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Abstract

This paper examines the dynamics of the Indonesian government's debt during the period of 1988-2001, its estimation and the impact on the government budget until 2007, by using the Branson model and the Present Value Constraint for the budget.

Based on the evaluation, it can be concluded that after the crisis in 1997-1998, public debt movements tended to be explosive and, consequently, caused the budget condition to be relatively unsustainable. The discussion also concludes that at least for the medium-term, there should be a serious effort to reduce the budget deficit to achieve a sustainable fiscal condition. Even though the analysis covers only the period up to 2007, some lessons to be learned and strategic steps for the future are presented, both for the revenues and expenditures side.

Keywords: Fiscal Sustainability, Government Debt, Branson Model, Present Value Constraint, Indonesia

JEL Classification: C61, E60, F31, F35

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1. INTRODUCTION

The financial and economic crisis that started in mid-1997 has caused a drastic change in Indonesian economy. The crises could be viewed as of currency exchange rate crisis (i.e. the failure of the central bank to maintain the value of rupiah) and crisis in the banking system. The crises had generally shaken the private sector and, in particular, the banking sector. This had also heavily burdened the central government as a consequence to its efforts to calm the condition. Within four years after it started, the government budget was under a huge pressure. The cost of banking restructuring program (through selling bonds) reached Rp 653 trillion as of 31 January 2001. Moreover, the foreign loans (both of the government and private sectors) had increased the burden significantly. At the end of 2001, the total of government’s debt was Rp 1,241.70 trillion, of which domestic debt was Rp 657.9 trillion and foreign debt was $58.4 billion. This figure was equal to 84.6% of the Indonesian GDP.

Therefore, in order to continue the economy recovery process the composition and structure of the debt maturity date and the interest payment management were matters of serious concern, both from fiscal and monetary aspects.

Furthermore, the fiscal decentralization cost (which was around 5.7% of 2001 GDP) and the costs for energy (gasoline and electricity) subsidy were also of important concern in the government budget expenditure.

This paper aims to analyze the government budget sustainability in short and medium-term period, by using the Indonesian case in 1988-2001 and its prediction until 2007. The scope of this paper is to analyze the dynamics of government debt by using the secondary time series data, to predict its movement in short- and medium-term, and to suggest appropriate policy in order to achieve fiscal and debt sustainability.

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2. THEORETICAL BACKGROUND

Debt and Fiscal Sustainability

It is not easy to state a widely accepted definition of fiscal sustainability. However, there is a common understanding that fiscal condition might be unsustainable when there is a potential pressure on recent and future public budget because of a fast and huge increasing debt to GDP ratio.

Thus, the dynamic of government debt has a significant influence over the fiscal condition in a country. The key indicator of fiscal sustainability is the size (and the growth rate) of debt to GDP ratio. A high debt to GDP ratio could cause a pressure to the real interest rate and, in turn, would increase the debt service component in the budget. Furthermore, reduces the fiscal policy flexibility or it does not leave enough room for fiscal maneuver. This is a solvency concept, i.e. a concept of sustainability that defines a sustainable fiscal condition is whenever the debt to GDP ratio is not continually increasing because of the control over its ratio to be lower than the growth of interest and inflation rates. In this context, solvency is a necessary condition for fiscal sustainability, i.e. when the government is able to pay all the public debt.

Mathematically, the solvency concept can be written as follows:

\[ b' + M'/Y = g_t - t_t + (n+p_t)b_t \]
\[ = d_t + (r - n)t \]

\[ b_t, M_t, d_t, g_t, t, i \]

where:
- \( b_t \) = debt to GDP ratio
- \( M_t \) = primary money stock (high-powered money or M0)
- \( d_t \) = primary deficit ratio to GDP
- \( g_t \) = government expenditure (except the interest payment) to GDP
- \( t_t \) = tax ratio
- \( i \) = nominal interest rate of government debt

3 An increasing of debt to GDP ratio influence the real interest rate through two channels which are crowding out effects dan portfolio (risk premium) effects. For detail see Paul R.Masson, "The Sustainability of Fiscal Deficits," IMF Staff Papers, 32 (December 1985).

\[ p_t = \text{inflation rate} \]
\[ n = \text{real growth rate} \]
\[ r = \text{real interest rate} = i - pt \]

If the ratio of primary money growth to the nominal GDP growth is equal, then:

\[ \frac{M'_t}{M_t} = \lambda_t = n + p_t \]
and \[ \frac{M'_t}{Y_t} = \lambda_t m_t \]

Thus, equation (2) can be rewritten as:

\[ b'_t = d_t + (r - n) b_t - \lambda_t m_t \] (3)

Equation (3) is identical with the Branson equation that states: “under a temporary budget constraint, the solvency condition is a situation when the debt to GDP ratio is equal to the summation of: primary balance to GDP, real interest rate net of real growth rate times the initial debt to GDP ratio and minus the value of seignorage”

\[ db = (r - g) b + p - s \] (4)

where \( db \) is the yearly change of government debt, \( b \) is the debt to GDP ratio, \( p \) is the ratio of primary deficit to GDP, \( r \) is the real interest rate, \( g \) is the real GDP growth, and \( s \) is the ratio of seignorage to GDP.

From the government budget constraint above, there are several interesting points to note:

- The change of debt to GDP ratio is determined by the primary balance, seignorage, and economic growth. When the interest rate is higher than the rate of economic growth, debt ratio will increase. This is because of the burden of interest payment of the public debt is smaller than the additional government revenue obtained from the growth. This condition could be avoided if government runs a surplus budget \((p_4 < 0)\), which requires \((p_4 = s)\)
to be a negative value. However, under a budget deficit \( (p_d > 0) \), fiscal sustainability is possible to be achieved when the deficit value is lower than the seignorage \( (p_d < s) \). Since the seignorage source of finance is also limited, thus the surplus budget policy becomes more important to apply. The higher the debt to GDP ratio, the less is the room for government to conduct fiscal policy maneuver.

- In contrast, when the real interest rate is lower than the growth rate, government can maintain or lower its debt ratio growth, so that the possibility for budget deficit to be higher than seignorage is bigger. However, it does not mean that there is no limit for budget deficit to increase. If the debt continues to increase, there is a risk for interest rate to grow higher than the growth rate of the economy. As a result, a sustainable fiscal condition may become unsustainable.

- Fiscal sustainability condition does not depend merely on factors under the government control, i.e. expenditure and revenue sides of the budget. External factors such as the interest rates, long-term economic growth, and demographic trend are also of considerable importance.

- The above budget constraint identity can also be used to calculate the budget target so that to achieve the expected debt to GDP ratio.

For developing countries such as Indonesia, the value of \( b \) (the debt ratio) is positive and quite huge. Thus, the \( (r - g) \) part will determine the debt's dynamic significantly. When the value of \( (r - g) \) is positive and continually increasing (the case when the real interest rate of government debt is higher than the real growth rate), the value of \( db \) will also increase. For \( db \) not to increase continuously, the value of \( (p - s) \) should be negative, which means that the value of primary deficit should be smaller than the seignorage. An explosive increasing of \( db \) is an indication that the debt condition and thus the fiscal condition are unsustainable. For debt sustainability condition, Branson requires that \( db < 0 \).
Approaches to Fiscal Sustainability

Accounting Approach to Sustainability

If we consider foreign debt burden in the budget constraint, the equation could be written as follows:

\[ \Delta B_t + S_t \Delta B_t^* + \Delta M_t = \text{SURP} + i B_t + i^* B_t^* \]  

(5)

Where \( B_t \) is the domestic debt, \( B_t^* \) is the foreign debt, and \( M_t \) is the base money. In real term, equation (5) can be rewritten as:

\[ \Delta B_t + (s B_t^*) + \Delta M_t = \text{SURP} - \pi M + r B_t + (r^* - \epsilon) B_t^* \]  

(6)

where \( r \) dan \( r^* \) shows real return of the domestic and foreign debt, \( s \) shows the real exchange rate (\( s = S_t^* P_t/P_t^* \)), \( P_t^* \) is the foreign price level, and \( \epsilon \) is the domestic currency depreciation rate.

