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A variety of simple fiscal sustainability indicators have been proposed in recent years to measure the overall fiscal position of the central government in a way that takes account of the fact that a given ratio of debt to GDP will be less problematic, the higher is the rate of real GDP growth relative to real interest rates. The analysis presented in this paper will look at the fiscal position of the central government only. Thus, the appropriate debt variable is gross central government debt issued to domestic and foreign lenders. Fiscal positions of provincial or local governments are excluded from the analysis. The framework is essentially a simplified version of Buiter (1995). The first four sections of the paper lay out the theoretical issues. Section 1 examines the fundamental solvency constraint that applies to a government over the long run. Section 2 then examines the short-run dynamics of the government budget. Section 3 defines the concept of fiscal sustainability in general terms, and discusses the simplest indicator of fiscal sustainability. Section 4 examines the relationship between this simple fiscal sustainability indicator and the fundamental solvency constraint for the government, while Section 5 examines the strengths and weakness of the indicator. Section 6 then presents an empirical analysis of recent experience in Indonesia based on application of the indicator.

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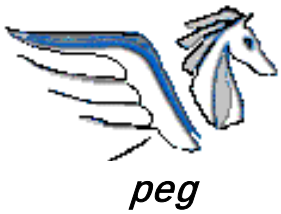
Fiscal Sustainability and Fiscal Solvency: Theory and Recent Experience in Indonesia

By Stephen V. Marks



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Fiscal Sustainability and Fiscal Solvency: Theory and Recent Experience in Indonesia

A variety of simple fiscal sustainability indicators have been proposed in recent years to measure the overall fiscal position of the central government in a way that takes account of the fact that a given ratio of debt to GDP will be less problematic, the higher is the rate of real GDP growth relative to real interest rates.

Some fiscal sustainability studies merge the accounts of the central bank with those of central government. In this case, the appropriate debt variable is net central government debt held by the public but not by the central bank. Moreover, liabilities issued to the public by the central bank would also be included among the liabilities of the public sector,[1] and assets held be the central bank in the form of foreign exchange reserves would be netted out of the total public-sector foreign debt.

The analysis presented in this paper will look more narrowly at the fiscal position of the central government only. Thus, the appropriate debt variable is gross central government debt issued to domestic and foreign lenders. Fiscal positions of provincial or local governments are excluded from the analysis. The framework is essentially a simplified version of Buiter (1995).[2]

The first four sections of the paper lay out the theoretical issues. Section 1 examines the fundamental solvency constraint that applies to a government over the long run. Section 2 then examines the short-run dynamics of the government budget. Section 3 defines the concept of fiscal sustainability in general terms, and discusses the simplest indicator of fiscal sustainability. Section 4 examines the relationship between this simple fiscal sustainability indicator and the fundamental solvency constraint for the government, while Section 5 examines the strengths and weakness of the indicator. Section 6 then presents an empirical analysis of recent experience in Indonesia based on application of the indicator.

1. Long-Run Fiscal Solvency

We will first look at the fundamental constraint under which a government operates over time, which Chalk and Hemming (2000) call the present value budget constraint.

Consider in particular the relationship between government debt in one period and the next, and for simplicity suppose for the moment that all debt is issued in the domestic currency. The relationship can then be written as

$$(1) \qquad B_t \equiv (1 + i_t)B_{t-1} - S_t \quad ,$$

[1] These liabilities consist of the monetary base—currency held by the public and banks, plus commercial bank deposits at the central bank.

[2] Buiter uses rather more elaborate notation and framework than other works in this area, such as Blanchard (1990) and Chalk and Hemming (2000). One reason is that he uses discrete time rather than continuous time, which makes his approach more useful for applied analysis. His framework is also very precise and complete.

where B_t is debt at the end of period t, i_t is the nominal interest rate in period t, and S_t is the primary surplus in period t.[3] The primary surplus is equal to the overall government surplus, but with interest payments excluded. More detailed expressions for B_t and S_t will be provided later.

