

Changes in Composition of Government Borrowing: Conceptual Design and Framework of Empirical Testing for Indonesia¹

By: M U H D I²

Abstract. This paper deals with some issues that arise in connection with fiscal deficit and government financing in Indonesia. One of the essential aspects of analyses is to illuminate the roles of domestic and external debt increases on economy, where the basic idea is expressed for developing economy. The problem implies that the government is confronted with the choice between external and domestic financings. Moreover, government borrowing has seemed to be a part of sensible strategy, and particularly foreign borrowing has become a central role of Indonesia's experience. Increase in domestic-debt since after financial crisis 1997/1998 has not seemed to attract much attention. To address this problem, particularly we investigated the effects of central government borrowing on economy by using framework of Keynesian. We found and concluded that emphasizing on domestic debt as a financing resource, basically, had an implication to discourage private investment (crowding-out). The bottom line is that central government should consider a prudent fiscal financing, for instance: by considering total maximum debt that can be issued.

JEL classification: E6, F3, G1, H6, O2

Keywords: budget deficit, external debt, domestic debt, crowding-out

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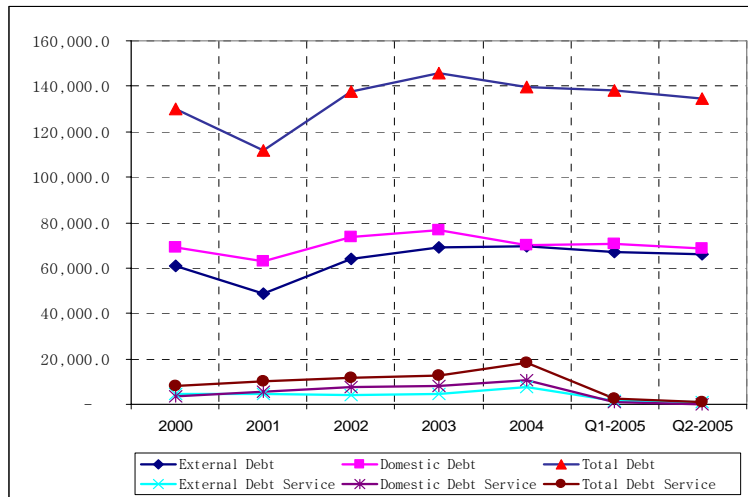
² Socio-Economic Information Science, Graduate School of Information Sciences (GSIS), Tohoku University, Address: Sendai-Shi, Aoba-Ku 980-8579-Japan. (E-mail: muhdi@se.is.tohoku.ac.jp).

1. Introduction

A major challenge for Indonesia’s economic-policy makers in the recent economic development is to resolve the persistence problem of budgetary deficit. So far, deficits have been covered by external debt, then after financial crisis 1997/1998, together by domestic debt. To eliminate a potential debt crisis is one of the important recent targets of the Indonesian government. Considering this research, we generalize public debt consist of domestic and external debt. *Domestic debt* refers to the government/public domestic indebtedness of a nation. This relates to the government or public debt held by residents. Because it is difficult to determine the holdings or securities held by the residents due to trading, in its restricted sense, the domestic debt is represented by: aggregate of bonds, notes, certificate of indebtedness, bill, and other direct obligations issued by the government on the domestic market. *External debt*, at any given time, is the outstanding amount of those actual current liabilities (not-contingent liabilities) that require payments of interest and/or principal by the debtor at some points in the future, which the debt services are owed to non-resident of an economy.

Beaugrand, et.al (2002) also classify two kind of public debt, that are external debt and domestic debt. In their paper implies that external debt is foreign debt, and domestic debt is a kind of domestic financing by issuing securities in domestic market. However, the distinction between domestic and external debt is blurred in some cases. Based on legal point of view, external loans are those that are contracted with non-resident lenders (rather than those denominated in foreign currency). From an economic point of few, however, debt instruments denominated in local currency underwritten by non-resident investors within the same currency zone have the features of domestic debts. Total outstanding debt and debt services of central government of Indonesia are illustrated by figure 1.

Figure1. Outstanding Debt and Debt Service Payments of Indonesia, 2000-2005 (US\$ Million)



Source: Ministry of Finance of Indonesia, 2005 (illustrated by author)

Figure 1 shows that total domestic debt has a higher composition comparing with external debt during the selected observation in 2000-2005. Since 1998, Indonesian

government has considered that domestic debt is a main resource to finance fiscal deficit. Generally, a fiscal deficit occurs when its potential to raise revenues is insufficient to cover the expenditures that are legally mandated to carry out. In 2004, a total debt to GDP ratio was about 57%, from our selected periods of observation (table 1), it can be clearly seen that total debt to GDP ratio tends to decrease. However, the country may have to borrow up to US\$35 billion during the next three years (2006-2009) to cover development needs. The government is targeting an external debt ratio of 31.8 percent of gross domestic product by 2009. Hence, in the recent periods the government has tried to overcome the budget deficits by expanding domestic debt.

Table1. Central Government Debt Outstanding and Debt Service of Indonesia
(In US\$ Million, unless indicated otherwise)

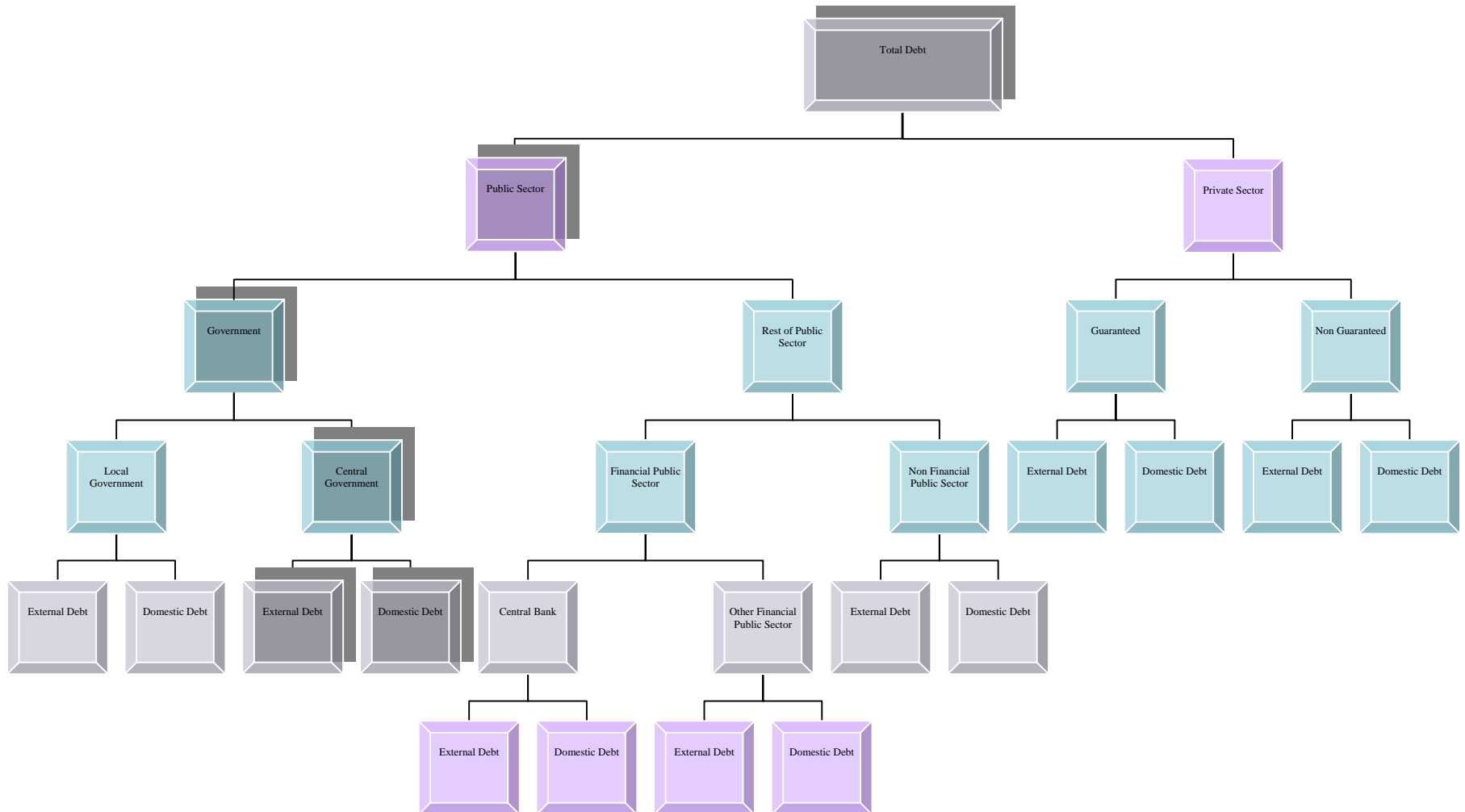
Total Debt	2000	2001	2002	2003	2004	Q1-2005 (R)	Q2-2005(P)	% of Total in Q2-2005
Total Debt	130,084	121,970	137,432	145,738	139,751	138,045	134,744	100.0%
External Debt	60,796	58,814	63,789	68,939	69,471	67,235	66,066	49.0%
Domestic Debt	69,288	63,156	73,643	76,799	70,280	70,809	68,678	51.0%
Total Debt Service	7,977	10,071	11,609	12,644	18,205	2,426	1,215	100.0%
External Debt Service	4,624	4,475	4,080	4,534	7,714	1,337	1,215	100.0%
Domestic Debt Service	3,353	5,596	7,529	8,110	10,491	1,089	-	0.0%
Total Principal Payment	1,710	1,564	2,570	4,964	11,358	967	879	100.0%
External Principal Payment	1,710	1,564	2,006	2,330	5,193	967	879	100.0%
Domestic Principal Payment	-	-	564	2,634	6,165	-	-	0.0%
Total Interest Payment (including fees)	6,267	8,507	9,039	7,680	6,848	1,460	336	100.0%
External Interest/ Commission Payments	2,913	2,911	2,074	2,204	2,522	370	336	100.0%
Domestic Interest Payments	3,353	5,596	6,964	5,476	4,326	1,089	-	0.0%
Gross Domestic Product (GDP) (in trillion Rupiah)	1,264.9	1,449.4	1,610.6	1,786.7	2,273	-	-	-
Exchange Rate (Rp/US\$)	9,595	10,400	8,940	8,465	9,320	-	-	-
Total Debt to GDP Ratio (%)	0.98	0.88	0.76	0.69	0.57	-	-	-

Note: (R): revised, (P): provisional

Source: Directorate General of Treasury, Ministry of Finance, www.perbendaharaan.go.id (recalculated by author)

The Indonesian government needs external debt between 3.2 and 3.6 US\$ billion annually in program loans, project loans, and export credit facilities. Total of external debt, only between US\$2.7 and 2.9 billion can be absorbed each year. The government has projected a total of 37.6 trillion (US\$4 billion) in foreign debt and Rp 35.8 trillion in net government bond sales in the revised 2006 state budget, and Rp 40.3 trillion and Rp 40.6 trillion, respectively, for 2007. With foreign debt is always a politically sensitive issue, in the medium term the government aims to bring down Indonesia's debt ratio from 48 percent of GDP in 2005, to 43.9 percent in 2006 and 39.5 percent in 2007, until 31.8 percent achieved by 2009. It also plans to shift the burden away from foreign sources to government bonds. The structure of total debt can be seen in the figure 2.

Figure2. Structure of Total Debt in Indonesia

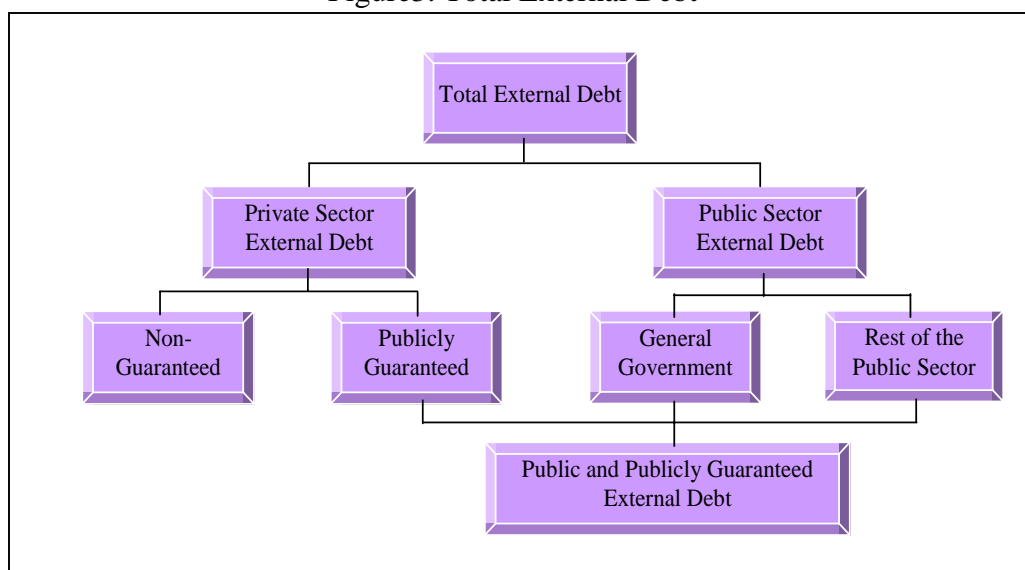


Source: Ministry of Finance of Indonesia, 2006 (modified by author)

1.1. External Debt in Indonesia

External financing refers to borrowing in foreign currency from non-resident creditors. External borrowing often appears attractive because of lesser crowding-out effects on private investment, and reduced risks of inflationary pressures. Figure 3 shows the structure of total external debt in a country.