In a simple dynamic equation, we can rewrite the relation between the previous debt stock, primary surplus and next period debt stock as:

\[ B_t = (1+r) B_0 - \text{SURP} \]  

(7)

In debt to GDP ratio, equation (7) becomes:

\[ B = \frac{(1+r)B_0}{G(1+g)} \frac{\text{SURP}}{Y} \]  

(8)

Or

\[ b_t = (1+r) b_0 - \text{SURP} \]  

(8.a)

By using the equation (8.a), the change of debt to GDP ratio can be written as:

\[ \Delta b = b_1 - b_0 = \frac{r-g}{1+g} b_0 - \text{SURP} \]  

(9)

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5 John T. Cuddington, 1996. *Analysing the Sustainability of Fiscal Deficits in Developing Countries*. Washington: Georgetown University, p.5

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The implications of the equation (9) are:

- If the ratio of primary surplus to GDP = 0, the debt to GDP ratio will increase or decrease, depending on the value of r-g.
- If the government runs a budget deficit the debt to GDP ratio will increase higher than r-g.

Under the accounting approach, a primary deficit is sustainable if the debt to GDP ratio can be maintained constant at a targeted growth rate and a constant interest rate. If we omit the seigniorage and foreign debt parts, a sustainable debt ratio is attained if Δb = 0 in equation (9), and could be described as:

\[
SURP = \frac{r - \delta}{1 + g} \frac{b_0}{1 + \delta} \quad (10)
\]

This is the value of primary surplus which is needed to maintain the debt to GDP ratio similar to initial level (b_0).

Although the accounting approach focuses its concern over the steady-state debt ratio, we can also determine the period needed to do the primary surplus adjustment for lowering the debt ratio to the targeted level.

Present Value Constraint Approach

The Present Value Approach starts also from the budget constraint with an N-period iteration:

\[
B_{t-1} = \sum_{j=1}^{\infty} \frac{SURP_{t+j}}{(1+r)^{t+j}} + \frac{B_{n+1}}{(1+r)^{t+j}} \quad (11)
\]

To obtain equation (11), we use equation (7) with a time-constant real interest rate assumption. Furthermore, it is also assumed that Non Ponzi Game condition is fulfilled, so that the limit of the last part in equation (11) is close to zero.

Mathematically it can be written as follow:
This condition stated that the present value of government debt in the future converges to zero. In other words, the value of government debt in a period should be equal to the present value of future primary surplus. Thus, under this approach the fiscal sustainability can be expressed as follows:

\[ \lim_{N \to \infty} \frac{B_{t+1}}{(1 + r)^{t+1}} = 0 \]  

(12)

Later, in this paper this present value constraint approach will be applied by testing the non ponzi game condition in equations (12) or (13).

3. AGHEVLI AND KHAN GOVERNMENT REVENUE AND EXPENDITURE MODEL

Government Expenditure Function

Aghevli and Khan describe the real government expenditure function as:

\[ \log \frac{G}{P} = \log \frac{G}{P} + g_1 \log Y \]  

(14)

Where \( G \) is the nominal government expenditure in period \( t \), \( P \), is the price index (CPI), \( Y \), is the nominal GDP and \( g_1 \) is the elasticity of real expenditure to revenue.

The adjustment process between the targeted expenditure and the real expenditure in the previous period can be written as follows:

\[ D \log \left( \frac{G}{P} \right) = v \left[ \log \left( \frac{G}{P} \right) - \left( \frac{G}{P} \right)_{t-1} \right] \]  

(15)

Where \( v \) is the coefficient of adjustment.

In addition, it also assumes that government maintains the value of its expenditure over the rate of inflation. By substituting equation (15) to equation (14):
\[ \log (G/P) = v_{go} + v_{g1} \log Y_t + (1-v) \log (G/P)_{t-1} \] 
\hspace{1cm} (16)

In nominal terms, we can rewrite equation (16) as:

\[ \log (G) = v_{go} + v_{gt} \log Y_t + (1-v) \log (G/P)_{t-1} + \log P_t \] 
\hspace{1cm} (17)

Government Revenue Function

The government revenue function is defined as:

\[ \log R_t = t_s + t_1 \log (Y_t + \log P_t) \]  
\hspace{1cm} (18)

where \( R \) is the total government revenue at period \( t \), \( Y \) is the nominal GDP, \( P \) is the price level, and \( t_s \) is the elasticity of government revenue with respect to expenditure.

The adjustment process between the targeted and actual revenue is:

\[ D \log R_t = r [\log R_t^d - \log R_{t-1}] \] 
\hspace{1cm} (19)

By substituting equation (18) to equation (19) and write it in nominal terms, we have:

\[ \log R_t = r t_s + r t_1 (\log Y_t + \log P_t) + (1-r) \log R_{t-1} \]  
\hspace{1cm} (20)

In combination with the elasticity of government revenue over expenditure, equations (17) and (20) will be useful for forecasting.
4. DATA AND METHODOLOGY

Data
This paper uses secondary macro data from yearly statistical books published by Badan Pusat Statistik, the IMF, Bank Indonesia, Ministry of Finance, and BAPPENAS.

Model and Research Methodology
The model under this paper uses the concept of government financing constraint by the following equation:

\[ P_tG_t - P_tT_t + (1+r)P_{t-1}B_{t-1} = P_tB_t + M_t - M_{t-1} \]  

(21)

where
- \( P_tG_t \): nominal Government expenditure at year \( t \)
- \( P_tT_t \): tax revenue at year \( t \)
- \( P_tG_t - P_tT_t \): budget deficit/ surplus at year \( t \), except the interest payment
- \( r \): nominal interest rate for debt payment
- \( P_{t-1}B_{t-1} \): total nominal debt during period \( t-1 \) and \( t \)
- \( P_tB_t \): total nominal debt at period \( t \)
- \( M_t - M_{t-1} \): high-powered money (M0) change between period \( t-1 \) and \( t \)

The left-hand side of the equation shows the current deficit which should be paid in a period, equal to \( P_tG_t - P_tT_t \) plus total government debt that faces its maturity date. Under the equation, all debt is assumed has one year maturity period.

The right-hand side of the equation shows how the deficit and the debt are financed. First, the source of finance could come from the issuing of new bonds \( P_tB_t \). Second, government could borrow from the Central Bank via the mechanism of money printing equal to \( M_t - M_{t-1} \). The government income that comes from money printing activity is known as seignorage.