Relationship (1) can be solved forward to a terminal period T from an initial period 0 to obtain an intertemporal budget constraint for the government. Suppose for simplicity that the interest rate i is constant over time. Then we get

$$(2) \qquad B_T = (1+i)^T B_0 - \sum_{j=1}^{T} (1+i)^{T-j} S_j$$

Now, divide by $(1+i)^T$ and rearrange to solve for B_0, then take the limit as the terminal time period T approaches infinity (∞):

$$(3) \qquad B_0 = \left[\lim_{T \to \infty} \frac{B_T}{(1+i)^T} \right] + \sum_{j=1}^{\infty} \frac{S_j}{(1+i)^j}$$

The term in square brackets is the present value of the terminal debt stock. Chalk and Hemming note that it makes no sense for this present value to be positive. If it were, then the government would be rolling over its debt in full every period by borrowing to cover both principal and interest payments: as long as there were a finite number of potential creditors, these creditors could do better by holding no government debt at all. Similarly, this present value could not be negative, which would imply that private individuals were borrowing from the government. Thus, a necessary condition for sustainability is that the limit in square brackets be equal to zero: the debt must be growing more slowly than the rate of interest. In this case, the intertemporal budget constraint is simply:

$$(4) \qquad B_0 = \sum_{j=1}^{\infty} \frac{S_j}{(1+i)^j}$$

The intuition is that the present value of future surpluses must exceed the present value of future deficits by an amount exactly equal to the initial level of debt. It will be shown later that an easy-to-compute measure of fiscal sustainability bears a close relationship to this solvency condition.

2. Central Government Debt Dynamics

We now look more closely at government finances, with the various components of the budget specified in detail, and allowing for government debt to be held domestically and internationally.

[3] The symbol ≡ means that the items on either side are not just equal, but that there equality represents an accounting identify.

The single period government budget constraint in period *t* is as follows:

$$(5)\quad C_t + A_t - T_t - E_t N_t^* - F_t - V_t + i_t B_{t-1}^d + i_t^* E_t B_{t-1}^* \equiv B_t^d - B_{t-1}^d + E_t(B_t^* - B_{t-1}^*)$$

The left side shows the deficit, and the right side shows how it is financed. In particular,

C_t is the nominal value of government consumption spending in period *t*

A_t is the nominal value of government capital formation in period *t*

T_t is the nominal value of taxes net of transfers and subsidies in period *t*

E_t is the nominal exchange rate defined as the number of rupiah per dollar in period *t*

N_t^* is the dollar value of foreign aid in period *t*

F_t is the nominal value of gross cash flow from the public sector capital stock in period *t*

V_t is the nominal value of privatization revenues in period *t*

i_t is the nominal interest rate on rupiah denominated central government debt in period *t*

B_t^d is the nominal face value of the gross stock of rupiah denominated debt of the central government at the end of period *t*.

i_t^* is the nominal interest rate on foreign currency denominated central government debt in period *t*

B_t^* is the nominal dollar value of the gross stock of foreign currency denominated debt of the central government at the end of period *t*.

The right side of (5) indicates that the central government finances a deficit in period *t* by issuing additional debt denominated in either rupiah or foreign currency. The central government surplus in period *t* is the negative of the left side of (5). The primary surplus of the central government in period *t*, denoted by S_t , is equal to this overall surplus except that interest payments are omitted:

$$(6)\quad S_t \equiv T_t + E_t N_t^* + F_t + V_t - C_t - A_t$$

The nominal rupiah value of the total gross stock of central government debt at the end of period *t* is given by B_t :

$$(7)\quad B_t \equiv B_t^d + E_t B_t^*$$

Equation (5) can now be rearranged, and simplified based on equations (6) and (7), to show the evolution of the debt over time:

$$(8)\quad B_t \equiv (1 + i_t)B_{t-1}^d + (1 + i_t^*)E_t B_{t-1}^* - S_t$$

Let Y_t be real gross domestic product (GDP), and P_t the GDP price index (deflator), in period *t*. Also define the following:

$g_t \equiv (Y_t - Y_{t-1})/Y_{t-1}$ is the rate of growth of real GDP in period *t*

$\pi_t \equiv (P_t - P_{t-1})/P_{t-1}$ is the rate of inflation in period *t*

$\varepsilon_t \equiv (E_t - E_{t-1})/E_{t-1}$ is the rate of appreciation of the dollar against the rupiah in period *t*

Divide both sides of equation (8) by nominal GDP, equal to $P_t Y_t$, so as to express all terms as ratios to GDP in period *t*:

$$(9) \qquad \frac{B_t}{P_t Y_t} \equiv (1+i_t)\left(\frac{B^d_{t-1}}{P_t Y_t}\right) + (1+i^*_t)\left(\frac{E_t B^*_{t-1}}{P_t Y_t}\right) - \frac{S_t}{P_t Y_t}$$

Now use the facts that $P_t \equiv P_{t-1}(1+\pi_t)$, $Y_t \equiv Y_{t-1}(1+g_t)$, and $E_t \equiv E_{t-1}(1+\varepsilon_t)$:

$$(10) \qquad \frac{B_t}{P_t Y_t} \equiv \frac{(1+i_t)}{(1+\pi_t)(1+g_t)}\left(\frac{B^d_{t-1}}{P_{t-1} Y_{t-1}}\right) + \frac{(1+i^*_t)(1+\varepsilon_t)}{(1+\pi_t)(1+g_t)}\left(\frac{E_{t-1} B^*_{t-1}}{P_{t-1} Y_{t-1}}\right) - \frac{S_t}{P_t Y_t}$$

Finally rewrite (10), using lowercase letters to indicate the original variable relative to GDP:

$$(11) \qquad b_t \equiv \frac{(1+i_t)}{(1+\pi_t)(1+g_t)} b^d_{t-1} + \frac{(1+i^*_t)(1+\varepsilon_t)}{(1+\pi_t)(1+g_t)} b^*_{t-1} - s_t$$

$b_t \equiv \frac{B_t}{P_t Y_t}$ is total central government debt at the end of period t, measured in rupiah, as a fraction of GDP in period t

$b^d_t \equiv \frac{B^d_t}{P_t Y_t}$ is central government debt denominated in rupiah at the end of period t, as a fraction of GDP in period t

$b^*_t \equiv \frac{E_t B^*_t}{P_t Y_t}$ is central government debt denominated in foreign currency at the end of period t, as a fraction of GDP in period t

$s_t \equiv \frac{S_t}{P_t Y_t}$ is the primary central government surplus as a fraction of GDP in period t

Finally, using the definition of the real interest rate r_t in period *t*,

$$(12) \qquad 1 + r_t \equiv \frac{(1+i_t)}{(1+\pi_t)},$$

and using the fact that $b^d_{t-1} \equiv b_{t-1} - b^*_{t-1}$, equation (11) can be rewritten as

$$(13) \qquad b_t \equiv \frac{(1+r_t)}{(1+g_t)} b_{t-1} + \left(\frac{(1+i^*_t)(1+\varepsilon_t) - (1+i_t)}{(1+\pi_t)(1+g_t)}\right) b^*_{t-1} - s_t$$

In the expression for b_t in (13), the first term applies the domestic real interest rate to the entire domestic and foreign debt. The second term shows the excess cost of borrowing by issuing foreign-currency-denominated debt rather than rupiah-denominated debt,[4] multiplied by the stock of foreign debt relative to GDP.