Figure3. Total External Debt



Source: Ministry of Finance of Indonesia, 2005 (modified by author)

According to the World Bank (1995), the top six developing country debtors at the end of 1993 were Brazil (US\$ 133 billion), Mexico (US\$ 118 billion), India (US\$ 92 billion), Indonesia (US\$89,5 billion), China (US\$ 84 billion), and the Russian Federation (US\$ 83 billion). As we know that, in 1994, Indonesia's foreign debt reached approximately \$US 97 billion, this is the fourth largest external debt among all developing countries. In 2007, government's multilateral loans, worth US\$18.24 billion, are semi-concessional, and bring total foreign loans to US\$61.33 billion, or 42.7 percent of government's debt. Meanwhile, US\$10.8 billion has been undisbursed to date.

A high level of external indebtedness has potential risk to explode financial and debt crisis. This grim economic picture can be illustrated by the case of Mexico in 1980s in post-oil bonanza. Mexico as an expanding oil exporter benefited from the second oil shock. In mid-1981 oil prices fell roughly 11 percent, and had eroded confidence in the stability of the exchange rate, such economic turbulence that is followed by acceleration of capital flight and balance-of-payment deficit. The flight rose from 4.5 billion US dollar in 1980 to 15 billion US dollar in 1981 (Cypher, 1990:117). The peso was allowed to devalue about 78 percent in February of 1982. In April 1982 the government announced (1) further spending cuts, (2) a tightening of the supply of credit, (3) a sizable increase in controlled prices (especially product produce by the *parastate* (state-owned) firms, and (4) the negotiation of a new loan of US dollar, in 1981 and the first eight months of 1982,

the government added US dollar 31 billion to its foreign debt, one-third of it short term (David Felix in Hartlyn 1986: 106). Throughout 1981 and 1982 the government borrowed massive amounts of short-term capital from the private banks; public debt increased 102 percent from 1980 through 1982. Much of this money was never used by the state; instead it was placed in the private banking system to protect the exchange rate.

Table2. Central Government's External-Debt Outstanding by Creditors
(US\$ Million, Exchange Rate as of end of period)

Creditors	2000	2001	2002	2003	2004	Q1-2005 (R)	Q2-2005(P)	% of Total in Q2-2005
International Org.	20,630	20,673	20,594	19,939	19,314	18,945	18,554	28.1%
ADB	7,653	8,020	8,629	8,734	8,875	8,813	8638	13.1%
IBRD	11,697	11,439	10,733	9,783	8,907	8,597	8,387	12.7%
IDA	717	727	797	875	993	991	1,009	1.5%
IDB	267	208	176	198	205	216	203	0.3%
NIB	206	191	175	160	145	141	136	0.2%
EIB	8	7	7	111	109	107	106	0.2%
IFAD	68	72	74	79	81	80	76	0.1%
MIGA	15	8	3	0	0	0	0	0.0%
Country	40,166	38,141	43,195	49,000	50,157	48,290	47,512	71.8%
Japan	24,068	21,819	25,008	28,432	28,643	27,562	26,666	40.4%
Germany	3,063	3,092	3,659	4,364	4,385	4,168	3,848	5.8%
United States	3,497	3,764	3,804	3,961	3,700	3,634	3,606	5.5%
France	2,000	1,981	2,334	2,790	2,806	2,667	2,496	3.8%
United Kingdom	1,733	1,717	1,855	1,977	1,935	1,893	1,822	2.8%
Austria	1,233	1,230	1,508	1,832	1,891	1,774	1,637	2.5%
Netherlands	1,078	1,066	1,265	1,546	1,757	1,668	1,615	2.4%
Australia	857	849	918	995	966	934	893	1.4%
Spain	464	507	546	569	571	577	575	0.9%
Canada	510	499	502	527	488	484	483	0.7%
Others	1,663	1,615	1,795	2,007	3,013	2,929	3,871	5.9%
TOTAL	60,796	58,814	63,789	68,939	69,471	67,235	66,066	100.0%

Note : (R): revised, (P): provisional

Source : Directorate General of Treasury, Ministry of Finance of Indonesia, www.perbendaharaan.go.id

In Radelet's paper ensures that Indonesia's debt burden will not distort fiscal sustainability. On October 5, 2006, Indonesia announced that would repay early its remaining obligations to the International Monetary Fund (IMF) amounting to some SDR 2.2 billion (about US\$ 3.2 billion). Indonesia's ability to repay the fund early reflects the strength of Indonesia's economic recovery and its strong balance of payments position. One essential aspect of this ability to repay the debt is the appropriate fiscal management.

Table3. Composition of External Debt, 1995-2005
(Percent of GDP)

Country Group Name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Emerging Market and Developing Countries	37.2	35.2	35.5	40.5	42.1	37.4	37	37.2	35.8	33.1	28.9
Africa	69.4	64.5	63.1	65.5	64.8	60.8	58.6	58.1	52.2	45.2	35.9
Africa: Sub-Sahara	69.1	64.4	63.6	67.2	67.2	63.9	62.7	62.1	55.6	48.7	38.6
Central and Eastern Europe	37.9	38.7	40.5	42.9	47.7	50.1	52.8	52.7	53.7	54.0	49.6
Commonwealth of Independent States and Mongolia	38.3	34.2	38.0	58.2	75.2	56.4	45.7	43.0	41.9	36.3	36.6
Developing Asia	31.5	29.8	31	35.2	32.3	28.4	27.9	25.8	23.8	22.2	20.3
Middle East	29.1	27.1	26.3	32.1	30.4	26.4	25.6	25.6	24.6	24.5	22.4
Western Hemisphere	36.9	35.4	34.3	38.5	44.8	38.8	40.6	45.4	44.8	39.4	31

Source: IMF, *World Economic Outlook*, September 2006

Note: Explanation of country's groups are shown in Appendix 2

For the developing countries, the 1970s were a time growing external indebtedness but strong real growth. On average, from 1970-1996, Indonesia had enjoyed more than two decades of rapid growth, inflation had been controlled, and the exchange rate had been relative constant. Not surprisingly, Indonesia was considered by many economists to be an example of successful long-run development.

Indeed, both lender and borrower have risks from international credit transactions. Considering the external-debt problems in developing countries, Basu (2003: 103-147) argues that there are two features of distinguishing between external and domestic debts, as follows:

- (1). International credit repayments typically occur in currencies different from the borrower's own currency. In fact, debt-servicing repayment usually has to be made in a hard currency. Hence, even if a less developed country has adequate wealth, if it does not also have enough foreign exchange, it may run into an international debt crisis.
- (2). International credit market, unlike domestic market, there is no institutionalized mechanism for enforcing contract. Thus, if one party reneges on a contract, there is no world police or world judiciary to enforce the contract.

Indonesia is currently confronting its worst financial and economic crisis since the great Asian Crisis in 1997. There were extensive repercussions on the real economy and international contagion effects. The main problem in Indonesia, premature or poorly prepared, inadequately regulated financial liberalization could easily lead to persistent financial crisis. Beneath this promising façade of growing prosperity, however, the fundamental of banking problems was not adequate. As another repercussion impact, Indonesia has a balance of payment problem and a crippling level of external indebtedness, and been forced into recession as it struggles to meet the interest payments on its debt. The most obvious symptom was the growing imbalance in the nation's

external accounts. The current account deficit grew from Rp 7,532.8 billion in 1997/1998 to over Rp 31,325.3 billion two years later, and from 1.2 percent to 2.85 percent of GDP. That deficit was financed by foreign borrowing, and recently domestic debt also growth rapidly. To avoid inflation, the government adopted a strategy to finance fiscal deficit by obtaining official development aid from its foreign creditors. Borrowing has seemed to be part of a sensible strategy of growth and development.

In January 2007, Indonesia decided to terminate the CGI (Consultative Group on Indonesia), which pledged US\$5.5 billion in new loan and grants to Indonesia in 2005. The decision was, according to the government, based on practical and political grounds, and the facts that Indonesia now can employ bonds as financing instruments. However, the government will continue to work closely with its major creditors from the CGI – Japan, the Asian Development Bank and the World Bank- on a bilateral basis with a view to securing concessional loans for social development programs and loans for specific projects (the Jakarta Post, January 27, 2007).

1.2. Domestic Debt in Indonesia

The external borrowing and its impact on fiscal sustainability and economic growth in developing countries have been extensively debated. However, at least until recently, much less attention has been given to the issue of domestic debt, despite its potentially significant impact on government budgets, macroeconomic stability, private sector investment, and, ultimately, growth performance. Domestic debt refers to the government/public domestic indebtedness of a nation. This relates to the government of public debt held by residents. The domestic debt is represented by: the aggregate of bonds, notes, certificate of indebtedness, bill, and other direct obligations issued by the government on the domestic market. The government's recent moves to reduce its external debt slightly and to issue bonds have become a new financing strategy. By the reason that tapping the bond market would be much more favorable than taking out further foreign loans from the exchange rate, maturity and interest rate perspective.

For the first time since the 1970's Indonesia has domestic debt. Post-economic crisis 1997/1998, Indonesian government has issued substantial amounts of domestic debts. Domestic debts are represented by the aggregate of domestic bonds, syariah bonds (Islamic bonds), international bonds, notes, certificate of indebtedness, treasury bill, and other direct obligations issued by the government on domestic market. In December 2000, the value of government bonds stood at Rp659 trillion (roughly about US\$659 billion) or equivalent to 51% of Indonesia's GDP. This policy intended to prevent the collapse in the domestic payment system, and then the government temporary nationalized the domestic banking system by injecting large amounts of government bonds. Indonesia's total sovereign bond debt currently stands at \$82.3 billion, or 57.3 percent of the country's total sovereign debt, this is a slight reversal of Indonesia's debt profile in 2000, when 53 percent of the debt consisted of bonds and 47 percent of foreign loans (the Jakarta Post, January 23, 2007). Ratio of stock of public debt to GDP rose from 24% in 1997 to 60% in 1998 and to 100% in 2000 (Anwar, 2001).

In 2007, the government is hoping to rise Rp 40.6 trillion in net bond proceeds this year to help plug the budget deficit and planning to sell more bonds to retail investors

and orders will be restricted to a maximum of Rp 5 billion (US\$526,325) per investor. In 2006, the government issued a total of Rp 3.28 trillion in retail bonds, which were bought by 17,403 investors. The selling price was Rp 1 million per unit and carried a 12.5-fixed rate. The government has so far issued Rp 480 trillion (about US\$53.3 billion) in bonds. In effort to diversify its deficit, the government will also issue its treasury bills, which have shorter maturities than the retail bonds.

The purposes of paper can be summarized as follows: (1) provide a macroeconomic situation of Indonesia that explicitly considers fiscal deficits and government debt. (2) Examine the performance of fiscal policy of Indonesia, in order to obtain a relationship among variables of macroeconomic policy. (3) To investigate characteristics of the behavior of external and domestic debt. (4) To demonstrate the results obtained in empirical and simulation analyses to know the benchmark of maximum demand of debt. We hope that these analyses will increase the level of awareness of the policy maker often penetrating, but too often neglected, work.

The structure of paper is summarized as follows: in chapter 2, we introduce a macroeconomic model of Indonesia and then formulate a framework for empirical analysis. Chapter 3 gives empirical analysis of Indonesia's macroeconomic situation that Indonesia has experienced from 1990 to 2003. Chapter 4 expresses a concluding remark.

2. The Model

This purpose of research actually has not been investigated comprehensively, although some aspects of them have been studied by: Blanchard (1990), Barro (1997), Buiters (1993, 1995), Cuddington (1996), and, Chalk and Heming (2000). Even in the literature about Indonesia's debt policy, there have not a comprehensive model to explain the role of government debt on economy. Some previous work involving Indonesia are: Woo and Nasution (1989), Radelet (1995, 1996), Marks (2004), *Gadjah Mada* University and MOF (2004), Lewis (2007). However, most of them elaborate the government debt in descriptive analyses. This reason motivates us to explain the phenomenon in a simple model.

We start in equation (1) from the composition of total debt in Indonesia, in which total debt consists of two financing resources, domestic debt and external debt. Considering the effect of them, within the scope of disaggregation of model, the analyses of domestic and external debt can perhaps be differentiated. The domestic debt is domestic currency-denominated. External debt means any debt which is or may become payable other than in the currency of debtor or the guarantor.

The value of total gross stock of central government debt at the end period t is given by the following equation:

$$B_t = B_t^D + \tau_t B_t^F \quad (1)$$

where

B_t is government's debt in rupiah at the end of period t

B_t^D is government's domestic-debt in rupiah at the end of period t

τ_t is exchange rate, defined as the average number of rupiah per US dollar in period t

B_t^F is central government's foreign-debt in US dollar at the end of period t

For simplicity, all of the value in rupiah and the interest rate i are expressed in real terms that are adjusted by a price index P , such as the GDP deflator or CPI, and nominal interest rate \tilde{i} adjusted by inflation rate π .

$$P_t = (1 + \pi_t)P_{t-1} \quad (2)$$

$$i_t = \frac{(1 + \tilde{i}_t)}{(1 + \pi_t)} - 1 \quad (3)$$

Borrowing changes the pattern of purchasing power between the lender and the borrower: the lender relinquishes toward purchasing power now for the promise of repayment later. The bond is a long-term promise by the borrower (bond issuer) to the lender (bondholder) to pay the face amount of the bond at a defined maturity date. We consider an intertemporal budget constraint in one period gap, as proposed by Chalk and Hemming (2000:3) and Marks (2004:228).

$$B_t = [(1 + i_t)B_{t-1} - S_t] \quad (4)$$

where

$(1 + i)$ is the discount factor applying between period $t - 1$ and t .

i_t^D is domestic interest rate in period t .

i_t^F is international interest rate in period t .

S_t is the primary surplus in period t .

