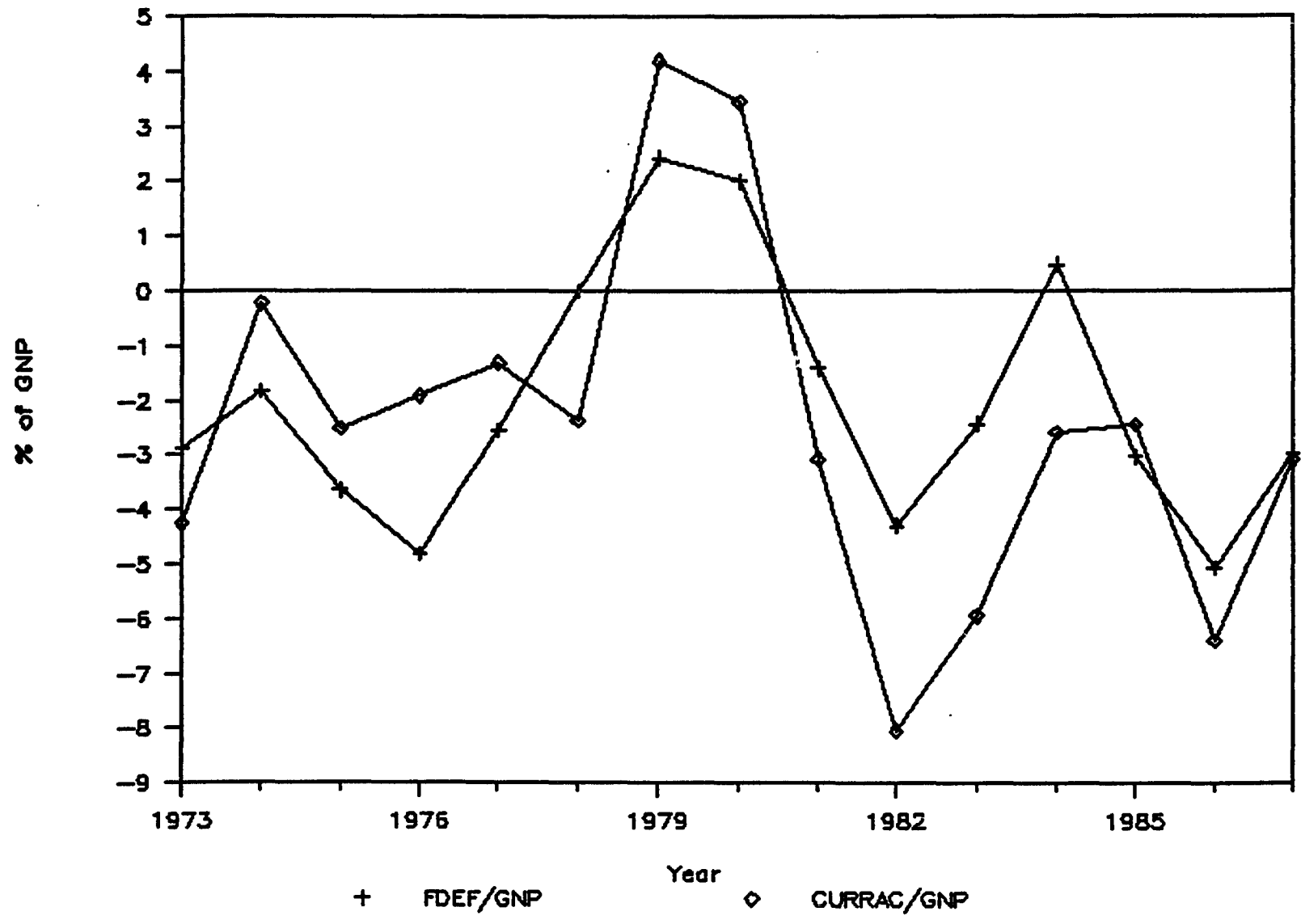
Appropriate Fiscal Policy:

In an economy with an open capital account, the current account deficit and the fiscal deficit move closely together. This is verified for Indonesia in Figure 7. Higher fiscal deficit will either reduce growth by crowding out private investment or increase the current account deficit. Monetary policy cannot be used to sustain lower domestic interest rates to stimulate growth. Eventually interest rates lower than foreign interest rates plus expected devaluation will result in an outflow of capital. The government will be forced to devalue. Monetary policy by itself, therefore, only provides the nominal anchor which determines the rate of inflation and devaluation; it has very little real effect on the economy if the exchange rate is adjusting periodically.