To simplify the notation, Buiter defines the augmented primary surplus-GDP ratio:

$$(14) \qquad \tilde{s}_t \equiv s_t - \left[\frac{(1 + i_t^*)(1 + \varepsilon_t) - (1 + i_t)}{(1 + \pi_t)(1 + g_t)} \right] b_{t-1}^*.$$

This augmented ratio equals the primary surplus-GDP ratio, adjusted for the excess cost of borrowing internationally rather than domestically, multiplied by the ratio of foreign debt to GDP. The process that describes the evolution of the central government debt can then be written simply as follows:

$$(15) \qquad b_t \equiv \frac{(1 + r_t)}{(1 + g_t)} b_{t-1} - \tilde{s}_t$$

3. Fiscal Sustainability Indicators

The concept of fiscal sustainability in general refers to the question of whether the government can maintain its current fiscal stance, or whether it will need to make some adjustment in tax or expenditure policies in order to assure solvency as defined by the present value budget constraint (4).

If we seek an indicator of fiscal sustainability, perhaps we need look no farther than the ratio of the public deficit to GDP, or the ratio of the stock of public debt to GDP? An increase in either of these ratios would seem to indicate a less sustainable fiscal position for the government.

However, suppose that our goal is simply to predict the ratio of debt to GDP in the next period. Equation (15) shows that a lower primary surplus will not necessarily be associated with a higher subsequent debt-GDP ratio (b_t), since it could be offset by a lower real interest rate (r_t), a higher real growth rate (g_t), or a lower initial debt-GDP ratio (b_{t-1}). Similarly, a higher initial debt-GDP ratio will not necessarily lead to a higher subsequent debt-GDP ratio, since it could be offset by a lower real interest rate, a higher real growth rate, or a larger primary surplus.

[4] Buiter states that this term corrects for deviations from uncovered interest parity, which is not exactly true. If the numerator of this term were equal to zero, *and* if the *expected* rate of appreciation of foreign currency appeared in it instead of the *actual* rate of appreciation, then uncovered interest parity would hold. The actual and expected rates of appreciation of foreign currency would be equal in general only if economic agents had perfect foresight. In any case, under uncovered interest parity, risk-neutral investors would be indifferent between putting their funds into domestic or foreign interest-bearing assets, or risk-neutral borrowers would be indifferent between issuing debt denominated in the domestic currency or a foreign currency.

We need a more sophisticated indicator of fiscal sustainability, then, one that takes into account the interrelationships among these variables. A variety of such indicators have been discussed. This paper will focus on the simplest measure that Blanchard, Buiter, and others have proposed. The goal in particular is to find the augmented primary surplus-GDP ratio that, if maintained over time, will hold the debt-GDP ratio constant at its initial level. It will be assumed for simplicity that the real interest rate and the real rate of growth will remain constant over time, at rates r and g, respectively. The next section will point out the strengths and limitations of this measure.

Denote the initial time period as period 0. We want to solve for the primary surplus-GDP ratio, $\tilde{s}$, which if maintained over time will maintain the debt-GDP ratio at its initial level, b_0. Thus, the debt-GDP ratio in period 1, b_1, will have to equal b_0, as will the debt-GDP ratio in all later time periods. Using equation (15), we thus require

$$(16) \quad b_0 = \frac{(1+r)}{(1+g)} b_0 - \tilde{s} \quad ,$$

which can be solved for $\tilde{s}$ to yield the *required augmented primary surplus*:

$$(17) \quad \tilde{s} = \frac{(r-g)}{(1+g)} b_0$$

The *one-period primary gap* indicator of fiscal sustainability proposed by Blanchard and Buiter then is equal to the difference between the required augmented primary surplus given by equation (17) and the actual augmented primary surplus. If this gap is positive, it indicates that the required primary surplus is higher than the actual primary surplus, implying that fiscal adjustment will have to occur at some time in the future, if the ratio of debt to GDP is not to increase. If it is negative, then the debt-GDP ratio will shrink over time under the assumption that the primary surplus-GDP ratio and the other relevant variables remain constant.