Equation (21) above can be rewritten as a ratio to nominal GDP as:

\[ b_t' + \frac{M_t}{Y} = g_t - t_t + ib_t - (n + p_t) b_t \]  
\[ = d_t + (r - n) b_t \]  
\[ (22') \]

(23)

where

- \( b_t \) = ratio of government debt to GDP
- \( M_t \) = money based stock (high-powered money atau M0)
- \( d_t \) = primary (non-interest) deficit ratio to GDP
- \( g_t \) = ratio of government expenditure to GDP
- \( t_t \) = tax ratio to GDP
- \( i \) = nominal interest rate of government debt
- \( p_t \) = inflation rate
- \( n \) = real GDP growth rate
- \( r \) = real interest rate \((r = i - p_t)\)

If the primary money growth is equal to the nominal GDP growth, then:

\[ \frac{M_t'}{M_t} = \lambda_t = n + p_t \]

and

\[ \frac{M_t'}{Y_t} = \lambda_t m_t \]

Thus, equation (23) can be rewritten as:

\[ b_t' = d_t + (r - n) b_t - \lambda_t m_t \]  
\[ (24) \]
5. GOVERNMENT DEBT AND ITS INFLUENCE ON THE BUDGET

The Model

In this paper, the dynamics of the Indonesian government debt during the period of 1988-2001 will be analysed by using the Branson model. The budget constraint equation from the Branson model can be rewritten as in equations (23) and (24).

Branson expresses the equation (24) as:

\[ db = (r - g) \cdot b + p - s \]  \hspace{1cm} (25)

where \( db \) is the yearly change of government debt, \( b \) is the debt to GDP ratio, \( p \) is the ratio of primary deficit to GDP, \( r \) is the real interest rate, \( g \) is the real GDP growth, and \( s \) is the ratio of seignorage to GDP.

Therefore, the models in this research are:

- The Branson model, which is similar to equation (21) above, and is used to analyze the dynamics of the government debt:

\[ db = (r - g) \cdot b + p - s \]

For a country like Indonesia, the value of \( b \) (the debt ratio) is positive and relatively huge. Thus, the \((r - g)\) part will determine the debt’s dynamics significantly. When the value of \((r-n)\) is positive and continually increasing (the case when the real interest rate of government debt is higher than the real growth rate), the value of \( db \) will also increase. For \( db \) not to increase continuously, the value of \((p-s)\) should be negative, which means that the value of primary deficit should be smaller than the seignorage. An explosively increasing \( db \) is an indication that the debt condition and thus the fiscal condition are unsustainable. Therefore, for debt sustainability condition, the Branson model requires that \( db < 0 \).

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8 For the period of 1988-2002.
9 This model is also used by Dr. Lukita D. Tuwo, Bappenas, in his paper “Kesinambungan Utang Pemerintah dan Kaitannya dengan Kesinambungan Fiskal”, Bogor, 17 March 2001.
To see the fiscal development path, the Hamilton-Flavin test is applied by using the following equation:

$$B_{t+1} = Ao (1+r)^t + \sum (1+r)^{t+j} SURP_{t+j} + n_t$$

In this test, the fiscal sustainability condition is achieved if the value of $Ao = 0$. Under this Non-Ponzi game condition (i.e. a condition where the limit of government debt goes to zero in the long term) is fulfilled. From the above equation, Hamilton and Flavin state that $Ao$ is equal to zero, if $B_{t+1}$ and $\sum (1+r)^{t+j} SURP_{t+j}$ is a stationary time-series process. Thus, the data stationarity test will be performed for $B_{t+1}$ and $SURP_{t+j}$.

In the last part, projection of the budget and the dynamics of the government debt will be performed. This projection will consider the external and internal factors which cannot completely be controlled by the government, such as the exchange rate, foreign interest rate, inflation rate, 3-month SBI rate, and economic growth. Besides using the PROPENAS targets, several other scenarios estimation are also applied. For this reason the following government income-expenditure model developed by Aghevli and Khan is used.

- Government expenditure function:
  $$\log (G) = vgo + vgt \log Y_t + (1-v) \log \left(\frac{G}{P}\right)_{t-1} + \log P_t$$

- Government income function:
  $$\log R_t = rt_o + rt_1 (\log Y_t + \log P_t) + (1-r) \log R_{t+1}$$

Several statistics and econometrics tests are conducted such as Augmented Dickey-Fuller test (i.e. to test the data stationarity) and also Johansen Cointegration test (i.e. to test whether the time series data cointegrate to each other in case it is not stationary)\(^{10}\).

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\(^{10}\) The Johansen cointegration test is one of the indicators for fiscal sustainability condition used by Trehan and Walsh.
The Variables

Debt to GDP Ratio (b)
The debt consists of the government’s domestic and foreign debt. All the data are obtained from the Government Finance Statistics Yearbook published by the IMF and internal data from the Management Center of the Government Bonds in the Ministry of Finance.

Real Interest Rate (r)
Regarding the real interest rate (r), the proxy variable is the 3-month SBI rate minus the inflation rate for the domestic debt interest rate, and the 6-month LIBOR rate minus the average of industrial country interest rate for the foreign debt interest rate. Since the composition of the domestic and foreign debt changes over time, the real interest rate is obtained by weighting the domestic and foreign real interest rate based on the composition of these two types of government debt.

Real GDP Rate (n)
This is calculated from the yearly change of 1993 constant price GDP data, taken from Bank Indonesia’s Indonesia - Economy and Financial Statistics.

Primary deficit to GDP Ratio (p)
The primary deficit is the budget deficit minus the interest payment. This is meant to measure the influence of budget policy in a certain period. The data is obtained from the Government Budget Report prepared by the Ministry of Finance.

Seigniorage to GDP Ratio (s)
Seigniorage is defined as government income received from money printing. Formally, seigniorage (s) is written as:

\[ S = \frac{M'}{P} or \ s = \mu \delta \]  

Seigniorage can be divided into two components: pure seigniorage and inflation tax. Thus, equation (26) can be modified as below:
\[
\left( \frac{M'}{P'} \right) = \frac{M' - MP'}{p^2} \\
\text{or} \quad \left( \frac{M'}{P} \right) = \left( \frac{P'}{P} \right) \left( \frac{M}{P} \right)
\]

\[s = m' + \pi m\] (27)

Since Branson use the ratio of seginorage to GDP, the value of s is defined as:

\[s = (\pi + n)/\nu\] (28)

where \(\pi\) is the inflation rate, \(n\) is the real GDP growth rate, and \(\nu\) is velocity of primary money.

The calculation of \(\nu\) is obtained from:

\[V = 1/k = Y/Md = \text{Nominal GDP / Primary money stock}\]


Foreign Government Debt

There was an enormous increase of debt ratio (from 40.92% to 81.79%) during the period of 1998-2000. This sudden increase was mainly due to the 1997/1998 crisis. In 1996/1997 the debt ratio was 23.9%, whilst in 1997/1998 it increased to 68.0%. The sudden depreciation of the Rupiah value caused the amount of foreign debt denominated in Rp to increase from Rp 127.2 trillion to Rp 425.4 (but, in US dollars the amount decreased from US$ 56.5 billion to US$ 51.1 billion).

Domestic Government Debt

Before the 1998 crisis most of the government debt was foreign debt. However, after the crisis (year 2000) the domestic debt percentage increased sharply to 54.7% of the total government debt.

Since September 25th, 1998, the government has issued series of
government obligation for the blanket guarantee, credit program, and banking recapitalization. There were three types of obligations issued:

1. Variable interest rate obligation. This type of obligation is issued to improve the Capital Adequacy Ratio (CAR) from minus to zero percent, with 15-year maturity period.

2. Fixed interest rate obligation. This is issued to improve the Capital Adequacy Ratio (CAR) from zero to 4%, with 15-year maturity period.

3. Indexed Obligation with interest rate 3% higher than CPI change. The maturity period of this type is 20 year.

The following tables show the composition of government debt and the cost of bank restructuring program during 2000. We can see that the enormous cost of bank restructuring had a significant impact on the government budget in the years after 2000, since the payment of the interest part costs around Rp 31.2 trillion, or equal to 2.4% of GDP in 2000.