Fiscal policy is the key to reconciliation of growth and debt within reasonable inflation targets. To keep growth unchanged, a reduction in the current account will require a corresponding reduction in the fiscal deficit. Furthermore, how the fiscal deficit is cut matters a great deal. The adjustment path is different if lower fiscal deficit comes from a decline in public consumption as against a cut in public investment.

The difference in the two cases arises from the impact of a fall in public investment on growth. With a cut in public investment, there is a reduction in income growth. This leads to a decline in private investment, but it also leads to a decline in private savings as consumers try to maintain consumption (we verified the permanent income model empirically in

Fiscal Deficit and Current Account

1973—1987

+   FDEF/GNP   ◊   CURRAC/GNP

Section III). The fall in private savings is greater than the cut in private investment and net private savings fall. This reduces the impact of the decline in the fiscal deficit on the current account deficit. Moreover, economic growth is lower than before.

We verify this empirically with the help of a simulation model based on the equations presented in Section III. [16/] Cutting the fiscal deficit by 2% of GNP, with the entire cut coming from public investment, reduces net private savings by almost 1% of GNP. As a result, the current account deficit declines by only 1% of GNP. Also, the growth rate falls. A further reduction in the current account deficit requires real exchange rate depreciation. A cut in the fiscal deficit through a cut in public consumption on the other hand translates into an equal decline in the current account deficit, while private investment, private consumption and growth remain unchanged.

A third option to reduce the fiscal deficit is through an increase in net taxation, or improved resource mobilization. Once again, the reaction of the private sector is important. If the tax increases are viewed as permanent and lead to a decline in permanent disposable income, then private savings do not decline. The improvement in public savings due to greater resource mobilization then translates, one to one, into a corresponding decline in foreign savings or the current account deficit. If, on the other hand, the resource mobilization effort is viewed as a tempoary reaction to the fall in oil prices, with the expectation that disposable incomes will rise once oil prices go up, private savings will fall.

[16/] This model is available from the authors on request.

Resource Mobilization and Adjustment

The last simulation provides the key to reconciliation of growth and debt targets. The target non-oil growth rate is 6% per annum with the external target set at reducing the current account from -2.5% of GNP in 1988 to -1% of GNP by 1995. A non-oil GDP target of 6.0% per annum implies an overall GDP and GNP growth rate of about 5% per annum. In order to achieve the target growth rate, the model calculates the required non-oil investment rate of 20.9% of GDP (this implies an incremental capital output ratio of about 3.5, which is close to its current level) rising from 18.8% of GDP in 1988. 17/ The increase is shared equally between public and private investment, with the public investment rate rising by 1% of GNP; and the balance coming from private investment, also amounting to about 1% of GNP.

The projected increase in private investment comes largely from the accelerator effect of higher demand, and to a smaller extent from a decline in real interest rates (the coefficients are based on Equation 6). World real interest rates are projected to decline by 2 percentage points between 1988 and 1995. 18/ Given the open capital account, this translates into a corresponding decline in real interest rates in Indonesia. The effect of the real interest rates on private investment is small in relation to the effect of higher demand.

How can Indonesia manage an increase in investment with a decline in the current account deficit (an increase in the current account surplus)? The key lies in increased resource mobilization leading to an increase in the net tax rate by about 2.5% of GNP. The decline in the fiscal deficit amounts to

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17/ Using constant 1979 price data.

18/ Based on World Bank projections.

only 1.5% of GNP, since the ratio of public consumption to GNP remains

constant but public investment increases by about 1% of GNP.