The one-period primary gap can be calculated for a succession of time periods, to determine how the posture of fiscal policy is changing over time. An advantage of these one-period calculations is that forecasts of future paths of economic and fiscal variables are not required. However, there are multi-period versions of the primary gap indicator that relax the assumption that the relevant variables (notably the real interest rate and the real growth rate) will remain constant over time, and instead utilize forecasts of these variables for future periods. Such approaches obviously would be most useful if policies or conditions are expected to change significantly in the near future.

4. The Primary Gap Indicator and Fiscal Solvency

It is important to understand clearly the relationship between the primary gap indicator and fiscal solvency. First, both sides of the solvency condition, equation (4), can be restated in terms of variables that are defined relative to nominal GDP. Suppose for simplicity that the growth rate of real GDP, the real interest rate, and the inflation rate will be constant into the indefinite future, at rates g, r, and π, respectively. Next, define

$$s_j \equiv \frac{S_j}{P_j Y_j} \qquad \text{and} \qquad b_0 \equiv \frac{B_0}{P_0 Y_0}.$$

In addition, note that

$$S_j \equiv s_j P_j Y_j = s_j P_0 Y_0 (1+\pi)^j (1+g)^j \qquad \text{and} \qquad B_0 \equiv b_0 P_0 Y_0.$$

Then, using the definition of real interest rates in (12), equation (4) can be rewritten as

$$(18) \qquad b_0 = \sum_{j=1}^{\infty} \left(\frac{1+g}{1+r} \right)^j s_j$$

In this case it is required that r > g, otherwise the infinite series shown in (18) will not converge.

Now let *s** represent a constant primary surplus-GDP ratio that will be maintained over time. Equation (18) can then be solved for *s**:

$$(19) \qquad s^* = b_0 \Big/ \sum_{j=1}^{\infty} \left(\frac{1+g}{1+r} \right)^j = \left(\frac{r-g}{1+g} \right) b_0$$

Notice that the expression for *s** in (19) is identical to the expression for $\tilde{s}$ in (17).[5] This equivalence provides an alternative interpretation of the one-period required primary surplus: it is the primary surplus-GDP ratio that, if held constant over time, given that the real interest rate and the growth rate also remain constant into the indefinite future, would allow the government to remain solvent.

Recall for comparison the original rationale for the required primary surplus: it was the primary surplus-GDP ratio that, if held constant over time, would hold the debt-GDP ratio constant, under the assumption that other factors like inflation, real interest rates, and the real economic growth rate remain constant.

5. Strengths and Limitations of the Primary Gap Indicator

The above analysis implies that the required primary surplus concept, and thus the primary gap fiscal sustainability indicators that are based on it, is more general than initially might have been supposed.

However, it must be acknowledged that the constancy of the primary surplus over time relative to GDP is a strong and arbitrary restriction. Chalk and Hemming note that meeting

[5] Recall that the required primary surplus in (17) corrected for differences in the cost of borrowing in domestic currency versus foreign currency. The s* expression in (19) would do so as well, were we to distinguish between domestic and foreign borrowing in its derivation.

the present value budget constraint (PVBC), the fundamental solvency constraint given by equation (4), in reality does not even require that the debt-GDP ratio be bounded, much less that it be constant. Thus, a government that meets the fiscal sustainability condition given by equation (17) will certainly satisfy the PVBC, but it is not necessary to satisfy equation (17) in order to satisfy the PVBC.

Buiter recognizes this limitation of his framework, and in its defense notes that in practice debt-GDP ratios will have to be bounded, if policy is to remain credible. Indeed, Chalk and Hemming conclude that indicators like the one-period primary gap can constitute a prudent approach to testing for fiscal sustainability in many cases in which a government has high debt and high primary deficits.

However, one does not want to rely on fiscal sustainability indicators to the exclusion of other considerations. For example, sustainability per se may be less important than economic recovery in the short run, if the economy has suffered a negative shock. Therefore, to support the long-run health of the economy, and thus the long-run viability of government finances, increased ratios of deficits or debt to GDP may sometimes be optimal, particularly if the economy cannot readily find its own way back to a high-employment, high-output equilibrium.