Table 1
GOVERNMENT DEBT AND OBLIGATION POSITION
As Januari 31st, 2001

<table>
<thead>
<tr>
<th>No.</th>
<th>Program</th>
<th>Issuing date</th>
<th>Maturity Date</th>
<th>Interest Rate</th>
<th>Total (Rupiah)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Blanket Guarantee</td>
<td>25/9/98 - 26/5/99</td>
<td>1/10/17 - 1/12/18</td>
<td>3% on principal indexed to CPI</td>
<td>218,315,594,294,530</td>
</tr>
<tr>
<td>2</td>
<td>Programme Credit</td>
<td>29/12/99</td>
<td>10/12/09</td>
<td>SBI-3 month rate</td>
<td>9,970,000,000,000</td>
</tr>
<tr>
<td>3</td>
<td>Bank Recapitalization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Fixed Rate</td>
<td>28/5/99 - 8/12/00</td>
<td>15/9/04 - 15/7/07</td>
<td>12% - 16%</td>
<td>79,729,800,000,000</td>
</tr>
<tr>
<td></td>
<td>b. Hedged-Bonds</td>
<td>20/12/99 - 31/10/00</td>
<td>25/3/01 - 25/12/02</td>
<td>SIBOR-3 month + 2% on principal indexed to exchange rate changes</td>
<td>26,328,082,000,000</td>
</tr>
<tr>
<td></td>
<td>c. Variable Rate</td>
<td>28/5/99 - 7/4/00</td>
<td>25/7/02 - 25/7/09</td>
<td>SBI-3 month rate</td>
<td>219,479,211,000,000</td>
</tr>
<tr>
<td></td>
<td>Total 3 (a+b+c)</td>
<td></td>
<td></td>
<td></td>
<td>425,537,093,000,000</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td>653,822,667,294,530</td>
</tr>
</tbody>
</table>

Source: Ministry of Finance
Table 2
THE COSTS OF BANK RESTRUCTURING
As of July 2000

<table>
<thead>
<tr>
<th>Bonds issued (Rp trillion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
</tr>
<tr>
<td>Credit Program</td>
</tr>
<tr>
<td>Recapitalization</td>
</tr>
<tr>
<td>- State banks</td>
</tr>
<tr>
<td>- Private banks</td>
</tr>
<tr>
<td>- Banks taken over</td>
</tr>
<tr>
<td>- Regional development banks</td>
</tr>
<tr>
<td>Non Recap Banks</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
</tr>
</tbody>
</table>

Sources: Prof. Dr. Anwar Nasution, Bank Restructuring: Progress And Outlook, 31 December 2000

Table 3
Indonesia Government Bonds: Some Figures

<table>
<thead>
<tr>
<th>Ratios (in %)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio to 2000</td>
<td>50.657</td>
</tr>
<tr>
<td>Ratio to M1</td>
<td>463.034</td>
</tr>
<tr>
<td>Ratio to M2</td>
<td>90.776</td>
</tr>
<tr>
<td>Ratio to total deposits</td>
<td>147.718</td>
</tr>
<tr>
<td>Ratio to inter bank call money</td>
<td>2314.253</td>
</tr>
<tr>
<td>Ratio to outstanding SBI</td>
<td>840.897</td>
</tr>
<tr>
<td>Ratio to outstanding bonds</td>
<td>3001.403</td>
</tr>
<tr>
<td>Ratio to issued bonds</td>
<td>288.544</td>
</tr>
</tbody>
</table>

Memorandum (in billions of Rp):

| Outstanding Government Bonds | 653,822.69 |
| GDP for fiscal year 2000/2001 | 1,290,684.30 |
| M1                            | 141,204.00  |
| M2                            | 720,261.00  |
| Total deposits in Commercial Banks | 442,614.00 |
| Interbank Call Money          | 28,252.00   |
| Outstanding SBI               | 77,753.00   |
| Outstanding bonds             | 21,783.90   |
| Value of issued bonds         | 226,593.60  |

Notes: * Total bonds Value as 31/1/2001
** All data, except GDP, as of November 2000
Primary Deficit
Comparing the primary surplus in the period of 1988-1995 to 1995-1998, there was a decreasing tendency from around 2.6% of GDP to 2.22%. However during the period of 1998-2000 there was an enormous increased of the deficits to approximately 4.46% of GDP because of the increasing domestic debt interest payment.

Interest Rate
While the international interest rate (i.e. 6 month LIBOR rate) was relatively stable in between 1.5% to 6.0%, the domestic real interest rate fluctuated quite extremely. Before the crisis, it was around 11.0%, and right after 1998 it became -38.5% due to the very high inflation rate. Graph 1 below shows the changes of the domestic and international interest rates.

Graph 1

Source: Indonesia Economics & Financial Statistics (Bank Indonesia) and International Finance Statistics Yearbook (IMF), several editions.
Therefore, the current huge amount of government debt has at least three risks, namely a currency risk, interest rate risk, and refinancing risk (risk from the structure of maturity period).

Graph 2 below shows the structure of the maturity period of the issued government bonds. It can be seen that a lot of the government obligation’s maturity date were due in the period of 2004–2009. This would mean that the government should have enough finance to pay the matured obligation. Therefore, concerning the budget, The refinancing problem is one of the most important issues until 2009.

Branson Model and 2002 Debt Sustainability

The Branson equation applies here to find the development path of the government debt during 1988-2000. During the period of 1988-1997, there was a declining trend in government debt with a level of an average of 5.1% of GDP. However, after the crisis it turned the other way around
with an average increased rate of 2.2% of GDP. This was an indication that the Indonesian government debt went into an explosive development path (see Table A1).

Four scenarios are applied to estimate the government debt to GDP ratio for 2002. Moreover, simulations are performed by assuming several alternatives of economic growth rate, inflation rate, and real interest rate.

Important points that can be concluded from table A2 at the appendix (where it is assumed that the international interest rate was stable at 4%):

- **Scenario 1** Similar assumption with the government budget of 2001, with an economic growth rate of 3.5%, inflation rate of 9.3%, exchange rate Rp9.600/US$, GDP Rp1,4681 trillion, and oil price of US$24/barrel, debt ratio 83.0 % and if the primary balance target of around 2.4% GDP could be achieved; the debt ratio would decrease around 2.3%. If constant level of government debt (db=0) was targeted, a 0.1% primary surplus is needed.

- **Scenario 2**, assuming that the targeted inflation rate could not be achieved so that the inflation rate is equal to 12% (12% is chosen since the average monthly inflation rate until September 2001 varied from 10.6% to 13.0%). Under this scenario, the government debt of around 3.8% of GDP could be reduced. In addition, a 1.4% primary deficit is possible to run without changing the debt ratio (db=0). Although there is a possibility of debt decreasing, the high inflation rate that occurred was not a good condition for the economy.

- **Scenario 3 and 4** are based on scenario 1 dan 2, but using different 3-month SBI rate i.e. 17%, since until September 2001 the SBI rate was still higher than 17,5%. Under these scenarios, if the economic growth target of 3.5% could be achieved, even though the inflation was relatively high, there would have been a declining debt ratio. Moreover, the primary surplus is not a necessary condition anymore. Under scenario 3, the minimum level of the primary surplus needed is only around 1.2 %, while under scenario 4 (when the inflation rate was higher), the minimum primary surplus is around 0.04% or equal to Rp 587.24 million.
The 2002 condition could be estimated with some scenarios as (see Table A3):

- Using all the assumption in 2002 budget (for example: a 4% growth rate and 9% inflation rate), it was estimated that the debt ratio would decrease at around 3.4%. If this condition achieved, then for 2003 around 0.6% of GDP (or Rp 9.39 trillion) primary deficit could be possible to run without increasing the debt ratio.