The primary surplus is equal to the overall government surplus, but with interest payments excluded. The explanation of primary surplus in detail will be explained later. Equation (2) expresses that total demand of debt in period t is equal total budget deficit expressed by total debt repayment in the previous time or initial indebtedness minus primary surplus.

If the government runs a primary surplus equal to zero ($S = 0$), the stock of real debt B will grow at a rate equal to the real interest rate.

$$\Delta B_t \equiv B_t - B_{t-1} = iB_{t-1} \quad (5)$$

Accordingly, if the government runs primary deficit $S < 0 \rightarrow (\Delta B_t / B_{t-1}) > i_t$, or if the government runs primary surplus $S > 0 \rightarrow (\Delta B_t / B_{t-1}) < i_t$. For empirical calculation, we modify equation (2), in order to accommodate the discrepancy between the demand of debt in theoretical and factual terms. In this situation, $S > 0 \rightarrow (\Delta B_t / B_{t-1}) < i_t$ might not

be hold. In the case of Indonesia, the discrepancy might be happened because of several reasons, for example: overhead cost that can not be accommodated by interest payment only, accounting policy, or other budget policy. For these reasons we adopt the equation of stock of debt, as follows:

$$B_t = [(1 + i_t)B_{t-1} - S_t] + \varepsilon_t \quad (6)$$

Where, ε_t is the discrepancy of demand of debt in period t . Statistically, we adopt equation as follows:

$$B_t = \alpha + \beta[(1 + i_t^D)B_{t-1}^D + (1 + i_t^F)B_{t-1}^F \tau_t - S_t] + \gamma GDP_{t-1} \quad (7)$$

Primary surplus of central government in period t , denoted by S_t , is equal to total government revenue G_t^R minus total primary expenditure $[(G_t + Tr_t) - (i_t B_{t-1})]$, with interest payments excluded. Remember that interest payment is includes in the current government expenditure. Here we distinct between overall balance and primary balance:

$$\text{Overall balance} : G^R - G^E$$

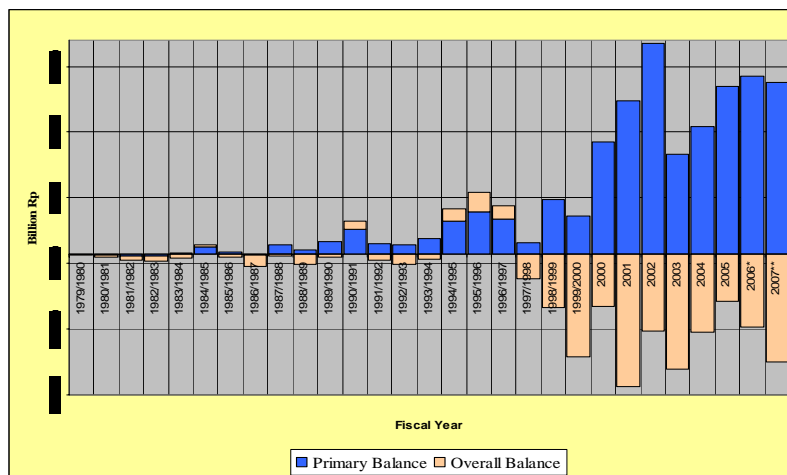
Overall balance :

$$\frac{(Tax\ Revenue + Non - Tax\ Revenue + Grants) - (All\ Gov.\ Expenditure + Interest\ Payment)}{}$$

$$B_t = B_{t-1} + \underbrace{B_{t-1}i_t}_{\text{Interest Payment}} - \underbrace{S_t}_{\text{Primary Surplus}}$$

$$\text{So that } S_t = G_t^R - (G_t^E - (B_{t-1}i_t))$$

Figure4: Primary Balance and Overall Balance of Indonesia



Source: Audited State Budget of Indonesia, Ministry of Finance

Note: *budget, **proposed budget

The equation of primary surplus can be written as:

$$S_t = G_t^R - [(G_t + Tr_t) - (i_t B_{t-1})] \quad (8)$$

In which $S_t \leq$ or ≥ 0 . Government revenue G_t^R is total revenue including tax revenue Tx_t , non-tax revenue NTx_t and foreign aids $FA_t \tau_t$ as follows:

$$G_t^R = Tx_t + NTx_t + FA_t \tau_t \quad (9)$$

However total foreign aids (by the meaning grants) was relative small before fiscal year 2001. This equation simplifies the practical calculation of course real revenues can be derived to be many sources. As we notified before, total interest payment, consisting of domestic and external debt's interest-payments are excluded from fiscal expenditure. This concept actually implies that we can detect the significance of total interest payment on budgeted deficits. The value of primary surplus of Indonesia's fiscal balance, base on data 1979/1980-2006, is mostly positive. The values are negative for several years; those are 1979/1980-1983/1984, and 1986/1987. Meanwhile, the overall balance, government revenue minuses overall expenditure including interest payment, shows that mostly negative. The positive overall balances are 1984/1985, 1990/1991, 1994/1995-1996/1997, and the rest ones are negative. This data means that interest payment has a big portion to make overall fiscal deficit, based on our calculation as shown in the table below, that is around 12.625% of total expenditure, or 13.45% of total revenue.

Table4.
Interest-Payment to Expenditure and Interest-Payment to Revenue Ratios, 1979/1980-2006
(Data in billion *Rupiah*, unless indicated otherwise)

Fiscal Year	Ext. Interest Payment	Dom. Interest Payment	Total Interest Payment (IP)	Expenditure (E)	Revenue (T)	IP-E Ratio (%)	IP-T Ratio (%)
1979/1980	309.9	0.0	309.9	7,141.2	6,733.2	4.340	4.603
1980/1981	407.7	0.0	407.7	10,653.8	9,933.3	3.827	4.104
1981/1982	460.7	0.0	460.7	13,314.5	12,162.4	3.460	3.788
1982/1983	620.0	0.0	620.0	13,823.0	12,373.8	4.485	5.011
1983/1984	1,116.0	0.0	1,116.0	17,815.4	16,366.7	6.264	6.819
1984/1985	1,496.7	0.0	1,496.7	15,366.5	15,931.3	9.740	9.395
1985/1986	1,704.1	0.0	1,704.1	22,147.5	20,939.4	7.694	8.138
1986/1987	2,988.0	0.0	2,988.0	20,737.8	17,385.3	14.408	17.187
1987/1988	3,431.4	0.0	3,431.4	22,384.4	21,730.7	15.329	15.791
1988/1989	4,443.4	0.0	4,443.4	26,733.6	23,413.8	16.621	18.978
1989/1990	4,738.5	0.0	4,738.5	32,692.0	31,504.2	14.494	15.041
1990/1991	4,959.2	0.0	4,959.2	39,754.0	42,193.0	12.475	11.754
1991/1992	5,051.8	0.0	5,051.8	44,581.3	42,582.0	11.332	11.864
1992/1993	5,784.9	0.0	5,784.9	52,048.1	48,862.6	11.115	11.839
1993/1994	6,157.4	0.0	6,157.4	57,833.1	56,113.1	10.647	10.973
1994/1995	6,144.6	0.0	6,144.6	62,606.9	66,418.0	9.815	9.251
1995/1996	6,615.0	0.0	6,615.0	65,341.7	71,340.1	10.124	9.272
1996/1997	6,610.0	0.0	6,610.0	82,200.9	86,278.1	8.041	7.661
1997/1998	10,817.6	0.0	10,817.6	109,301.5	101,768.7	9.897	10.630
1998/1999	24,479.5	8,384.8	32,864.3	172,669.2	156,408.5	19.033	21.012
1999/2000	20,504.9	22,230.4	42,735.3	231,879.0	200,643.7	18.430	21.299
2000	18,830.2	31,237.9	50,068.1	221,466.7	205,334.5	22.608	24.384
2001	28,945.3	58,197.0	87,142.3	341,562.7	301,077.7	25.513	28.943
2002	25,406.0	62,261.0	87,667.0	322,180.0	298,605.0	27.211	29.359
2003	18,995.0	46,356.0	65,351.0	376,505.0	341,396.0	17.357	19.142
2004	22,797.0	39,689.0	62,486.0	427,177.0	403,367.0	14.628	15.491
2005	14,136.0	51,064.0	65,200.0	509,632.0	495,224.0	12.794	13.166
2006	28,018.0	48,611.0	76,629.0	647,667.8	625,237.0	11.832	12.256
Average Ratio						12.625	13.470

Source: Audited Budget, Ministry of Finance of Indonesia

Letting Y_t^E stands for Gross Domestic Product (*GDP*) in period t . We know that ex post aggregate expenditure equal national income. Aggregate demand in an economy is an expression of the demand for output comes from sum of household consumption, private investment, government investment, government purchase, net export, in period t .

This description is shown in equation (6), and called the national income accounts identity.

$$Y_t^E = C_t + I_t + (G_t^I + G_t^C - Tr_t) + EP_t - MP_t \quad (10)$$

where

Y_t^E is the gross domestic product (GDP) in period t

C_t is total private consumption in period t

I_t is total investment in period t

G_t^I is total government investment in period t

G_t^C is total government consumption in period t

Tr_t is transfer payment in period t

EP_t is total export of goods and services in period t

MP_t is total import of goods and services in period t .

Government consumption is such as government expenditure in balance sheet minus transfer payment. Government consumption can be classified to be government consumption for investment, and government consumption for goods and services. The equation is shown as follows:

$$G_t = G_t^E - Tr_t \quad (11)$$

$$G_t = G_t^I + G_t^C$$

An economy's output of goods and services can be expressed by two elements: quantity of inputs, called the factor of production, and its ability to turn inputs into output, as represented by production function. Letting Y_t^P stands for gross domestic product in period t , the expression of national income based on production is amount of output, and then we write the production function as:

$$Y_t^P = F(L_t, K_t, G_t^K) \quad (12)$$

where

L_t is total labors in period t

K_t is total stock of private capital investment in period t

G_t^K is total stock of public asset in period t

From equations (6) and (7), the gross domestic product in period t is represented in the following equation:

$$GDP_t = \alpha Y_t^E + (1 - \alpha) Y_t^P \quad (13)$$

Therefore, α is share for national expenditure, and $(1 - \alpha)$ is share for production, where $0 < \alpha < 1$.

The total export EP in period t is influenced by several variables including gross domestic product and level of exchange rate in the previous period and oil price OP . This model implies that GDP in the previous years become a variable to indicate the economic stability. Fluctuating of exchange rate may become a very important factor in

precipitating a country's export problem. Then, increase in oil price has potential effect to discourage export. The equation can be shown as follows:

$$EP_t = EP(GDP_{t-1}, \tau_{t-1}, Oil\ Price_{t-1}) \quad (14)$$

The total import MP in period t is influenced by several variables that are GDP in and exchange rate in the previous year, as shown in equation (10):

$$MP_t = MP(GDP_{t-1}, \tau_{t-1}) \quad (15)$$

As explained in equation (9) GDP in the previous year becomes a parameter to know the conduciveness of economic activity. Exchange rate become a central variable in import, appreciation of domestic currency of course will encourage import.

Public Sector

The public sector behavior is explained by several variables, for example: government consumption and government investment. The government consumption G_t^C and government investment G_t^I are determined by the government, and both of them are exogenous variables. From equation 4, we can find all of deficit or surplus as:

$$S + (i + l)B_{t-1} = (Tx_t + NTx_t + FA_t) - G_t + Tr_t \quad (16)$$

Then income tax revenue Tx_t is expressed by

$$Tx_t = Tx(GDP_{t-1}, Tx_{t-1}) \quad (17)$$

Private Sector

The household consumption C_t , private investment I_t , and private capital K_t in period t respectively, are shown as follows:

$$C_t = C(GDP_{t-1}, Tx_{t-1}) \quad (18)$$

Private investment I_t is influenced by economic stability, which is indicated by the economic growth, private-capital availability and total domestic debt, as follows:

$$I_t = I\left(GDP_{t-1}, \frac{B_{t-1}^D}{B_{t-2}^D}, K_{t-1}\right) \quad (19)$$

This equation (14) implies that country with higher volatility will have lower level of investment and as consequence will have lower growth. Stock of private capital investment is expressed as total stock of capital in previous year pluses total private investment in the current year. We assume that there is no capital inflow, such as foreign direct investment (FDI). Total of private capitals can be decomposed into K_t and G_t^K as follows:

$$K_t = (1 - \delta_t)(K_{t-1}) + I_t \quad (20)$$

$$G_t^K = (1 - \delta_t')G_{t-1}^K + G_t^I \quad (21)$$

Total national saving can be derived from equation (5), as disposable income minuses consumption:

$$Sv_t = (Y_t - Tx_t) - C_t \quad (22)$$

Equation (17) equal with:

$$Sv_t - I_t = (EP - EM)_t + (G - Tx)_t \quad (23)$$

Then, exchange rate is influenced by several endogenous variables; those are GDP, net export, exchange rate and foreign debt in the previous year. The equation is given by

$$\tau_t = \tau(NX, GDP, B_{t-1}^F, \tau_{t-1}) \quad (24)$$

The first step in the model above expresses the total debt as shown by the equation (1). In the second step, estimated total debt, \hat{B}_t is decomposed into \hat{B}_t^D and \hat{B}_t^F , as shown in equations (21) and (22)

$$\hat{B}_t^D = \hat{B}^D(B_{t-1}^D, B_{t-2}^D, GDP_{t-1}, i_{t-1}^D) \quad (25)$$

$$\hat{B}_t^F = \hat{B}^F(B_{t-1}^F, \tau_{t-1}, (EP - MP)_{t-1}) \quad (26)$$

In order to get a composition of external and domestic debt, we write the relative external and domestic debt as follows:

$$B_t = \hat{B}_t^{D*} + \hat{\tau} \hat{B}_t^{F*} \quad (27)$$

$$\hat{B}_t^{D*} = \left(\frac{\hat{B}_t^D}{\hat{B}_t^D + \hat{\tau} \hat{B}_t^F} \right) B_t \quad (28)$$

$$\hat{\tau} \hat{B}_t^{F*} = \left(\frac{\hat{\tau} \hat{B}_t^F}{\hat{B}_t^D + \hat{\tau} \hat{B}_t^F} \right) B_t \quad (29)$$

In order to investigate the composition of debt over GDP, we divide equation (1) by total GDP, so that we have a ratio of total government's debt to GDP in period t , as follows:

$$b_t = \frac{B_t}{Y_t} \quad (30)$$

In other words, b_t is total central government debt at the end of period t , measured in *rupiah*, as a fraction of GDP in period t . The debt ratios have been developed mostly to detect potential debt-related risks, and thus to support sound debt management.