Some of this change in fiscal policy will occur automatically. For example, tax revenues typically go down during a recession. This reduction in taxes then partly cushions the economy against the recession. If the budget is not tightened to offset the lower tax revenues, it will shift toward deficit, and the public debt could grow as well. Since real GDP is shrinking during a recession by definition, the deficit-GDP ratio will increase, and the debt-GDP ratio could increase as well. But over the long run this would be better for the economy and government finances than if these ratios remained constant or went down. Indeed, the government may wish to consider discretionary fiscal policies in order to provide additional stimulus to economic activity.

5. Empirical Analysis Applied to Indonesia

The final goal of this paper is to calculate the one-period primary gap indicator over a recent span of years for Indonesia. Table 1 shows the relevant data and calculations for each of the fiscal years from 1991 to 2001.[6] All figures are in billions of rupiah, unless stated otherwise.

Calculations are reported in Table 1 for two alternative assumptions about the domestic interest rate. In the first case, a money-market interest rate is used, and the real interest rate is calculated based on actual inflation and that nominal interest rate. In the second, it is simply assumed that the domestic real interest rate is constant and equal to 3.0 percent per annum.

The complete sources for the data are shown in the table below. The foreign debt and domestic debt data are from IFS (1990-99) and WB (2000-01). For domestic debt, the sum of the IFS and WB figures is used for 1998-99, since the WB figures include extraordinary borrowing related to the financial crisis.

[6] Some of the data are needed for 1990 as well, and these are also shown in the table. In the year 2000, fiscal years were shifted from April 1 through March 30 to instead coincide with calendar years. The transitional period is omitted.

Consolidated central government flow variables are all from GFS, except for tax revenues, which is a correction of GFS figures by Bappenas: the GFS tax revenue figures include government natural resource income along with tax revenues. However, the correction plays no part in the subsequent calculations of the primary surplus: total revenues include cash flows from government capital, and in principle could include privatization revenues as well. Expenditures include both current and capital account items.[7]

Data Sources Used in the Empirical Analysis	
IFS	*International Financial Statistics*, Washington, DC: International Monetary Fund (CD-ROM).
GDF	*Global Development Finance: Country Tables*, Washington, DC: World Bank, various issues.
GFS	*Government Finance Statistics Yearbook 2001*, Washington, DC: International Monetary Fund.
WB	Data from World Bank, Indonesia Country Office, available online at http://lnweb18.worldbank.org/eap/eap.nsf/Attachments/Govtdebt/$File/Government+debt.pdf

The actual primary surplus is derived from the above figures, except for 2000-01, for which it is assumed to remain constant at the 1999 percentage of GDP. The correction factor for interest differentials is the term in square brackets from the definition of the augmented primary surplus-GDP ratio in (14) .

The gross domestic product and exchange rate data are from IFS. The Indonesia money-market interest rate is the call money rate from IFS. The foreign interest rate is an interest rate imputed on the basis of the stock of debt at the end of the previous year and interest payments on foreign debt during the given year. (In effect, it is assumed that all transactions occur on the last day of each year.) The stock of debt and interest payments are both from GDF.

The calculations of the one-period primary gap for Indonesia show the gap to be comfortably negative for much of the period from 1991-2001, whichever assumption is made about domestic interest rates. For example, in 1996, the gap was –5.6% of GDP if the money-market interest rate was used and –6.2% of GDP if the real interest rate was assumed constant at 3.0%. The negativity of the gap indicated that, if the augmented primary surplus, real GDP growth rate, and real interest rate were continued into the indefinite future, the ratio of public debt to GDP would diminish over time. In other words, it showed that, if these variables remained constant over time, the government would surpass the condition for fiscal solvency.