- If in 2002 the economic growth rate was 0%, three alternative scenarios of dynamic paths could be analyzed. The first, under scenario 2, when the government targets a low inflation rate of around 5%, the debt ratio would increase by 1.8%. In this case, when a constant debt ratio is targeted (db=0), a primary deficit of around 4.5% of GDP (around Rp 76.4 trillion) is required.

- Under scenario 3, if a 9% inflation is targeted, a decrease of debt ratio by 0.05% would be achieved. Furthermore, the upper limit for deficit to maintain a constant debt ratio is around -2.7% of GDP, or in other words a primary surplus of around Rp 45.50 trillion was required.

- Finally, under scenario 4, if the government set a “soft (loose)” target for inflation at 15%, a decrease by 2.8% of debt ratio becomes possible with a primary deficit of 0.04%. However, high inflation rate has never been a good condition for the economy. Therefore from scenarios 2, 3, dan 4 it can be concluded that even though a soft inflation target is set, an effort to tighten fiscal policy would be required to avoid a huge increase of the debt ratio.

- Scenarios 5, 6, and 7 assume low economic growth (i.e. 3%) with different inflation rates. The softer the inflation target is, the higher the decreasing rate of debt ratio. This is due to the fact that the real interest rate will be lower when the inflation rate is higher. Under these scenarios, even though the inflation rate is similar with the target (9%), a tight fiscal policy (0.2% primary surplus) is still needed.

- Assumptions in scenario 8 are the same with those in the basic scenario (scenario 1) except for the higher 3-months SBI rate (equal to 17%). Here, the decrease of the debt ratio is around 2.25%. Moreover, the upper limit of primary deficit to avoid db>0, is around -1.6% of GDP. Therefore, if the 2002 SBI-rate did
not change significantly, a tight fiscal policy, with a primary surplus of at least Rp 27.47 trillion, is required.

- Scenario 9 is applied in order to know the path of government debt if a 2.5% primary deficit exists. This figure is chosen based on assumption in the 2002 budget. Under this scenario, with a primary deficit of 2.5%, government debt would increase at around 1.9% of GDP. So if the db=0 condition is targeted, a 0.6% of GDP primary deficit is required.

7. **ECONOMETRIC TEST AND PROJECTION OF FISCAL SUSTAINABILITY**

In the previous parts, the development of government debt has been explained by using several scenarios. However, the above explanation is not adequate to describe the fiscal sustainability condition since only the bounded (non-explosive) condition applied.

In order to enhance the analysis and to check whether the future fiscal condition is sustainable, the Hamilton-Flavin econometric test which is based on the present value constraint approach, is applied. Under this test, the government is considered able to pay debt if in the long run the stock of debts is equal to the present value of the expected budget surplus.

8. **HAMILTON – FLAVIN TEST MODEL**

Under the *Present Value Constraint* approach the budget constraint for $N$ period is defined as below:

$$
B_{n+1} = \sum_{t=0}^{\infty} \left( \frac{SURF_{t+1} + B_{n+1}}{(1+r)^{t+1}} \right)_{t=t+1}
$$

Non Ponzi Game condition requires that:

$$
\lim_{N \to \infty} \frac{B_{n+1}}{(1+r)^{t+1}} = 0
$$

Equation (30) means that the government debt in the future should converge to zero. In other words, all debts should be paid by the Government.
By using the Non Ponzi Game in Equation (29), the fiscal sustainability condition can be written as:

$$B_{t-1} = \sum_{j=0}^{\infty} \frac{SURP_{t+j}}{(1+r)^{t+1}}$$

(31)

By doing forward iteration and expectation operation, we can rewrite equation (29) as:

$$B_{t-1} = \frac{E_t \lim_{N \to \infty} B_{N+t} (1+r)^{N+1} + E_t \sum_{j=0}^{\infty} (1+r)^{-(j+1)}SURP_{t+j} + \eta_t}{N \to \infty}$$

(32)

In short, Hamilton and Flavin test the below condition

$$E_t \lim_{N \to \infty} B_{N+t} (1+r)^{N+1} = 0$$

(33)

Or by testing this condition

$$B_{t-1} = E_t \sum_{j=0}^{\infty} (1+r)^{-(j+1)}SURP_{t+j}$$

(34)

Furthermore, Hamilton and Flavin assumes a debt process that follows:

$$E_t \lim_{N \to \infty} B_{N+t} (1+r)^{-(N+t)} = A_0$$

(35)

whereas $A_0$ is a constant. Budget constraint which follows (38) debt process can be written as:

$$B_{t-1} = A_0 (1+r)^t + \sum_{j=0}^{\infty} (1+r)^{-(j+1)}SURP_{t+j} + \eta_t$$

(36)

A debt development process which follows equation (35) will fulfill the present value constraint if $A_0=0$. This condition is fulfilled if and only if SURP and $B_t$ are a stationary series.

In this paper a stationarity test (Augmented Dickey Fuller test) will be applied for the government debt and primary surplus variable in order to know the fiscal sustainability condition for the year 1988-2001.
Augmented Dickey Fuller Test Result

Government debt (Bt) and primary surplus (SURPt) in equation (36), and the hypothesis is:

- **H₀** = β₀ = 0 and β₁ = 1 (random walk, the series is non-stationary)
- **H₁** = β₀ ≠ 0 and β₁ ≠ 1 (non random walk)

The ADF test result of Bₜ and SURₚₜ is shown at table 4. We can see from table 4 that for every level of confidence (i.e. 1%, 5% dan 10%), ADF test fails to reject H₀, which means that both the variables are not stationary. Therefore we can conclude that based on the Hamilton-Flavin test during period 1988-2001, the Indonesian fiscal condition is unsustainable.

To check the robustness of the result above, Trehan and Walsh (1991) test is performed. This test improves the Hamilton and Flavin test in case that primary surplus series is not stationary in level. Their preposition is:

"If the evolution of Bₜ is given by equation Bₜ = (1+r) Bₜ₋₁ - SURₚₜ, with constant expected interest rate, and (1 - Aλ) SURₚₜ is a mean zero stationary with 0 < λ < (1+r), then the Non Ponzi Game condition holds if and only if there exists a linear combination of SURₚₜ and Bₜ₋₁ that is stationary".