There are conceptual problems in defining on general level what are the maximum debt-GDP ratio (b_t^*), due to the scope for identifying critical ranges for debt indicators is rather limited. For example, PPE-FE UGM (2004) states that external debt-GDP ratio at 15 percent is a benchmark of warning signal for possibility of a debt crisis or debt-service difficulties. The World Bank considers a debt to GNP ratio of more than 80% as high risk. In term of total debt service to export, the World Bank considers 18%

the “warning” threshold (Nasution, 2001). In the basic model, we express that the total debt-GDP ratio b_t should be less or equal than a maximum ratio b_t^* as follows:

$$b_t \leq b_t^* \quad (31)$$

In order to predict a maximum debt level, we consider the fiscal sustainability as Cuddington’s model (1996:6-10). The concept of sustainability can be viewed by two approaches that are: accounting and present value constraint approaches. We can express the concept of sustainability, as follows:

$$\frac{B_t}{GDP_t} = \frac{(1+i_t)B_{t-1}}{(1+g_t)GDP_t} - \frac{S_t}{GDP_t} \quad (32)$$

$$b_t = \frac{(1+i_t)}{(1+g_t)} b_{t-1} - s_t \quad (33)$$

$$\Delta b_t = b_t - b_{t-1} = \frac{i_t - g_t}{1+g_t} b_{t-1} - s_t \quad (34)$$

A primary surplus is defined as sustainable if it does not generate an increasing debt to GDP ratio, given a specified real GDP growth target and constant real interest rate. Thus, the sustainable primary surplus to GDP ratio is determined by the formula that the change in the debt/GDP ratio in equation (29) equals to zero:

$$s = \frac{i-g}{1+g} b \quad (35)$$

Another approach to detect the sustainability is the present value constraint approach, which is more explicit in this regard. We can rewrite the equation (2) by ignoring level of discrepancy as follows:

$$B_{t-1} = \frac{B_t}{(1+i_t)} + \frac{S}{(1+i_t)} \quad (36)$$

Suppose the real interest rates are constant over time, we can express the equation (31) for n periods as follows:

$$B_{t-1} = \sum_{j=0}^n \frac{S_{t+j}}{(1+i)^{j+1}} + \frac{B_{t+n}}{(1+i)^{t+n}} \quad (37)$$

No Ponzi game condition can be explained by the equation as follows:

$$\lim_{n \rightarrow \infty} \frac{B^{t+n}}{(1+i)^{t+n}} = 0 \quad (38)$$

So that, assuming that no-ponzi game in (33) is satisfied, the government debt at any point in time must equal the present value of its expected future of primary surplus, as shown by equation (34).

$$B_{t-1} = \sum_{j=0}^{\infty} \frac{S_{t+j}}{(1+i)^{j+1}} \quad (39)$$

By assuming i and g are constant over time, we can express equation (37) by an expression analogues to equation (32) as follows:

$$b_0 = \sum_{j=0}^n \left[\frac{1+g}{1+i} \right]^{(j+1)} \frac{S_j}{GDP_j} + \left[\frac{1+g}{1+i} \right]^{(n+1)} \frac{B_{n+1}}{GDP_{n+1}} \quad (40)$$

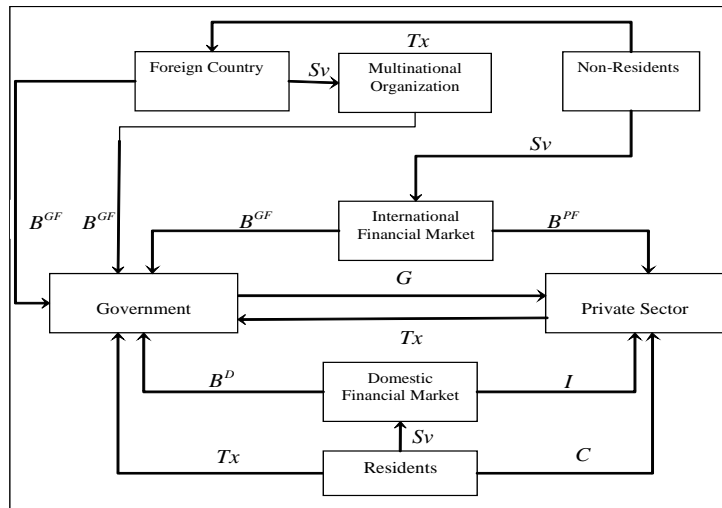
Then, the no-Ponzi game can be expressed as:

$$\lim_{n \rightarrow \infty} \left[\frac{1+g}{1+i} \right]^{(n+1)} \frac{B_{n+1}}{GDP_{n+1}} = 0 \quad (41)$$

The Role of Government Debt on Economy

The main question of the debt problems is “Does debt-financing of public expenditure a burden on future generation?” We describe the economic interactions depicted in the Figure. Broadly speaking about the huge debt in Indonesia, we can clarify to be the positive and negative effects of government debt.

Figure4. Government Deficit and Investment



Source: Figure illustrated by author

-Positive Effect

We can divide the role of government debt to be two sides, the positive effect or the growth effect, as follow:

$$B \uparrow \rightarrow G^I \uparrow \rightarrow G^K \uparrow \rightarrow Y^P \uparrow \rightarrow GDP \uparrow$$

$$B \uparrow \rightarrow G^C \uparrow \rightarrow Y^E \uparrow \rightarrow GDP \uparrow$$

Increasing government debt will raise government investment and capital formation, so that national production will increase and *GDP* growth occurs. In addition, increasing government debt will raise government consumption, this means national expenditure increases, and then it has positive impact on *GDP* growth.

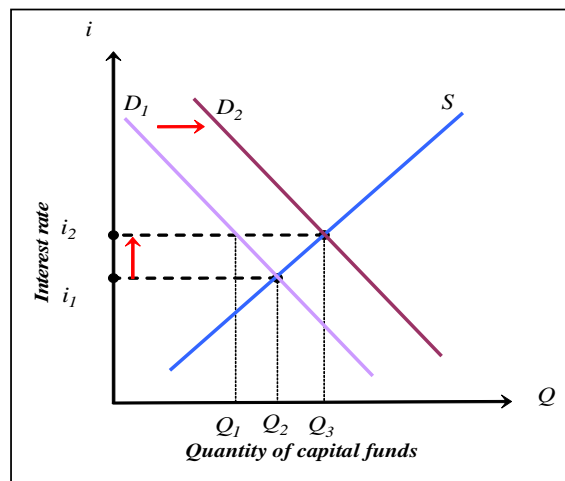
-Negative Effect

Now, we are dividing the negative impact of increasing domestic and foreign debt. Consider the negative effects of an increase in government borrowing; we can divide the effect of domestic debt and external debt as follows:

$$B^D \uparrow \rightarrow I \downarrow \rightarrow K \downarrow \rightarrow Y^P \downarrow \rightarrow GDP \downarrow$$

A number of critics have argued that such a conclusion does not take account of the impact of increase in government's demand for bond finance upon the capital market and upon private sector investment. This debate has come to be known as the question of "crowding out". Increasing domestic debt will reduce investment and private capitalization, and then will reduce total production and, finally, *GDP* decreases. This is because; an increase in domestic debt will, therefore, raise domestic interest rates and increase the cost of borrowing, so that it will crowd out investment. Crowding out here refers to the displacement of private economic activity by public economic activity. Clearly, high level of domestic debt will discourage investment. It is necessary to probe more deeply into the total international bonds to ensure that the use of this instrument is justifiable.

Figure5. An Increase in Domestic Debt and Crowding Out



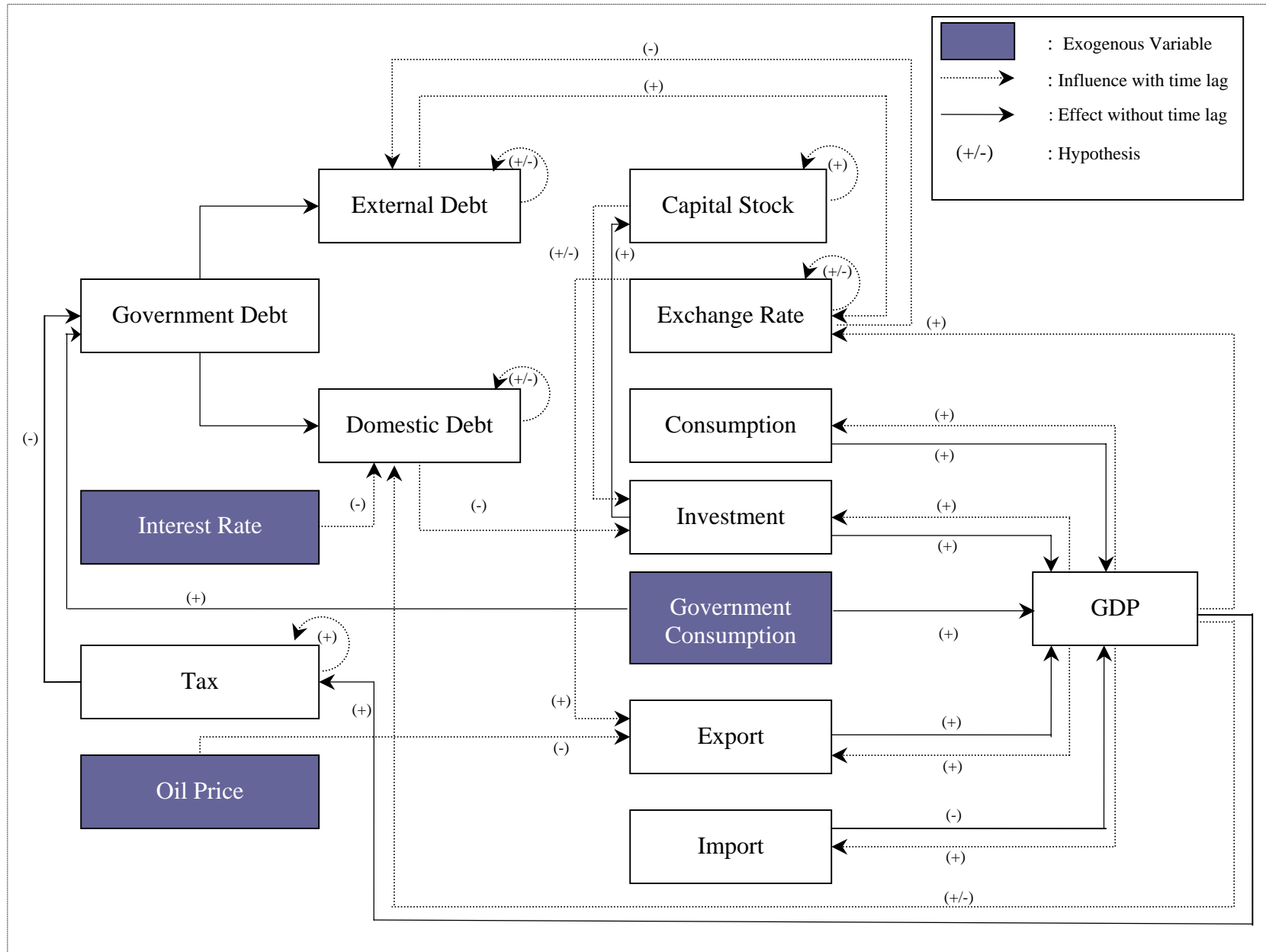
In this case, the government floats a bond issue, which has attractive interest rates in order to get the individual to substitute idle cash balances for government bonds. A Fiscal policy financed by issuing government bonds is likely to be more expansionary than a tax or money supply financed fiscal policy.

$$B^F \uparrow \rightarrow \tau \uparrow \rightarrow \tau_i B^F \uparrow \rightarrow B_i \uparrow$$

Based on foreign debt view, increasing foreign debt has potential effect to raise foreign currency's value or depreciation of local currency, so that total redemption will increase. This means that foreign debt has potential effect to increase total debt due to instability of exchange rate or depreciation of local currency. High-level foreign debt in turn adds the pressures of repayment, which in turn reduces the ability to repay. Then debt overhang potentially will occur, the presence of an existing inherited debt sufficiently large that creditors do not expect with confidence to be fully repaid. Moreover, the debt overhang is accompanied by massive capital flight, as confidence of investors was eroded.

After the debt crisis, the country should maintain a permanent surplus in the trade account. This not only serves to depress investment, but also reduce consumption and employment as well. The debt crisis will create a domestic transfer problem, while the government has to pay the interest on foreign debt; the private sector owns the surplus on the trade account, which could provide the necessary foreign exchange. The public sector has to buy the funds from private sector, obtaining the funds to do so by reducing expenditure or raising taxes. All the options open to the government would tend to depress economic activity and reduce investment. However, the harmful effects of large debts –crowding out and, in extreme cases, the *debt trap*- are recognized and there is almost general agreement on the need to reduce debt in such situations.