The only three years that indicated problems based on the one-period primary gap indicator were 1997, 1998, and to a lesser extent 2000. The first two years marked the onset of the

[7] Buiter takes the analysis of the consolidated central government capital account further—by relating government capital formation, privatization, depreciation, and cash flow from government capital to the stock of government capital in the current and previous period. Such an approach was not practical for Indonesia due to data limitations, and so the primary surplus derivable directly from GFS is used.

economic crisis. The third witnessed a deterioration in economic conditions due in part to a loss of confidence in the government of Abdurrahman Wahid. Closer examination of the data for these three years is instructive:

- Real GDP growth was negative only in 1998. It was higher in 1997 and 2000 than it was in 1999 and 2001, during which the primary gap did not indicate any significant problem.

- Similarly, the GDP inflation rate was very high in 1998, but was lower in 1997 and 2000 than in 1999 or 2001.

- Domestic real interest rates were very high in 1997, but negative in 1998 and 2000. Foreign interest rates were relatively stable throughout the entire period.

- The central-government primary surplus was lower by about two percent of GDP during and after the economic crisis than it had been earlier.

- Both foreign and domestic debt of the central government increased significantly during the economic crisis. Foreign debt peaked relative to GDP in 1997, while domestic debt and total debt peaked relative to GDP in 2000.

The sharp increases in the debt figures certainly are significant developments. However, the factor that seems most decisive in the measured changes in fiscal sustainability from year to year in the recent past has been the behavior of the exchange rate. In each of the three years for which Indonesia had positive one-period primary gap measurements—1997, 1998, and 2000—the rupiah depreciated sharply against the dollar. By the year 2000, even though total debt to GDP was peaking, depreciation of the rupiah was less than it had been in 1997 and 1998, and the primary gap indicator was lower than it had been in the earlier years as well.

The influence of the exchange rate is via the rupiah value of foreign-currency-denominated debt and grants, and through the correction factor for the interest differential between foreign versus domestic borrowing. In particular, even with a relatively stable primary surplus-GDP ratio since 1997, notice that the *augmented* primary surplus-GDP ratio was highly volatile over the period. The three years in which the augmented primary surplus ratio turned sharply negative relative to the primary surplus ratio were the years in which the correction for interest differentials was positive and the rupiah was losing value.

This framework shows, then, the importance of the exchange rate for fiscal conditions within Indonesia. It also shows, however, that the one-period primary gap indicator of fiscal sustainability can vary substantially from year to year, even without major changes in underlying economic conditions or indebtedness. These observations lead to two practical conclusions:

- It is important to understand the underlying causes for changes in the primary gap as a fiscal sustainability indicator. Such understanding is useful in order to diagnose the problem, assess its severity, and if necessary prescribe a remedy in terms of policy adjustment.

- Only if the primary gap indicator shows a sustained deterioration and positive values over a prolonged period of time should there be serious concerns about fiscal sustainability.

Temporary deterioration of the indicator can easily be reversed in the near future without major policy adjustments.