The corresponding improvement in the current account deficit by 1.5%

of GNP requires an increase in private savings by 1% of GNP. This is verified

by the model simulations. The increase in private savings happens despite a

decline in the Singapore real interest rate by 2 percentage points. The key

assumption here is that in the medium term the increase in the tax rate will

be viewed as permanent. Since permanent disposable income is a function of

current and lagged disposable income, the increase in the net tax rate is

permanent over a 7 year projection. If the increase in the net tax rate is,

however, not considered permanent (but will be reversed as oil prices rise)

then consumption growth will equal income growth at 6% per annum, as against

only 4.5% per annum projected by the model. Fiscal policy measures for

increasing the net tax rate would need to be implemented on a sustained basis

in order to give signal to the public that these changes are permanent. Thus,

well-publicized, sustained improvements in tax administration and phasing out

of budgetary subsidies and liquidity credits can be expected to lower

permanent income.

The simulation results also confirm that the target current account

deficit is compatible with no further depreciation of the real exchange rate,

given world income growth of about 2.5-3.0% p.a. between 1988 and 1995.

Domestic inflation (CPI growth) remains low, declining to equal world

inflation with no nominal depreciation. The stable real exchange rate index

implies that there are no further real losses on past debt.

VI. Conclusions

To summarize, Indonesia has to a large extent undergone the painful macroeconomic adjustments in response to a series of external shocks since 1981, especially the sharp drop in oil prices in 1986. Non-oil exports, investment, and output growth have picked up again and future prospects appear promising. The adjustment has come about primarily due to a large and swift real exchange rate adjustment combined with structural reforms to improve economic efficiency. The adjustment of the real exchange rate has not been costless. It led to a loss in Indonesia's real income as the value of its external debt increased in relation to GNP. Real wages also fell, particularly in the public sector. However, Indonesia is now back to a reasonable non-inflationary growth path, although with a sizeable accumulated debt. This paper has shown that Indonesia can achieve a reduction in its debt GNP ratio without further depreciation of the real exchange rate, while maintaining a satisfactory pace of growth.

The key to this reconciliation lies in Indonesia's fiscal policy and improved resource mobilization. This will reduce fiscal deficits and restrain private consumption to a growth rate of 4.5% per annum over the 1988-94 period (per capita growth of about 2.5% per annum). Higher growth in per capita consumption will come at the cost of lower debt/GNP reduction. However, even with 6% growth in private consumption and no reduction in the current account deficit, the debt/GNP ratio will still decline, although not to the target level of about 50% of GNP.

The open capital account has reduced one degree of freedom for policy through the interest rate arbitrage. Over the long term, Indonesian interest rates will need to be equal to Singapore interest rates plus expected devaluation. This has also meant that the fiscal deficit and the current

account deficit cannot deviate from each other over an extended period. But it has forced the needed stability in macroeconomic policies that has allowed Indonesia quite uniquely among the middle-income oil producing countries to adjust rapidly to oil price shocks and begin the next decade with good prospects for non-inflationary growth and better creditworthiness indicators.

This paper has used an econometrically estimated macroeconomic model to simulate the degree of adjustments Indonesia has undertaken and then to look for the direction of future policy changes in light of Indonesia's objectives on growth, external debt and inflation. It shows that, as a result of past adjustment, Indonesia has the ability to reduce its stock of debt and maintain non-inflationary growth. For the future, a sustained strategy to reduce the fiscal deficit, restrain the growth of consumption at below the pace of output growth and promote non-oil exports will be required. The Indonesian experience not only provides an example to other oil-exporters but to all high-debt countries. Indonesia has focussed on maintaining creditworthiness through swift policy adjustments aimed at increasing exports and growth. It has provided a stable and sound macroeconomic policy environment in contrast with the stop-go reforms in many high-debt countries with considerable uncertainty heightened by continuous debt renegotiations. The gains from this stable policy environment in terms of avoiding capital flight, attracting productive foreign investment and export diversification probably far exceed the likely benefits of contentious debt reduction negotiations currently underway. Of course, many of the high debt countries may not have the options Indonesia now enjoys because of its past adjustment efforts.

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