Flowchart of macro-econometric model for Indonesia



3. Empirical Evidence and Policy Implications

From the discussion in the earlier sections, the appropriate measure of economic stability and government borrowing is not very clear. We interested in the magnitude and significance of macroeconomic indicators correlated with the impact of domestic and foreign debts. They will be presented through the ordinary least squares (OLS) estimation. In order to evaluate performance of model, we use the mean absolute percentage error (MAPE) analysis. If the model has relative small error, it can be applied to evaluate the role of government debt on economy. Then, we examine the role of government debt on economy by using simulation analysis. Finally, we want to investigate the maximum debt for Indonesia, by the term of fiscal sustainability.

Particularly for OLS estimation, the observations are made of annual data from 1990 to 2006 (unless indicated otherwise). Figures in parentheses are the *t-values* of estimated parameter, R^2 is the coefficient of determination for degree of freedom, DW is the Durbin-Watson statistic to test on the autocorrelation of first order of disturbance variable. In the regression, a dummy variable is introduced to eliminate the effect of economic crisis in 1997/1998. We employ a regression model to predict trend of independent variable that is estimated by the STATA package, and the calculations are as follows:

a. Consumption

Consumption consists of the goods and services bought by households. Total private consumption in Indonesia is around two-thirds of GDP, this calculation based on average data 1990-2006 is about 62%. We can conclude that households' consumption-decisions affect the Indonesia's macro economic performance as a whole behaves both in the long run and in the short run. Because consumption to GDP ratio is so large, fluctuations in consumption are a key determinant of economic stability. It is necessary to formulate the consumer's behavior by developing a more thorough explanation of what determines aggregate consumption. We observe on some annual data from 1991 to 2006, and finally adopt the following equation:

$$C_t = -\underset{(-2.19)^{**}}{(1.34E + 14)} + 0.877 \underset{(16.38)^{***}}{(GDP - Tx)_{t-1}}$$

$$R^2 = 0.95 \quad d = 2.0 \quad n = 16$$

** significant at 5% level *** significant at 1% level

The relationship between independent and dependent variable is significant, as shown by coefficient of determination for degree of freedom at $R^2 = 0.95$. The positive coefficient of disposable income in the previous year indicates that a higher income encourages current consumption. Income in the previous year represents performance of economy in the previous year. Basically, effect of income on consumption has become a long debate in consumption theory. However, the analysis above shows that an increase in disposable income has positive effect on consumption, and significant at 1% level. Tax revenue in the previous year Tx_{t-1} has negative effect on consumption. This relationship

shows that increase in tax revenue has been a counterproductive effect on consumption. Based on *DW – statistic table*, 5% significance of d_L and d_U in this analysis are 1.106 and 1.371, respectively. The result shows $d > d_U$, so that we do not reject the null hypothesis.

b. Investment

Average private-investment in Indonesia is about 22.48% of GDP, based on data 1990-2006. We test the quantity of private investment demanded based on the previous GDP, quantity of previous domestic debt and capital stocks. The result of analysis is shown as the following equation:

$$I_t = (-5.34154E + 12) + 0.503GDP_{t-1} - 0.141K_{t-1} - (4.372E + 12) \frac{B_{t-1}^D}{B_{t-2}^D}$$

(-0.047) $(3.184)^{***}$ $(-3.148)^{***}$ $(-3.28)^{***}$

$$R^2 = 0.70 \quad d = 1.28 \quad n = 16$$

*** significant at 1% level

The result shows that domestic debts increase has a negative effect on increase in quantity of investment demanded. This relationship is shown by the negative coefficient that is significant at 1% level. This result can be interpreted that domestic government-debt increase will reduce the private investment in the market, if so, this is because increase in interest rate. As the interest rate rises, the fewer investment projects are profitable, thus the quantity of investment demanded falls. This phenomenon shows that *crowding-out* happened.

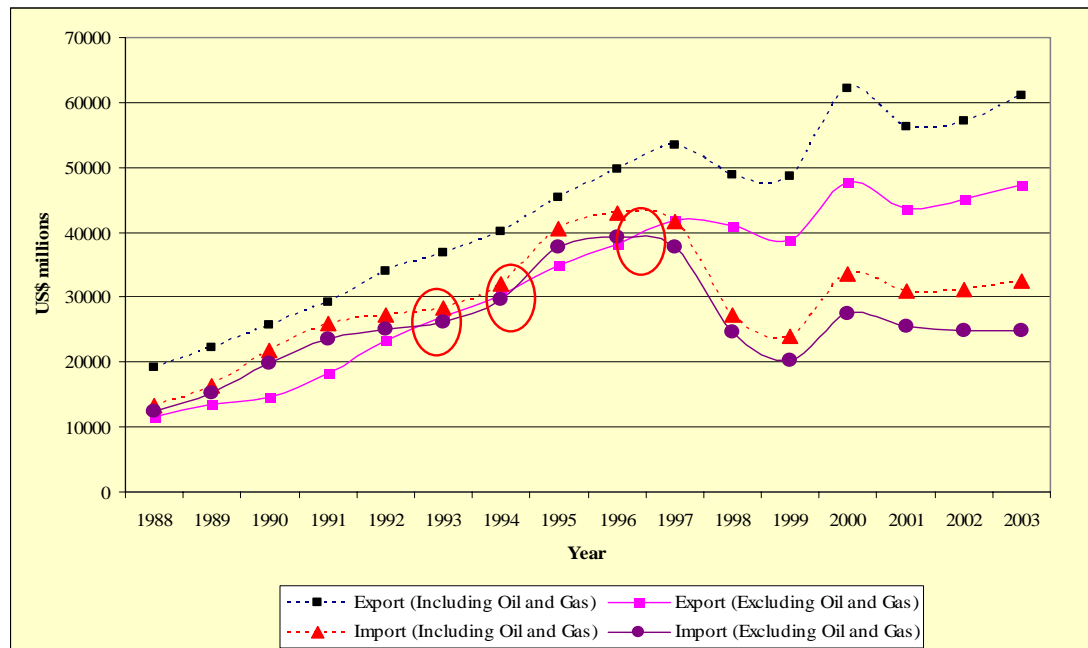
Particularly for private capital stocks at the time t are determined by $K_t = (1 - \delta_t)K_{t-1} + I_t$. Capital stocks consists of the private investment in the current year and the accumulation of capital stocks minuses depreciation, where δ_t is rate of the depreciation rate of capital stocks. Unfortunately, there is no data on capital stocks as well as depreciation value validly, so we take the data of 1990 as the initial value of capital stocks and assume that the average value of depreciation rate is about 5% over periods. We can interpret the relationship between capital stocks in the previous year and investment to be two possibilities: *expansion* and *replacement*. The negative relationship means increasing capital stocks will discourage a new investment demanded, $(1 - \delta_t)K_{t-1} \uparrow \rightarrow I_t \downarrow$, significant at 1% level.

The quantity of GDP in previous year has positive effect on current private investment, as shown by the positive coefficient of GDP_{t-1} , which is significant at 1% level. Throughout of the relationship between dependent and independent variables is shown by the coefficient of determination for degree of freedom at $R^2 = 0.70$. Based on *DW – statistic table*, 5% significance of d_L and d_U in this analysis are 0.814 and 1.750, respectively. The result shows $d_L < d < d_U$, so that the test is inconclusive.

c. Export

The major trading partner countries of Indonesia are: Japan, the United States, Singapore, South Korea, China, Taiwan and Germany. In 2003, the trade between Indonesia and those eight countries especially for goods (not including services) amounted to US\$ 59,215.0 million or 63.26% of Indonesia's total external trade (BPS, 2003). Indonesia's export registered to US\$ 61,058.2 million or rose by 6.82%. While oil and gas exports, and non-oil goods exports increased respectively by 12.70% and 5.24% to US\$ 13,651 million and US\$ 47,406.8 million.

Figure6. The Quantity of Export and Import of Goods of Indonesia (1988-2003)



Note: values of exports are FOB (Free on Board) at Indonesian ports of export, while value of imports are CIF (Cost, Insurance, and Freight) at Indonesian ports of import. The data is not including exports and imports of services.

Source: Central Bureau of Statistics of Indonesia, 2005 (illustrated by author)

The relationship between total export and independent variables, such as GDP and exchange rate in the previous year can be shown in the following equation:

$$\begin{aligned}
 EP_t = & (-2.305E + 17) + (1.609E + 11)\tau_{t-1} - (1.027)GDP_{t-1} - (92866714.76)OP_{t-1} \\
 & (-4.12)^{***} \quad (3.28)^{***} \quad (-2.98)^{***} \quad (-1.73)^{**} \\
 & - (1.53E + 11)\tau_{t-1}Dummy1 + (1.16E + 14)t \\
 & (-3.44)^{***} \quad (4.12)^{***} \\
 R^2 = & 0.91 \quad d = 1.83 \quad n = 16
 \end{aligned}$$

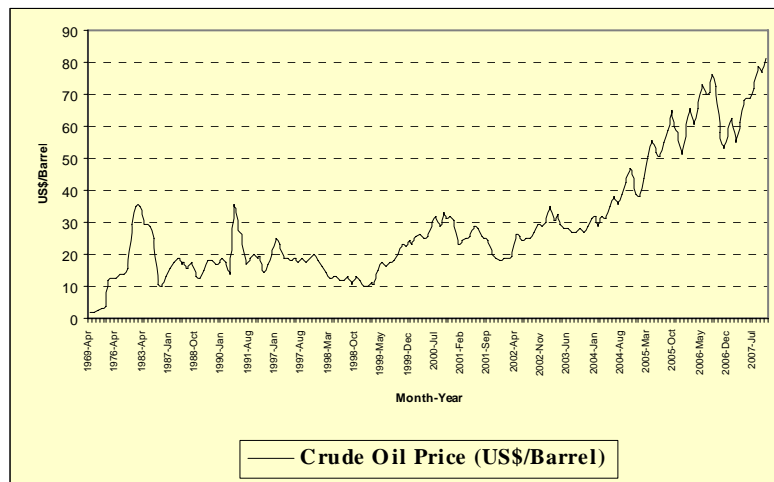
** significant at 5% level, *** significant at 1% level

The relationship between dependent and independent variables is shown by the coefficient of determination for degree of freedom at $R^2 = 0.91$. In this equation, we

consider the relationship between exchange rate and export in which it is positive as theoretically expected, as shown by coefficient of exchange rate. The sign positive of exchange rate's coefficient means: if the value of domestic currency decreases over foreign currency, which is rupiah depreciated or the nominal value of τ increases, so that the quantity of export increase. This is because the price of domestic product will cheaper over international price. When the domestic product is cheaper comparing with other countries, it will generate higher demand of domestic products. The relationship between exchange rate in the previous year and export is significant at 1% level. The effect of the previous GDP on export that is negative and significant at 1% level. GDP increase in the previous year might be has negative effect of the increase in export, this is because capacity of market decreases as a response of the previous export. However, performance of GDP shows the economic situation historically and become such an indicator for production in current year.

In this model, we also consider the crude-oil price. Table shows the nominal of minas price per *barrel* (which is 42 US gallons or approximately 159 liters, and is equivalent to 34.97 UK gallons) in FOB. By investigating in real price, the result shows that oil price increase has negative effect on export, and significant at 5% level. Increase in oil price has a counterproductive effect on production. Since December 1962, Indonesia has become the member of OPEC (the Organisation of Petroleum Exporting Countries). The rise in crude oil price has positive and negative effects. The positive effect is government revenue increases (especially: profit transfer from state-owned enterprises- SOE, oil and gas revenues, and oil and gas taxation), but at the same time government expenditures rise very fast, because transfer payment or petroleum subsidy for social security also increases. The oil sector generates about 20% of government domestic revenues. Recently, since government reduced transfer payment for oil subsidy, it has destructed economic activity, for example: cost of production increases. Based on *DW – statistic table*, 5% significance of d_L and d_U in this analysis are 0.91 and 1.539, respectively. The result shows $d > d_U$, so that we do not reject the null hypothesis.