<table>
<thead>
<tr>
<th>Variable</th>
<th>Test Value</th>
<th>1%</th>
<th>5%</th>
<th>10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEBT</td>
<td>-0.280596</td>
<td>Accept</td>
<td>Accept</td>
<td>Accept</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-4.1366)*</td>
<td>(-3.1483)</td>
<td>(-2.7180)</td>
</tr>
<tr>
<td>DEBT (1)</td>
<td>-1.389609</td>
<td>Accept</td>
<td>Accept</td>
<td>Accept</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-4.2207)</td>
<td>(-3.1801)</td>
<td>(-2.7349)</td>
</tr>
<tr>
<td>DEBT (2)</td>
<td>-1.092781</td>
<td>Accept</td>
<td>Accept</td>
<td>Accept</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-4.3260)</td>
<td>(-3.2195)</td>
<td>(-2.7557)</td>
</tr>
<tr>
<td>PRIMARY SURPLUS</td>
<td>-0.252627</td>
<td>Accept</td>
<td>Accept</td>
<td>Accept</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-4.1366)</td>
<td>(-3.1483)</td>
<td>(-2.7180)</td>
</tr>
<tr>
<td>PRIMARY SURPLUS (1)</td>
<td>-1.393494</td>
<td>Accept</td>
<td>Accept</td>
<td>Accept</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-4.2207)</td>
<td>(-3.1801)</td>
<td>(-2.7349)</td>
</tr>
<tr>
<td>PRIMARY SURPLUS (2)</td>
<td>-3.165362</td>
<td>Accept</td>
<td>Accept</td>
<td>Reject</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-4.3260)</td>
<td>(-3.2195)</td>
<td>(-2.7557)</td>
</tr>
</tbody>
</table>

Notes: (1) shows the first difference of that variable
(2) shows the second different
Reject H₀ if test value < critical value
* Critical value
Thus, the basic idea of Trehan and Walsh test is to apply cointegration test between $B_{t+1}$ and SURP$_t$ variables, in case that SURP$_t$ is difference stationary.

Moreover, after performing the Johansen cointegration test, it is found that the government debt and primary surplus are not cointegrated. In conclusion, similar with the Hamilton-Flavin test, under Trehan-Walsh test Indonesia fiscal condition for the period 1988-2001 does not fulfilled the non ponzi game condition, thus the fiscal condition is unsustainable.

**Debt and Fiscal Sustainability Projection: 2002-2007**

There are six scenarios considered under this estimation, which are:

1. **Scenario 1:** condition with a high tax ratio, 6% economic growth and 3-month SBI rate = 12%. This scenario is based on the government targets in PROPERNAS and REPETA 2002 (see table 5).

2. **Scenario 2:** scenario 1 with lower economic growth (3%).

3. **Scenario 3:** scenario 1, but with lower tax ratio (around 12%).

4. **Scenario 4:** is the worst condition, low tax ratio (12%) and low economic growth (3%).

5. **Scenario 5:** scenario 1 with weaker exchange rate, i.e. Rp 9,000 per US$ for 2004-2007.

6. **Scenario 6:** scenario 1 with lower SBI rate (=9%) and weaker exchange rate (Rp/US$ = Rp 9,000 for 2004-2007).

**Table 5**

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rp/US$</td>
<td>9,600</td>
<td>9,000</td>
<td>8,500</td>
<td>8,000</td>
<td>8,000</td>
<td>7,500</td>
<td>7,500</td>
</tr>
<tr>
<td>Inflation</td>
<td>9.3%</td>
<td>9%</td>
<td>5.7%</td>
<td>5.7%</td>
<td>5.7%</td>
<td>5.7%</td>
<td>5.7%</td>
</tr>
<tr>
<td>3-month SBI</td>
<td>15%</td>
<td>14%</td>
<td>12%</td>
<td>12%</td>
<td>12%</td>
<td>12%</td>
<td>12%</td>
</tr>
<tr>
<td>Tax/GDP</td>
<td>12.6%</td>
<td>13.0%</td>
<td>13.3%</td>
<td>14.2%</td>
<td>17.7%</td>
<td>18.7%</td>
<td>19.7%</td>
</tr>
</tbody>
</table>
Since the calculation for each scenario has different assumptions of economic growth and tax ratio, there is a need to calculate government expenditure elasticity, government revenue elasticity, and tax elasticity, as developed by Aghevli and Khan (1978).

**Government Expenditure:**

\[
\text{Log (G)} = 0.042829 + 0.690003 \text{log } Y_t + 0.16058 \text{log } (G/P)_{t-1} + 0.269959 \text{log } P_t
\]

\[
t-\text{stat} \quad (0.036316) \quad (3.013096) \quad (0.689948) \quad (0.689948)
\]

Adjusted \(R^2 = 0.982855\) \(\text{DW} = 2.050910\)

**Government Revenue:**

\[
\text{Log } R_t = -0.026595 + 0.979841 \text{log } Y_t + 0.233301 \text{log } P_t - 0.221352 \text{log } R_{t-1}
\]

\[
t-\text{stat} \quad (-0.023689) \quad (4.331447) \quad (0.679273) \quad (-1.134464)
\]

Adjusted \(R^2 = 0.983850\) \(\text{DW} = 1.589730\)

**Tax Revenue:**

\[
\text{Log (T)} = 0.141869 + 0.840065 \text{log } Y_t
\]

\[
t-\text{stat} \quad (0.368569) \quad (27.02028)
\]

Adjusted \(R^2 = 0.974602\) \(\text{DW} = 0.949455\)

From the regression results we can see that the elasticity of revenue is 0.979841, elasticity of expenditure is 0.690003, and elasticity of tax revenue is 0.840065.

The results of projections using the six scenarios are presented in table 6. Some important points that we can conclude are:

- If the economic conditions after 2001 had been similar to the Government target/assumption, then starting from 2004 the deficit budget would experience a surplus, and the debt to GDP ratio would decrease until 38.4 % of GDP in 2007.

- When the economic growth rate is lower then that targeted in 2001 Propenas but maintaining the high tax ratio (scenario 2), the budget would start having a surplus in 2006. Debt to GDP ratio would decrease until about 68.7% in 2007.
### Table 6

**INDONESIAN GOVERNMENT FINANCIAL AND DEBT SUSTAINABILITY**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>YEAR</th>
<th>Surplus/Budget Deficit</th>
<th>Debt/GDP</th>
<th>Debt/GDP Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scenario 1 (PROPENAS)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>high tax ratio, growth = 6%, SBI = 12%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2001</td>
<td>2002</td>
<td>2003</td>
<td>2004</td>
</tr>
<tr>
<td>Surplus/Budget Deficit</td>
<td>-3.7</td>
<td>-2.3</td>
<td>-1.2</td>
<td>0.7</td>
</tr>
<tr>
<td>Debt/GDP</td>
<td>82.99</td>
<td>77.84</td>
<td>71.60</td>
<td>64.08</td>
</tr>
<tr>
<td>- Domestic</td>
<td>44.81</td>
<td>40.46</td>
<td>34.98</td>
<td>28.19</td>
</tr>
<tr>
<td>- Foreign</td>
<td>38.18</td>
<td>37.38</td>
<td>36.62</td>
<td>35.89</td>
</tr>
<tr>
<td><strong>Scenario 2:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Scenario 1 but growth = 3%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surplus/Budget Deficit</td>
<td>-3.7</td>
<td>-4.4</td>
<td>-3.8</td>
<td>-2.4</td>
</tr>
<tr>
<td>Debt/GDP</td>
<td>82.99</td>
<td>82.43</td>
<td>81.00</td>
<td>78.55</td>
</tr>
<tr>
<td>- Domestic</td>
<td>44.81</td>
<td>43.69</td>
<td>41.67</td>
<td>38.63</td>
</tr>
<tr>
<td>- Foreign</td>
<td>38.18</td>
<td>38.75</td>
<td>39.33</td>
<td>39.92</td>
</tr>
<tr>
<td>Debt/GDP Change</td>
<td>-0.55</td>
<td>-1.44</td>
<td>-2.45</td>
<td>-3.26</td>
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<tr>
<td><strong>Scenario 3:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(Scenario 1 but low tax ratio = 12%)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surplus/Budget Deficit</td>
<td>-3.7</td>
<td>-3.1</td>
<td>-2.4</td>
<td>-1.4</td>
</tr>
<tr>
<td>Debt/GDP</td>
<td>82.99</td>
<td>78.69</td>
<td>73.61</td>
<td>68.18</td>
</tr>
<tr>
<td>- Domestic</td>
<td>44.81</td>
<td>41.09</td>
<td>36.57</td>
<td>34.03</td>
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<tr>
<td>- Foreign</td>
<td>38.18</td>
<td>37.60</td>
<td>37.04</td>
<td>36.15</td>
</tr>
<tr>
<td>Debt/GDP Change</td>
<td>-4.30</td>
<td>-5.08</td>
<td>-5.43</td>
<td>-3.11</td>
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<tr>
<td><strong>Scenario 4:</strong></td>
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<td></td>
</tr>
<tr>
<td>(Scenario 1 but low tax ratio = 12% and low growth=3%)</td>
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</tr>
<tr>
<td>Surplus/Budget Deficit</td>
<td>-3.7</td>
<td>-6.2</td>
<td>-6.6</td>
<td>-6.4</td>
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<tr>
<td>Debt/GDP</td>
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<td>84.73</td>
<td>87.10</td>
<td>89.85</td>
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<td>- Domestic</td>
<td>44.81</td>
<td>45.99</td>
<td>47.77</td>
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<td>- Foreign</td>
<td>38.18</td>
<td>38.75</td>
<td>39.33</td>
<td>39.92</td>
</tr>
<tr>
<td>Debt/GDP Change</td>
<td>1.7</td>
<td>5</td>
<td>2.37</td>
<td>2.75</td>
</tr>
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<td><strong>Scenario 5:</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>(Scenario 1 but Rp/US$ = 9,000 since 2004)</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Robert A. Simanjuntak; Friska P. Panjaitan