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Table 1. Data and Calculations for One-Period Primary-Gap Indicator of Fiscal Sustainability, 1991-2001 (billions of rupiah, unless indicated otherwise)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Consolidated central government stock variables												
Foreign debt end of period	85891	87435	105546	118797	138841	136781	127324	450890	514134	490685	614233.5	647680.8
Ratio to GDP	40.7%	35.0%	37.4%	36.0%	36.3%	30.1%	23.9%	71.8%	53.8%	44.2%	47.6%	43.4%
Domestic debt end of period	3578	4172	5449	4861	939	3229	83	4097	113481	503481	654000	647000
Ratio to GDP	1.7%	1.7%	1.9%	1.5%	0.2%	0.7%	0.0%	0.7%	11.9%	45.4%	50.7%	43.4%
Total debt end of period	89469	91607	110995	123658	139780	140010	127407	454987	627615	994166	1268234	1294681
Ratio to GDP	42.4%	36.6%	39.3%	37.5%	36.6%	30.8%	23.9%	72.5%	65.7%	89.6%	98.3%	86.8%
Consolidated central government flow variables												
Total revenue and grants	39566	42415	50645	56318	69469	80427	90298	113882	157411	198673		
Tax revenues	24641	27353	32853	37073	51193	60157	63803	79680	114972	147446		
Total expenditure	38720	41319	52200	54983	61866	66723	77964	112893	174097	223462		
Interest payments	5031	4562	5386	6344	7565	7130	6426	10818	31264	42910		
Primary surplus	5877	5658	3831	7679	15168	20834	18760	11807	14578	18121		
Actual primary surplus-GDP ratio	2.8%	2.3%	1.4%	2.3%	4.0%	4.6%	3.5%	1.9%	1.5%	1.6%	1.6%	1.6%
Correction factor for interest differentials		-0.03	-0.02	0.00	0.00	-0.02	-0.04	0.66	0.12	-0.26	0.22	-0.06
Augmented primary surplus-GDP ratio		3.5%	2.1%	2.4%	3.8%	5.4%	4.8%	-13.9%	-7.4%	15.7%	-7.9%	4.4%
Interest rates												
Indonesia nominal money market interest rate	14.0%	14.9%	12.0%	8.7%	9.7%	13.6%	14.0%	27.8%	62.8%	23.6%	10.3%	15.0%
Indonesia real money market interest rate		3.7%	5.5%	-0.9%	1.8%	3.4%	4.9%	13.5%	-7.1%	7.3%	-0.6%	2.9%
Public and guaranteed foreign debt ($ millions)	47982	51891	53664	57156	63926	65309	60016	55869	66953	72554		
Interest payments on this debt ($ millions)	2808	2941	2994	3233	3248	3773	3620	3215	2969	3720		
Imputed interest rate on public foreign debt		6.1%	5.8%	6.0%	5.7%	5.9%	5.5%	5.4%	5.3%	5.6%		
Exchange rate (Rp/$)	1901	1992	2062	2110	2200	2308	2383	4650	8025	7085	9595	10400
Rate of appreciation of dollar against rupiah		4.8%	3.5%	2.3%	4.3%	4.9%	3.2%	95.1%	72.6%	-11.7%	35.4%	8.4%
Gross domestic product												
Nominal GDP	210866	249969	282395	329776	382220	454514	532568	627695	955753	1109980	1290680	1490974
Real GDP (1995=100)	70.86	75.79	80.68	85.93	92.40	100.00	107.82	112.89	98.07	98.90	103.62	107.06
GDP deflator (1995=100)	65.47	72.56	77.01	84.44	91.01	100.00	108.67	122.33	214.42	246.93	274.05	306.40
Real GDP growth		7.0%	6.5%	6.5%	7.5%	8.2%	7.8%	4.7%	-13.1%	0.8%	4.8%	3.3%
GDP inflation rate		10.8%	6.1%	9.6%	7.8%	9.9%	8.7%	12.6%	75.3%	15.2%	11.0%	11.8%
Required one-period primary surplus-GDP ratio												
Based on indonesia real money market interest rate		-1.3%	-0.3%	-2.7%	-2.0%	-1.6%	-0.8%	2.0%	5.0%	4.2%	-4.6%	-0.4%
Based on constant three percent real domestic interest rate		-1.6%	-1.2%	-1.3%	-1.6%	-1.8%	-1.4%	-0.4%	13.5%	1.4%	-1.5%	-0.3%
One-period primary gap												
Based on indonesia real money market interest rate		-4.8%	-2.5%	-5.1%	-5.8%	-7.0%	-5.6%	15.9%	12.4%	-11.5%	3.3%	-4.8%
Based on constant three percent real domestic interest rate		-5.1%	-3.3%	-3.7%	-5.4%	-7.1%	-6.2%	13.5%	20.9%	-14.3%	6.4%	-4.7%