Figure7. Nominal Crude Oil Price of Indonesia
April 1969- October 2007 (US\$/barrel)



Source: US Energy Information Administration, October 2007
<http://tonto.eia.doe.gov/dnav/pet/hist/wepcminasw.htm> (illustrated by author)

e. Import

In 2003, Indonesia's import increased by 4.03% to US\$ 32,550.7 million compared with previous year. It was mainly due to the increasing in oil and gas imports around 16.63% to US\$ 7,619 million while non-oil goods import was a little bit rise of 0,71% to US\$ 32,550.7 million (BPS, 2003). We express the relationship between import and independent variables, as follows:

$$EM_t = (-5.35E + 12) - (5442693579)\tau_{t-1} - (0.317)GDP_{t-1} - (2.04)Dummy1$$

(-0.072)
(-0.59)
(5.02)***
(0.26)

$$R^2 = 0.79 \quad d = 1.53 \quad n = 16$$

***significant at 1% level

It is expected theoretically that the exchange rate τ will have a negative effect on import, so that we adopt the equation mentioned, although partially it is insignificant. Depreciation of home currency over foreign currency discourages import. The test shows that the GDP in previous year has positive coefficient and significant at 1% level. The result might indicate that increase in income will encourage more demand of import, or due to expanding more import is needed. Constant dummy is intended to eliminate the fluctuating of exchange rate before and after economic crisis in 1997/1998. The result of regression-test shows that the relationship between import and independent variables is shown by the value of the coefficient of determination for degree of freedom at $R^2 = 0.79$. Based on *DW – statistic table*, 5% significance of d_L and d_U in this analysis are 1.106 and 1.371, respectively. The result shows $d > d_U$, so that we do not reject the null hypothesis of no autocorrelation.

f. Exchange rate

The aim of this test is to estimate the relationship between level exchange rate and independent variables. To clarify this problem, for example: Fukuchi and Tokunaga (1999) construct a monthly econometric model for the period of February 1996 to December 1997, with considering: inflow, outflow, net inflow and stock of short-term capital, dollar and rupiah values of export and import, trade balance and real GDP. They select the purchasing power parity (PPP), bandwagon effect, and net private capital inflow as three basic explanatory variables, which have contribution 18.4%, 66.0% and 15.6%, respectively. With the same matter, we consider five explanatory variables that are: the previous values of export, import, real GDP, external debt, and exchange rate. The result of analysis as shown by the following equation:

$$\tau_t = -497.38 - 31296.18 \frac{NX_{t-1}}{GDP_{t-1}} + (1.04E - 11)\tau_{t-1} B_{t-1}^F - 0.3270088\tau_{t-1} + 885.89 Dummy2$$

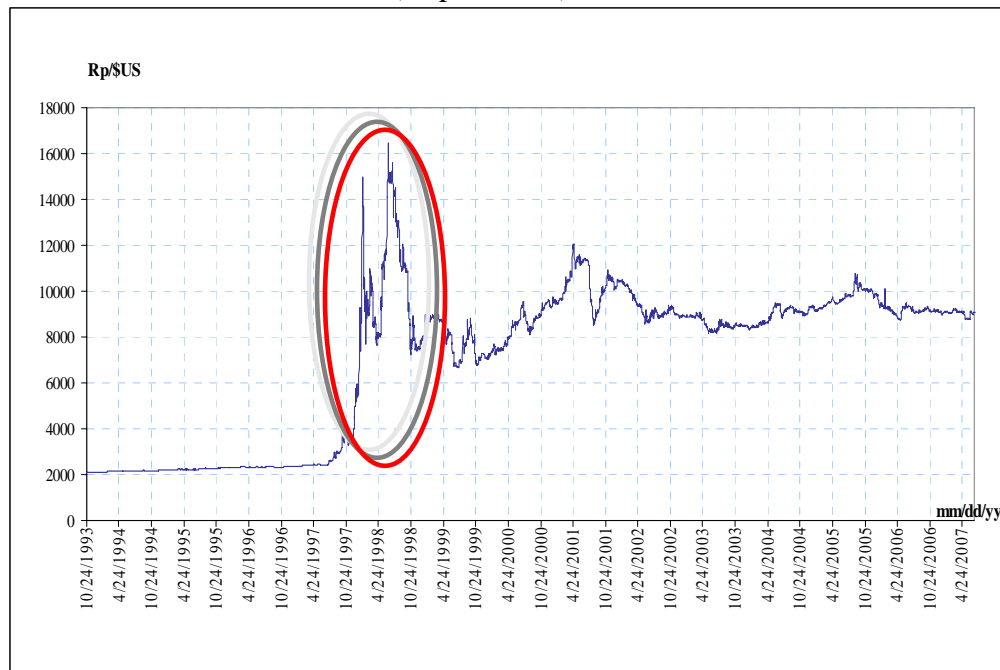
(-0.26)
(-2.71)**
(1.92)*
(-2.59)**
(11.09)***

$$R^2 = 0.98 \quad d = 2.43 \quad n = 15$$

*significant at 10% level, ** significant at 5% level, *** significant at 1% level

The relationship between exchange rate and independent variables mentioned is shown by $R^2 = 0.98$. The positive coefficient of external debt means that external debt increase has positive effect on domestic-currency depreciation. This relationship is significant at 10% level. The view actually occurs because of external debt repayment will reduce total external-currency reserve. The soaring debt repayment has been partly due to the rupiah's depreciation (Nasution, 2001). Of course, this phenomenon can be eliminated by debt-reprofiling policy, such as debt rescheduling. However, debt rescheduling has no meaning if the government cannot avoid repaying the debt at the maturity time. This means that external debt has possibility impact to suffer external-currency shock. Moreover another setting of this phenomenon, increasing outstanding external-debt might generate more external-debt; this means that government uses the external debt to recover primary deficit and debt service or such a *ponzi* game happened.

Figure8. Daily Exchange Rate, 1993-2007
(Rupiah/US\$)



Source: <http://www.oanda.com/convert/fxhistory> (illustrated by the author)

Net export is a main variable, in which increase in net-export can be used to recover lack of currency reserve. Increase in currency reserve will appreciate domestic currency's value. As shown by the *t-test* value that net-export has 5% significant level. However it is difficult to interpret the value of exchange rate based on previous exchange rate. There are two possibilities, if the previous year domestic currency is not so depreciated might be has a possibility to be stable or to appreciate continuously. However, if the previous exchange rate is depreciated deeply such economic turbulence, perhaps it will need a long time to recover. The result of regression test shows such the first scenario mentioned.

The other variable is GDP, which it might have a negative relationship with exchange rate depreciation or a positive relationship on exchange-rate depreciation. The positive relationship might be happened, if the GDP of other countries have higher growth level.

Based on *DW – statistic table*, 5% significance of d_L and d_U in this analysis are 0.814 and 1.750, respectively. The result shows $d > d_U$, so that we do not reject the null-hypothesis (of no autocorrelation).

g. Domestic Debt

The estimation of domestic debt is influenced by several variables as shown in the following equation:

$$\hat{B}_t^D = (2.965E + 13)_{(1.146)} + (3.21E + 14)_{(1.96)^*} \left(\frac{B_{t-1}^D - B_{t-2}^D}{GDP_{t-1}} \right) - (9.21E + 11)_{(-0.28)} i_{t-1}^D + (4.78E + 14)_{(16.36)^{***}} Dummy1$$

$$R^2 = 0.97 \quad d = 1.32 \quad n = 15$$

* significant at 10% level *** significant at 1% level

The value of the coefficient of determination for degree of freedom at $R^2 = 0.97$ shows that the significance level of relationship between independent and dependent variables is very high. Domestic interest rate has negative effect on demand of domestic debt, as shown by negative coefficient of domestic interest rate, although this is not highly significant. This means that government domestic-debt demanded decreases when domestic interest rate increases. Increase in stock of domestic debt in the previous year does not discourage the domestic-debt demanded in the current time. In the view of stock of domestic debt, we conclude that the government tends to expand total domestic debt in order to achieve economic growth targeted. However, it is difficult to clarify the relationship between GDP growth and demand of government debt. But, as shown by the equation above, increase in GDP in the previous year might have negative effect on domestic-debt demanded in the current year. We use constant dummy to eliminate fluctuating of domestic interest rate in 1998, at the time level inflation was so high comparing with domestic interest rate. Based on *DW – statistic table*, 5% significance of d_L and d_U in this analysis are 0.814 and 1.750, respectively. The result shows $d_L < d < d_U$, so that the result is inconclusive.

h. External Debt

Outstanding of external debt is predicted by several independent variables, as shown by the following equation:

$$\hat{B}_t^F = (3.82E + 11)_{(2.75)^{**}} - (9300874.8)_{(-1.301)} \tau_{t-1} + 0.00144_{(2.14)^{**}} NX_{t-1} - 1.28_{(-1.64)} B_{t-1}^F - (3.184E + 11)_{2.72^{**}} Dummy1$$

$$R^2 = 0.80 \quad d = 2.17 \quad n = 15$$

*** significant at 1% level

The depreciation of domestic-currency will discourage outstanding of external debt as shown by negative coefficient of exchange rate, although this relationship is not highly significant. Depreciation of domestic currency will raise higher repayment, so that foreign debt decreases. Moreover, increase in external debt in the previous year will discourage the more external debt in the current year. This result might imply that

expanding external debt is used to substitute the total debt desired. Furthermore, we find the situation that increase in net export will stimulate confidence of central government to issue more external debt, and this variable is significant at 5% level. The binding constraint of Indonesia to manage external debt is not GDP per se, but rather the capacity to generate the export revenues necessary to meet their debt servicing obligations. Based on *DW – statistic table*, 5% significance of d_L and d_U in this analysis is 0.685 and 1.977, respectively, so that we reject the null hypothesis of no autocorrelation. The coefficient of determination for degree of freedom at $R^2 = 0.80$ is quite significant to detect the correlation between independent and dependent variables.

i. Tax Revenue

Tax revenue is the most important source of government financing, and we adopt the equation as follows:

$$Tx_t = (-2.93E + 13) + 0.102GDP_t + 0.325Tx_{t-1}$$

(-1.92)*
(3.95)***
(1.74)*

$$R^2 = 0.93 \quad d = 1.86 \quad n = 16$$

* significant at 1% level *** significant at 1% level

The equation shows that increase in GDP has positive effect on tax revenue, and significant at 1% level. Tax in the previous year has positive effect on tax revenue in the current year at 10% level. The relationship between dependent and independent variables is significant, as shown by the coefficient of determination for degree of freedom at $R^2 = 0.93$. Based on *DW – statistic table*, 5% significance of d_L and d_U in this analysis are 0.982 and 1.539, respectively, this means $d > d_U$ so that we reject the null hypothesis of no autocorrelation. Increase in tax revenue can be used to recover financing problem, however minimizing government deficits by raising tax revenue sometime is not the best solution, due to the counterproductive effects on consumption and production. The composition of tax revenues in Indonesia are dominated by income taxes and value added taxes. The composition of tax revenue in Indonesia can be illustrated as follows:

Table5. Total Tax Revenues in Indonesia, 2000-2006
(in Rupiah Billion)

Tax Revenues	2000	2001	2002	2003	2004	2005	2006*
I. Domestic taxes	108,884.2	175,973.9	199,512.0	230,933.0	268,156.0	331,792.0	399,321.7
1. Income taxes	57,073.0	94,576.0	101,873.0	115,016.0	119,515.0	175,367.0	210,713.6
1.1. Oil and gas	18,651.5	23,101.6	17,469.0	18,963.0	22,947.0	35,143.0	37,516.1
1.2. Non oil and gas	38,421.5	71,474.4	84,404.0	96,053.0	96,568.0	140,398.0	173,197.5
2. Value added taxes	35,231.8	55,957.0	65,153.0	77,082.0	102,573.0	101,296.0	128,307.6
3. Land and building taxes	3,525.3	5,246.2	6,228.0	8,762.0	11,769.0	16,219.0	15,727.9
4. Duties and building taxes	930.8	1,416.7	1,600.0	2,144.0	2,911.0	3,433.0	5,280.1
5. Excises duties	11,286.6	17,394.1	23,189.0	26,277.0	29,172.0	33,256.02	36,519.7
6. Other domestic taxes	836.7	1,383.9	1,469.0	1,654.0	1,832.0	2,050.0	2,772.8
II. International trade taxes	7,028.3	9,567.0	10,575.0	15,115.0	12,742.0	15,239.0	16,991.5
1. Import duties	6,697.1	9,025.8	10,344.0	114,885.0	12,444.0	14,921.0	16,572.6
2. Export taxes	331.2	541.2	231.0	230.0	298.0	318.0	418.9
Total Tax Revenues (I+II)	115,912.5	185,540.9	210,087.0	242,048.0	280,559.0	347,031.0	416,313.2

Source: Audited State-Budget of Indonesia, 2000-2005

* is based on the state-budget data

j. Non-Tax Revenue

Non-tax revenue that has significant portion on total revenue, for example: oil, gas, general mining, forestry, fishery, and profit transfer from SOE.

Table6. The Composition of Non-Tax Revenue in Indonesia (in Rupiah billion)

Item	2000	2001	2002	2003	2004	2005	2006*
I. Natural Resources	76,290.1	85,671.8	64,755.0	67,510.0	91,543.0	110,467.0	151,641.6
1.1.Oil	50,953.0	58,671.8	47,686.0	42,969.0	63,060.0	72,822.0	110,137.7
1.2.Gas	15,708.0	22,091.3	12,325.0	18,533.0	22,199.0	30,940.0	36,096.6
II. Profit Transfers from SOE's	4,017.8	8,836.7	9,760.0	12,617.0	9,818.0	12,835.0	23,278.0
III. Other Non-Tax Revenues	9,114.1	20,550.1	13,925.0	18,754.0	21,185.0	23,586.0	30,372.7
Total Non-Tax Revenue	89,422.0	115,058.6	88,440.0	98,880.0	122,546.0	146,888.0	205,292.3

*The data is not including general mining/other natural resources, forestry, fishery and others.