<table>
<thead>
<tr>
<th>YEAR</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surplus/Budget Deficit</td>
<td>-3.7</td>
<td>-2.87</td>
<td>-1.79</td>
<td>0.01</td>
<td>2.15</td>
<td>3.59</td>
<td>5.0</td>
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<tr>
<td>Debt/GDP</td>
<td>82.99</td>
<td>78.68</td>
<td>77.81</td>
<td>74.49</td>
<td>71.64</td>
<td>67.92</td>
<td>63.25</td>
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<tr>
<td>- Domestic</td>
<td>44.81</td>
<td>40.50</td>
<td>36.00</td>
<td>29.30</td>
<td>23.60</td>
<td>18.50</td>
<td>12.90</td>
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<tr>
<td>- Foreign</td>
<td>38.18</td>
<td>38.18</td>
<td>41.81</td>
<td>45.19</td>
<td>48.04</td>
<td>49.42</td>
<td>50.35</td>
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<tr>
<td>d($\text{change of debt/GDP ratio}$)</td>
<td>-3.585</td>
<td>-4.666</td>
<td>-6.051</td>
<td>-7.357</td>
<td>-7.052</td>
<td>-7.750</td>
<td></td>
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</tbody>
</table>

Scenario 6 (Scenario 1, but SBI = 9% and Rp/US$ = 9,000 since 2004)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surplus/Budget Deficit</td>
<td>-3.70</td>
<td>-0.97</td>
<td>0.41</td>
<td>2.10</td>
<td>4.11</td>
<td>4.18</td>
<td>5.39</td>
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<td>Debt/GDP</td>
<td>82.99</td>
<td>68.55</td>
<td>68.81</td>
<td>67.16</td>
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<td>- Domestic</td>
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<td>30.38</td>
<td>27.00</td>
<td>21.98</td>
<td>17.70</td>
<td>13.88</td>
<td>9.68</td>
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<tr>
<td>- Foreign</td>
<td>38.18</td>
<td>38.18</td>
<td>41.81</td>
<td>45.19</td>
<td>48.04</td>
<td>49.42</td>
<td>50.35</td>
</tr>
<tr>
<td>d($\text{change of debt/GDP ratio}$)</td>
<td>-3.585</td>
<td>-4.737</td>
<td>-6.096</td>
<td>-7.394</td>
<td>-7.081</td>
<td>-7.773</td>
<td></td>
</tr>
</tbody>
</table>

Source: own calculation

- Under scenario 3, with the tax ratio had been at the level of around 12%, we find that eventhough the rate of economic growth had been high, the 2007 budget was still in deficit and the debt to GDP ratio was around 62%.
- Scenario 4 reflects the worst condition. Low tax ratio and low economic growth rate would result in an explosive debt's dynamic and the debt to GDP ratio in 2007 would climb to a level of 104.5 % of GDP.
- Scenario 5 considers a similar case with Scenario 1, except that the weaker exchange rate (i.e. Rp per US$ was Rp 9,000 for 2004 until 2007). Under this condition surplus would start in 2004, although it was only with smaller percentage. Moreover, the debt to GDP ratio in 2007 was 63.3 %.
- In scenario 6, the exchange rate is assumed as in scenario 5, but the SBI rate here is lower, i.e. 9%. Such condition would create a surplus budget since 2003 and the slightly better (lower) debt to GDP ratio than scenario 5.

From table 6 we can see that the government has basically two choices, i.e.: pushing the effort to increase the economic growth without increasing the tax ratio; or increasing the tax revenue target in order to reduce the budget deficit and debt stock. It is quite clear that an effort to
increase the tax revenue is a necessity in short- and medium-term, although there is a possibility that in the longer term this could be done parallel with an effort to optimise the growth rate of the economy.

In short, for the government to achieve the fiscal and debt sustainability in several years ahead, an effort to increase the tax ratio is a more crucial issue than trying to restore the economic growth to the level of before crisis.

9. CONCLUDING REMARKS AND POLICY IMPLICATIONS

There are important points to note from this analysis of the 1998-2001 data and its projection to 2007, and some suggestions for several years after 2007:

1. The dynamic path of the Indonesian government debt tend to move into an unsustainable one. By applying the Branson equation, it was found that before 1997 there was a declining debt to GDP ratio with an average change of 5.1% of GDP. But for 1998-2000, the ratio increased quite explosively with an average of around 2.2% of GDP.

2. The enormous increase of the debt to GDP ratio makes the fiscal policy less flexible and lowers the primary deficit's amount that can be implemented.

3. The path of 2001 government debt makes primary surplus as a necessity. Assuming 3.5% of economic growth, whatever the inflation rate assumed, then primary surplus was required. Budget deficit is only possible to be implemented if the inflation rate target was set in a very 'soft' level (around 12%)

4. For the year 2002, an effort to increase economic growth was also important. If the government wanted to reduce the debt ratio, a 3% growth rate with a low level of inflation was required.

5. Indonesia's fiscal condition was on an unsustainable path. Both the Hamilton-Flavin test and Trehan-Walsh test concluded that it would be difficult for the government to be able to pay all the debt in the future. The prediction calculated for at least until 2007, an effort to increase the tax revenue has been a key issue. Moreover, efforts to raise economic growth would certainly not be sufficient without a combined effort of increasing tax revenue, at least in the medium period.
6. During the crisis, efforts to increase the tax revenue by widening the tax base would have been more successful than merely raising the tax rates.

7. From the expenditure side, reducing the cost of bank restructuring was very important and need to be achieved. The issue here is synchronized fiscal and monetary policies that requires good cooperation between the government and the central bank.

8. Cutting the subsidy, especially the gasoline subsidy, has been a key issue. As an example, if in the 2002 budget the government had cut the gasoline subsidy, the deficit could have been reduced by Rp 23.4 trillion.

9. Control over and reallocation of the routine expenditure is also important, since the portion of this expenditure has been high (i.e. on average more than 50% of total expenditure).