We observe government non-tax revenue based on GDP in the previous year. And we adopt the relationship as follows:

$$NTx_t = (-4.36E + 15) + 0.29NTx_{t-1} + (2.21E + 12)t$$

$(-3.37)^{***}$ (1.14) $(3.39)^{***}$

$$R^2 = 0.70 \quad d = 1.82 \quad n = 16$$

*** significant at 1% level

Non-tax revenue in the previous year has positive effect on non-tax revenue in the current year. The result of t test is not significant, but this is the best result comparing other observation. We consider time as independent variable to show effect of time on non tax revenue. The relationship between independent and dependent variables is shown by the coefficient of determination for degree of freedom at $R^2 = 0.70$. Based on *DW – statistic table*, 5% significance of d_L and d_U in this analysis are 0.685 and 1.977, respectively, so that the conclusion is inconclusive.

k. Demand of Debt

We adopt equation (2), (3) and (4) to observe prediction demand of debt. Theoretically demand of debt usually equal with $[(1 + i_{t-1})B_{t-1} - S]$, but practically demand of debt is much higher than total budget deficits. In this calculation, we use the outstanding debt data as demand of debt. By this approach, we have an outstanding debt data as follows:

$$B_t = [(1 + i_{t-1})B_{t-1} - S] + \varepsilon$$

$$B_t = \alpha + \beta\{(1 + i_{t-1})B_{t-1} - [G^R - (G^E - i_{t-1}B_{t-1})]\} + \gamma GDP_{t-1}$$

$$B_t = \alpha + \beta\{(1 + i_{t-1})B_{t-1} - [G^R - (G^E - i_{t-1}B_{t-1})]\} + \gamma GDP_{t-1}$$

$$B_t = \alpha + \beta \left\{ (1 + i_{t-1}) B_{t-1} - \left[G^R - \left(G^E - (i_t^D B_{t-1}^D + i_t^F B_{t-1}^F) \right) \right] \right\} + \gamma GDP_{t-1}$$

$$B_t = (-1.963E + 15) + 6.398 \left[(1 + i_t) B_{t-1} - S_t \right] - 0.895 GDP_{t-1}$$

(-5.51)***
(6.28)***
(-3.05)***

$$R^2 = 0.87 \quad d = 1.03 \quad n = 15$$

*** significant at 1% level

4. Final Test: Investigating Performance of the Model

It is possible to trace the model using the structure of econometric model adopted so far, and evaluate to various policy effects taking advantage of that model. In order to describe a complete framework of the problem, we outline the model as shown by the flowchart in Figure 11. In order to evaluate the performance of econometric model as tracing the financing system in Indonesia, the final test of model is carried out. The result of the mean absolute percentage error (MAPE) for each endogenous variable Z , defined as:

$$\frac{1}{n} \sum_{t=1}^n \frac{|\hat{Z}_t - Z_t|}{Z_t}$$

where:

\hat{Z}_t = predicted value of each endogenous variable at time t

Z_t = actual value of each endogenous variable at time t

By giving actual values of endogenous variables at each period, for $t = 1991 - 2005$, and the initial values of endogenous variables at the first period, for $t = 1991$, and predicted value resulted in the previous analysis to the next period, for $t = 1992 - 2005$, we have the simultaneous analysis of MAPE and the results as follows:

Table 7. MAPE Values of Each Endogenous Variable (%)

No	Endogenous Variable	MAPE Values (%)
1	Consumption (C)	35.75
2	Investment (I)	52.90
3	Export (EP)	41.83
4	Import (EM)	35.15
5	Gross Domestic Product (Y)	34.45
6	Domestic Debt (B^D)	755.0
7	External Debt (B^F)	16.19
8	Total Debt (B)	15.17
9	Exchange Rate (τ)	13.40
10	Capital Stock (K)	48.77
11	Government Revenue (G^R)	27.51
12	Tax Revenue (T_x)	45.93

A relatively large error is associated with the estimation of domestic debt that is 755%. In fiscal year 1996, total domestic debt was relatively small, and dummy variable can not eliminate this fluctuation completely. As a result, total error of prediction of total domestic debt is relatively high. After financial crisis 1997/1998 domestic debt highly increases, as a part of government policy to recapitalize the banking system. In particular, the average error of exchange rate, total debt and external debt are relatively small, that are 13.4%, 15.17% and 16.19%, respectively. The smallest error is happened to exchange rate. Finally, in the estimation of GDP, the average error is 34.45%. It is not the extremely good result, but it can be judged that the adopted structures of model can be used for evaluating the effect of change government-debt on Indonesia's economy.

5. Predictions and Simulation Analysis

In this simulation we consider the role of government debt on economy, by investigating effects of government debt increase or decrease on economy. Hence, we propose some scenarios:

- a. Predicting the situation of economy within 15 year later
- b. Investigating the effect of increase in predicted external debt by 30% at 2006
- c. Investigating the effect of increase in predicted domestic debt by 30% at 2006
- d. Total maximum debt that can be issued by the government by considering the concept of debt sustainability (*still in process to attain a good approach*).

In order to adopt scenario (b) and (c) we investigate the effect of increase in debt using the equation as follows:

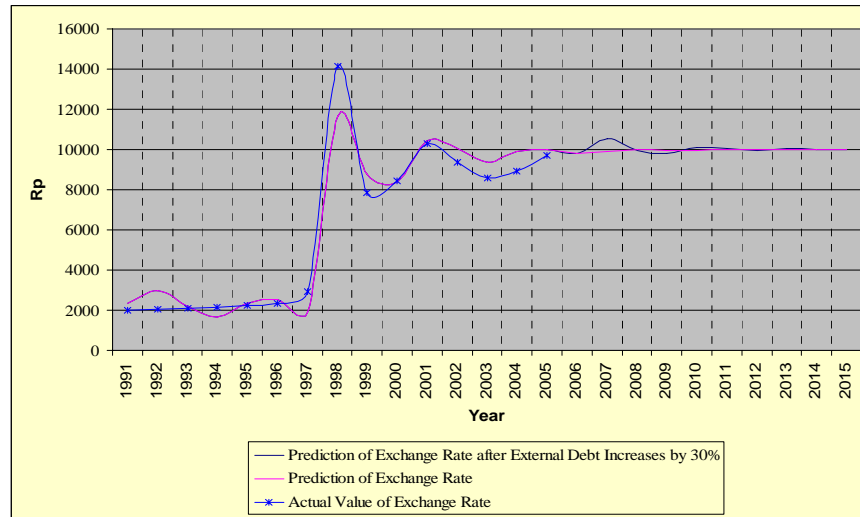
$$B_t = \alpha + \beta \left\{ (1 + i_{t-1}) B_{t-1} - [G^R - (G^E - i_{t-1} B_{t-1})] \right\} + \gamma GDP_{t-1} + B$$

We assume that at 2006 the government issues a new debt policy considering demand of debt B , suppose total debt change by increasing demand of debt. By predicting exogenous variables total government consumption $G_{2006-2015}$, interest rate $i_{2006-20015}$, and $[G^I + G^C + Tr - (1 + i) B_{t-1}]_{2006-2015}$, we found the result of analyses as follows:

a.1. Effect of External Debt Increase on Exchange Rate

Exchange rate increase has positive impact on domestic exchange-rate depreciation. This positive relationship is shown by the following figure:

Figure9. External Debt and Exchange Rate (Rp/US\$)

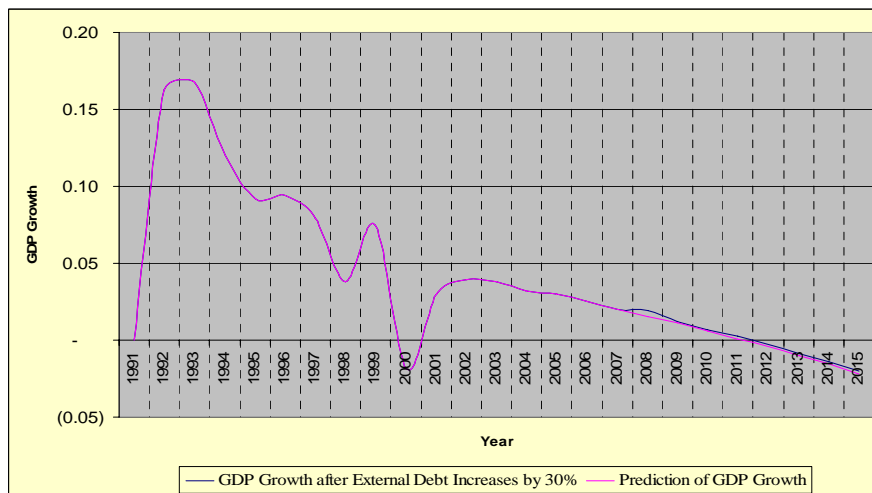


Comparing with the initial predicted value, the value of exchange rate is more depreciated if the government raises external debt by 30%. The government has to repay higher debt repayment in external currency, which has negative effect on total external currency reserves. An exchange rate shock occurs especially for short-term debt, and of course it has negative effect on short-term debt repayment.

a.2. Effect of External Debt Increase on GDP Growth

Simulation result shows that increase in external debt has positive effect on growth. It might be obvious that more financing has positive effect on growth; although the effect of currency depreciated might become a burden on growth. The positive relationship is shown by the following figure:

Figure10. External Debt and Real GDP Growth (in%, FY2000=100)



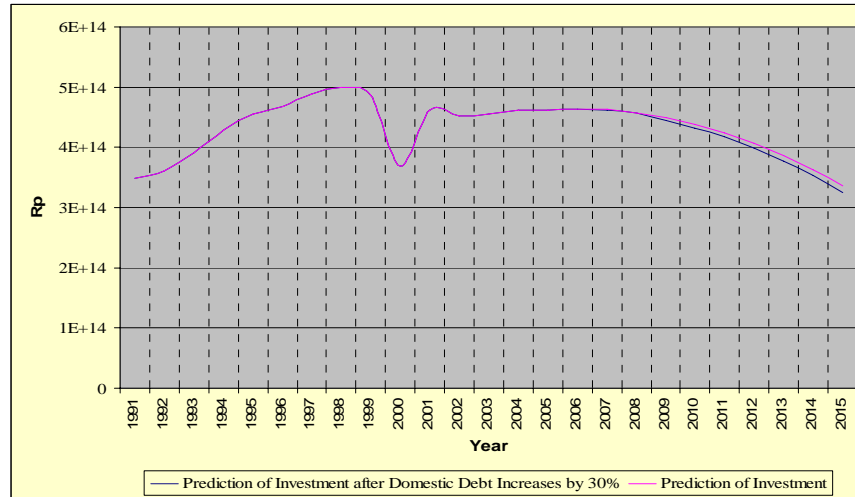
Investigating the model, we have several reasons for this relationship, for instance: 1).export increase because effect of domestic currency depreciation, 2).higher GDP in the

previous year has positive effect on consumption, export and import, 3).however under the model domestic currency depreciation has negative effect on import.

b.1. Effect of Domestic Debt Increase on Investment

Effect of domestic debt increase on investment is our focus in this research, and the result of analysis occurs in Indonesia. Domestic debt increase discourages private investment, and the relationship is shown by the following figure:

Figure 11. Domestic Debt and Investment (FY2000=100)



By this scenario, we can prove that increase in domestic debt generates crowding-out phenomenon. Consider the function of capital stock $I_t = K_t - (1 - \delta_t)K_{t-1}$, capital stock in the previous year increase discourages a new investment. Referring to capacity-accelerator principle, this situation can be explained as follows:

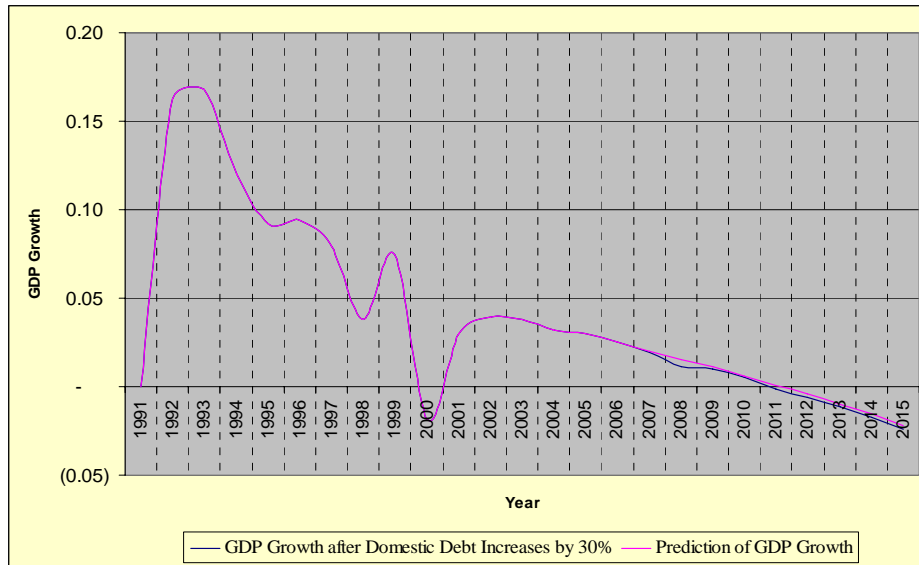
$$I_t = a_1 K_t^* - a_2 (1 - \delta_t) K_{t-1}$$

Suppose K_t^* is the optimal capital stock at time t , a_1 and a_2 are accelerations, they will indicate how rapidly the capital stock will adjust disequilibrium between output and capital stock. This means that investment is proportional to the difference between optimal capital stock and the actual capital stock at the beginning of the period, where desired capital stock is predicted on the assumption that the current levels of sales will continue in the future. Upon looking back at the previous problem, investment decrease means that desired capital stock decreases.

b.2. Effect of Domestic Debt Increase on GDP Growth

Effect of domestic debt increase on GDP growth can be shown by the following figure:

Figure12. Domestic Debt and Real GDP Growth (in %, FY2000=100)



Domestic debt increase has negative effect on growth; this is because all of the components of GDP decrease.