10. In order to minimize the cost of bank restructuring, looking from the financing side, efforts to develop a secondary market for domestic bonds is crucial. The establishment of a primary dealer system could create an active and liquid market for government bonds, so that the foreign financing sources could ultimately be replaced by domestic financing sources.

11. Privatization or asset selling is also an important issue. Delay of this process would only lead to a decline in the interest of the investors and would finally increase the amount of government debt.

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APPENDIX

Table A1
(in percentage to nominal GDP)

<table>
<thead>
<tr>
<th>period</th>
<th>real interest rate (r)</th>
<th>growth rate (n)</th>
<th>growth factor (r-n)</th>
<th>debt/GDP (b)</th>
<th>(r-n)*b</th>
<th>inflation rate</th>
<th>primary deficit (p)</th>
<th>seigniorage (s)</th>
<th>(p-s)</th>
<th>debt changes = (r-n)*b+(p-s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988-</td>
<td>2.85</td>
<td>6.94</td>
<td>-4.09</td>
<td>46.17</td>
<td>-1.89</td>
<td>7.77</td>
<td>-2.58</td>
<td>0.86</td>
<td>-3.44</td>
<td>-5.3</td>
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<tr>
<td>1995</td>
<td>3.64</td>
<td>6.91</td>
<td>-3.27</td>
<td>40.92</td>
<td>-1.34</td>
<td>8.46</td>
<td>-2.22</td>
<td>1.00</td>
<td>-3.21</td>
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<tr>
<td>1995-</td>
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<td>10.54</td>
<td>2.44</td>
<td>81.79</td>
<td>8.62</td>
<td>29.63</td>
<td>-4.22</td>
<td>2.18</td>
<td>-6.40</td>
<td>2.2</td>
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<td>1998</td>
<td>3.09</td>
<td>6.93</td>
<td>-3.85</td>
<td>44.60</td>
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<td>7.98</td>
<td>-2.47</td>
<td>0.90</td>
<td>-3.37</td>
<td>-5.1</td>
</tr>
<tr>
<td>1998-</td>
<td>8.00</td>
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<td></td>
<td>81.79</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td></td>
<td></td>
<td></td>
<td>81.79</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
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* the calculation ignores the domestic real interest rate in 1998 due to its extreme level (-38.54%)

Table A2
The 2001 Government Debt Dynamics: Four Scenarios
(in percentage to nominal GDP)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>real interest rate (r)*</th>
<th>growth rate (n)</th>
<th>growth factor (r-n)</th>
<th>debt/GDP (b)</th>
<th>(r-n)*b</th>
<th>inflation rate</th>
<th>primary deficit (p)</th>
<th>seigniorage (s)</th>
<th>(p-s)</th>
<th>growth of debt ratio; db = (r-n)*b+(p-s)</th>
<th>upper limit of deficit for non-positive db</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>4.85</td>
<td>3.50</td>
<td>1.35</td>
<td>82.99</td>
<td>1.12</td>
<td>9.3</td>
<td>-2.4</td>
<td>1.0</td>
<td>-3.4</td>
<td>-2.28</td>
<td>-0.12</td>
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<tr>
<td>Scenario 2</td>
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<td>-0.50</td>
<td>82.99</td>
<td>-0.41</td>
<td>13.0</td>
<td>-2.4</td>
<td>1.0</td>
<td>-3.4</td>
<td>-3.81</td>
<td>1.41</td>
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<tr>
<td>Scenario 3</td>
<td>6.10</td>
<td>3.50</td>
<td>2.60</td>
<td>82.99</td>
<td>2.16</td>
<td>9.3</td>
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<td>1.0</td>
<td>-3.4</td>
<td>-1.24</td>
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<td>Scenario 4</td>
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<td>3.50</td>
<td>1.25</td>
<td>82.99</td>
<td>1.04</td>
<td>13.0</td>
<td>-2.4</td>
<td>1.0</td>
<td>-3.4</td>
<td>-2.40</td>
<td>-0.04</td>
</tr>
</tbody>
</table>

* real international interest rate is assumed stable at 4%

Scenario 1: Govt budget (APBN) 2001: growth = 3.5%; GDP = Rp 1,468T; inflation = 9.3%; Rp/US$ = 9,600; SBI rate = 13%; oil price = US$24/barrel

Scenario 2: Scenario 1 but with inflation rate = 12%

Scenario 3: Scenario 1 but with SBI rate = 17.5%

Scenario 4: Scenario 2 but with SBI rate = 17.5%
Table A3
The 2002 Government Debt Dynamics: Nine Scenarios
(in percentage to nominal GDP)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>real interest rate (r)*</th>
<th>growth rate (n)</th>
<th>growth factor (r-n)</th>
<th>debt/GDP (b)</th>
<th>(r-n)*b</th>
<th>inflation rate</th>
<th>primary deficit (p)</th>
<th>seigniorage (s)</th>
<th>growth of debt ratio: ( \text{db} = (r-n)*b+(p-s) )</th>
<th>upper limit of deficit for non-positive ( \text{db} )</th>
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<tr>
<td>(Scenario 1)</td>
<td>4.5</td>
<td>0.5</td>
<td>1.1</td>
<td>75.8</td>
<td>0.4</td>
<td>9.0</td>
<td>-2.75</td>
<td>1.02</td>
<td>-3.8</td>
<td>-3.39</td>
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<tr>
<td>Zero growth:</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 2</td>
<td>6.5</td>
<td>0.0</td>
<td>6.5</td>
<td>75.8</td>
<td>4.9</td>
<td>5.0</td>
<td>-2.75</td>
<td>0.39</td>
<td>-3.1</td>
<td>1.78</td>
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<tr>
<td>Scenario 3</td>
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<td>4.5</td>
<td>75.8</td>
<td>3.4</td>
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<td>-0.05</td>
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<td>75.8</td>
<td>1.1</td>
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<td>1.18</td>
<td>-3.9</td>
<td>-2.79</td>
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<td>Low growth:</td>
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<td>Scenario 5</td>
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<td>3.0</td>
<td>3.5</td>
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<td>Scenario 7</td>
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<td>-5.31</td>
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<tr>
<td>Higher r</td>
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<td></td>
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<tr>
<td>Scenario 8</td>
<td>6.0</td>
<td>4.0</td>
<td>2.0</td>
<td>75.8</td>
<td>1.5</td>
<td>9.0</td>
<td>-2.75</td>
<td>1.02</td>
<td>-3.8</td>
<td>-2.25</td>
</tr>
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<td>Higher p</td>
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<td></td>
<td></td>
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<tr>
<td>Scenario 9</td>
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<td>0.5</td>
<td>75.8</td>
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<td>9.0</td>
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<td>1.02</td>
<td>1.5</td>
<td>1.86</td>
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</tbody>
</table>

* real international interest rate is assumed stable at 4%

Scenario 1: 2002 budget assumptions (growth 4%; GDP Rp 1,685T; inflation 9%; Rp/US$ 9,000; SBI 14%; oil price US$22/barrel)
Scenario 2: Scenario 1 but 0% growth and 5% inflation
Scenario 3: Scenario 1 but 0% growth and 9% inflation
Scenario 4: Scenario 1 but 0% growth and 15% inflation
Scenario 5: Scenario 1 but 3% growth and 5% inflation
Scenario 6: Scenario 1 but 3% growth and 9% inflation
Scenario 7: Scenario 1 but 3% growth and 15% inflation
Scenario 8: Scenario 1 but SBI 17%
Scenario 9: Scenario 1 but primary deficit 2.5%