6. Concluding Remarks

We shall conclude the result of analyses by emphasizing the grounds for a complete reevaluation of budgeted financing and budget deficits. In the view of budget financing, we confront the roles (advantages and disadvantages) of any financing sources, in particular between external and domestic debt. Actually, the problem has been faced by major borrower nations, especially developing countries. This paper highlights both a unified framework for conceptualizing the current government debt dilemma. Some sets of case studies have geared to this interpretative model in order to elucidate the role ones. This paper provides a multiple perspective on the debt management to attain fiscal sustainability with the substantive case of Indonesia. By considering the domestic debt increase as budgetary policy after crisis 1997/1998, we interest to investigate the role of domestic and external debt on Indonesia's macro-economy. We derive series of conclusions and recommendations as follows:

1. Actually, budget deficit can be recovered by imposing higher tax revenue, but this policy has a counterproductive effect on private consumption. Since tax revenue just slightly increase, another way to recover budget deficits is, for instance, by increasing government borrowing, but consequently debt services will increase. Although the government can manage sustainability debt repayment, for example by reprofiling policy, but increasing debt service to GDP ratio always becomes a burden in the long-run economy. Reprofiling policy is emphasized on debt-maturity management, but this policy does not resolve the problem completely, because long-term debt service now will become a short-term debt tomorrow.
2. The role of concessional external-debt, by considering interest rate, is usually a superior choice over domestic debt in terms of financing cost. External debt has a

- positive effect on economic growth. However, a particular perspective about exchange rate crisis (external shock) should be considered as a potential risk as an unexpected situation. Regarding this problem, a gradual approach to external-debt management is needed to keep a fiscal sustainability. In response to this, allocating the external debt has to calculate the maturity time and return on investment. A characteristic of recent debt problem is the important role of short-term debt; payment crises potentially will erupt when country failed in their attempts to refinance short maturities. The appropriate government actions to reduce the potential for a crisis include further deregulation to support growth in exports (especially non-oil export) and discouraging implicit government guarantees for private sector projects.
3. The role of domestic-debt, by considering external shocks, is usually superior choice over external debt. Domestic financial institutions prefer to invest in government bonds because business risk is zero. The result of analysis indicates that domestic debt increase has potential effect to discourage private investment. The relationship of interest rate, investment and expanding domestic debt can be seen in the recent phenomenon of Indonesia in 2006: financial institution insisted to keep at the high-level interest rate, expanding domestic debt was relative high, and private investment languished in this situation, such crowding-out phenomenon happened.
 4. The debt management such as rescheduling might be can resolve the problem of liquidity in short-term/inflow solution, and does not resolve the problem of debt burden/stock for the medium and long term. It merely shifts the greater burden to the future government/generation. By this reason, such a benchmark should be determined to obtain a maximum debt in Indonesia by assumes several economic situations, for example: fiscal sustainability.

5. References

- Aggrawal, Vinod K., (1987), "International Debt Threat: Bargaining among Creditors and Debtors in the 1980s", *Policy Paper in International Affairs*, No.29, Berkeley: Institute of International Studies (IIS)-University of California.
- Arslanalp, Serkan and Peter Blain Henry, (2006), "Policy Watch: Debt Relief", *Journal of Economic Perspectives*, 20(1): 207-220.
- Asher, Mukul G. (ed.), (1989), *Fiscal Systems and Practices in ASEAN: Trends, Impact and Evaluation*, Pasir Panjang, Singapore: Institute of Southeast Asian Studies.
- Asian Development Bank, Sri Lanka: "Borrowing Capacity Assessment", November 2003.

- Basu, Khausik, (2003), *Analytical Development Economics: the Less Developed Economy*, Massachusetts: MIT Press
- Beaugrand, Philippe, Brileau Loko, and Montfort Mlachila, “The Choice between External and Domestic Debt in Financing Budget Deficits: The Case of Central and West African Countries, *IMF Working Paper*, No: WP/02/79, May 2002.
- Bird, Graham (1989), *Commercial bank Lending and Third-World Debt*, London: MacMillan.
- Bird, Richard M., “Fiscal Flows, Fiscal Balance, and Fiscal Sustainability”, Atlanta: Andrew Young School of Policy Studies, *Working Paper 03-02*, January 2003.
- Blanchard, Olivier Jean, “Suggestions for a New Set of Fiscal Indicators, Organisation for Economic Co-operation and Development (OECD)”, *Working Paper*, No.79, April 1990.
- Bradlow, Daniel D., (ed.), (1986), *International Borrowing: Negotiating and Structuring International Debt Transactions*, Washington: International Law Institute.
- Buiter, Willem H., *Measuring Fiscal Sustainability*, University of Cambridge, 29 August 29, 1995. (Mimeo: www.nber.org/~wbuiter/sustain.pdf).
- BPS (Central Bureau of Statistics of Indonesia), “Statistik Perdagangan Luar Negeri Indonesia (*Indonesia Foreign Trade Statistics*) 2003”, Volume 1, 2004.
- Buiter, Willem H., (1989), *Macroeconomic Theory and Stabilization Policy*, Manchester: Manchester University Press.
- Buiter, Willem H., (1990), *Principles of Budgetary and Financial Policy*, London: Harvester Wheat sheaf.
- Bulow, Jeremy, Kenneth Rogoff and Rudiger Dornbush, “The Buyback Boondoggle”, *Brookings Papers on Economic Activity*, Vol. 1999, No.2 (1988), pp. 675-704.
- Carvounis, Chris C., (1984), *The Debt Dilemma of Developing Nations*, Connecticut: Greenwood Press.
- Carvounis, Chris C. (1984), *The Debt Dilemma of Developing Nations: Issues and Cases*, Connecticut: Greenwood Press.
- CEPR, “Financial Crises and Asia”, *Centre for Economic Policy Research (CEPR) Conference Report*, No. 6, March 16, 1998.
- Chalk, Nigel and Richard Hemming, “Assessing Fiscal Sustainability in Theory and Practice”, *IMF Working Paper*, WP/00/81, April 2000.
- Choeryanto, Syaifoel, (2003), *An Econometric Model for Indonesia, 1965-1990*, Jakarta: Lembaga Penerbit Fakultas Ekonomi Universitas Indonesia.
- Corbridge, Stuart (ed.), (2000), *Development: Critical Concept in the Social Sciences*, London: Routledge.

- Cypher, James M. (1990), *State and Capital in Mexico: Development Policy since 1940*, Colorado: Westview Press.
- Darity, William and Bobbie L. Horn (1988), *The Loan Pushers: the Role of Commercial Banks in the International Debt Crisis*, Massachusetts: Ballinger Publishing Company.
- Delamaide, Darrell (1984), *Debt Shock: The Full Story of the World Credit Crisis*, New York: Doubleday & Company.
- Despande, Ashwini, “The Debt Overhang and the Disincentive to Invest”, *Journal of Development Economics*, Vo. 52 (1997), 169-187.
- Dickenson, D.I. Trotman (1996), *Economics of the Public Sector*, London: MacMillan Press.
- Directorate General of Treasury, Ministry of Finance of Republic of Indonesia, “Central Government Debt: Statistical Tables”, Quarter II, 2005
- Eaton, Jonathan, “Fiscal Policy, Inflation and the Accumulation of Risky Capital”, *the Review of Economic Studies*, Vol. 48, No.3, July 1981, pp.435-445.
- Eaton, Jonathan, “Sovereign Debt: A Primer”, *The World Bank Economic Review*, 1993, 7(2): 137-172.
- Fatas, Antonio and Illian Mihov, “The Case for Restricting Fiscal Policy Discretion”, *Quarterly Journal of Economics*, November 2003: 1419-1447.
- Fair, Donald E. and Christian de Boissieu, *Fiscal Policy, Taxation and the Financial System in an Increasingly Integrated Europe*, Boston: Kluwer Academic Publishers.
- Fisher, Irving, “The Debt-Deflation Theory of Great Depressions”, *Econometrica*, Vol.1, No.4. (Oct., 1933), pp. 337-357.
- Fukuchi, Takao and Suminori Tokunaga, “Simulation Analysis of Exchange Rate Dynamics: the Case of Indonesia”, *the Developing Economies*, XXXVII-1 (march 1999): 35-58
- Geithner, Timothy, “Assessing Sustainability”, *International Monetary Fund Paper*, May 28, 2002.
- Hamilton, James D. and Marjorie A. Flavin, “On the Limitations of Government Borrowing: A Framework for Empirical Testing”, *the American Economic Review*, September 1986, 76(4): 808-819.
- Hartlyn, Jonathan and Samuel A. Morley (1986), *Latin American Political Economy: Financial Crisis and Political Change*, Colorado: Westview Press.
- Healey, Nigel M., “The International Debt Crisis”, in Subrata Ghatak (1995), *Introduction to Development Economics*, London: Routledge.
- Hui, Jia and Komei Sasaki, “Interregional Disparity and Regional Economic System in China”, *Interdisciplinary Information Sciences*, Vol. 13, No.2, 2007, pp. 203-225.

- Jha, Raghendra (1994), *Macroeconomics for Developing Countries*, New York: Routledge.
- Keuning, Steven and Erik Thorbecke, "The Impact of Budget Retrenchment on Income Distribution in Indonesia: A Social Accounting Matrix Application", OECD paper, June 1989.
- Khan, Shahrukh Rafi (1999), *Do World Bank and IMF Policies Work?*, New York: Palgrave.
- Lau, Sie Ting and Thomas H. McInish, "IMF Bailouts, Contagion Effects, and Bank Security Returns", *International Review of Financial Analysis*, 12(2003), 2-23.
- Act No.24/2002, "Surat Utang Negara (the State's Debt)".
- Lewis, Blane D. "On Lending in Indonesia: Past Performance and Future Prospects", *Bulletin of Indonesian Economic Studies*, Vol. 43, No.1, 2007: 35-57.
- Lessard, Donald R. and John Williamson (1987), *Capital Flight and Third World Debt*, Washington: Institute for International Economics.
- MacEwan, Arthur (1990), *Debt and Disorder: International Economic Instability and U.U. Imperial Decline*, New York: Monthly Review Press.
- Mankiw, N. Gregory (1994), "The Debates over Government Debt", in *Macroeconomics*, New York: Worth Publishers.
- Marks, Stephen V., "Fiscal Sustainability and Solvency: Theory and Recent Experience in Indonesia", *Bulletin of Indonesian Economic Studies (BIES)*, Vol. 40, No.2, 2004:227-42
- McKay, Lloyd, et.al, "Indonesia: Managing Government Debt and Its Risks", *The World Bank, East Asia and the Pacific Region*, Report No.20436-IND, May 22, 2000.
- McLeod, Ross H., "Indonesian Foreign Debt: a Comment", *Bulletin of Indonesian Economic Studies (BIES)*, Vol. 32, No.2, August 1996, pp. 119-31.
- Meier, Gerald M. (1986), *Financing Asian Development: Performance and Prospect*, Boston: University Press of America.
- Ministry of Finance of Indonesia, "Central Government Debt: Statistical Table", Quarter II 2005.
- Mikesell, John L. (1986), *Fiscal Administration: Analysis and Applications for the Public Sector*, Chicago: the Dorsey Press.
- Missale, Alessandro and Oliver Jean Blanchard, "The Debt Burden and Debt Maturity", *The American Economic Review*, Vol.84, No.1, March 1994, pp.309-319.
- Nasution, Anwar, "Fiscal Distress in Indonesia Following the 1997-1998 Economic Crisis", a paper presented at the 14 General Meeting of Pacific Economic Cooperation Council (PEEC XIV), Hong Kong: 28-30 November 2001.

- Nasution, Anwar, "Fiscal Distress in Indonesia Following the 1997-1998 Economic Crisis", General Meeting of PECC XIV, Hong Kong: 28-30 November 2001.
- Nelson, Paul J. (1995), *The World Bank and Non-Governmental Organizations: the Limits of Apolitical Development*, New York: St. Martin's Press.
- O'Connell, Stephen and Stephen P. Zeldes, (1988), "Rational Ponzi Games", *International Economic Review*, 29(3):431-450.
- Ott, Attiat F. (1993), *Public Sector Budgets: a Comparative Study*, Brookfield Vermont: Edward Elgar.
- Pitchford, John (1995), *The Current Account and Foreign Debt*, London: Routledge.
- Prawiraatmadja, Widhyawan, "Indonesia's Transition to a Net Oil Importing Country: Critical Issues in the Downstream Oil Sector", *Bulletin of Indonesian Economic Studies (BIES)*, Vol.33, No.2, August 1997, pp.49-71.
- PPEFE UGM (2004), "Studi Manajemen Utang Luar Negeri dan Dalam Negeri Pemerintah dan Assessment terhadap Optimal Borrowing- (Study on Government's External and Domestic Debts and Assessment to Attain Optimal Borrowing)", in Bahasa Indonesia, *Center of Economic Research and Development-Gadjah Mada University*.
<http://www.fiskal.depkeu.go.id/bapekki/kajian/ManajemenUtangBAF&UGM.pdf>.
- Radelet, Steven, "Indonesian Foreign Debt: Headed for a Crisis or Financing Sustainable Growth?" *Bulletin of Indonesian Economic Studies (BIES)*, Vol. 31, No.3, December 1995, pp. 39-72.
- Radelet, Steven, "Indonesian Foreign Debt: a Reply", *Bulletin of Indonesian Economic Studies (BIES)*, Vol. 32, No. 2, August 1996, pp. 133-42.
- Savin, N.E and Kenneth J. White, "The Durbin-Watson test for Serial Correlation with Extreme Sample Sizes or many Regressors", *Econometrica*, VI. 45, No.8, (Nov. 1977), pp. 1989-1996.
- Woo, Wing Thye and Anwar Nasution, "Indonesian Economic Policies and Their Relation to External Debt Management", in Sachs, Jeffrey D. and Susan M. Collins (eds.), (1989), *Developing Country Debt and Economic Performance: Country Studies-Indonesia, Korea, Philippines, Turkey*, Chicago: the University of Chicago Press.
- Solomon, Robert and Jeffrey Sachs (1981), *The Debt of Developing Countries: Another Look, Brookings Paper on Economic Activity*, 1981(2): 593-607.
- Stglitz, Joseph , "Macroeconomic Dimensions of the East Asian Crisis", in *CEPR (Centre for Economic Policy Research) Conference Reports*, No.6, 1988.
- Tanzi, Vito (1992), *Fiscal Policies in Economies in Transition*, Washington, D.C.: International Monetary Fund.
- The Jakarta Post, "Restoring Indonesia's economy to a higher growth path", December 30, 2006.

The Jakarta Post, “Govt to sell more retail bonds this year”, January 23, 2007

The Jakarta Post, “Govt will turn to offshore bond market to plug budget deficit”, January 27, 2007.

Van der Ploeg, Frederick, (ed.), (1994), *The Handbook of International Macroeconomics*, Massachusetts: Blackwell.

World Bank, “Indonesia: the Imperative for Reform, Brief for the Consultative Group on Indonesia”, *Report No. 23093-IND*, November 2, 2001.