MODELING GOVERNMENT EXTERNAL DEBT
AND SUSTAINABILITY OF FISCAL POLICY

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Abstract

Development theories assume that developing countries are trapped by vicious circles of poverty due to low incomes, savings and investments. External debt financing is viewed as a means of escaping from the cycle of poverty and a way to to relieve bottlenecks in development process. This work focus on public external debt and government public finance since its fiscal policy is important in development process as well as in securing stability and growth. It attempts to show how spiraling external debt has harmful effects on fiscal sustainabilit, using system dynamics model. An experiment with a set of policy options is carried out, to find a better strategy that is able to reduce the dependency on external debt and to maintain fiscal sustainability.

Key Words: Debt Service, External Debt, Economic Development, Fiscal Policy, Fiscal Sustainability, Deficit Budget, Energy Subsidy Reduction, System Dynamics

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I. Background of the Study

A. Introduction

The foundations for theories of the role of "foreign aid"[1] in development were laid down in the 1950s and 1960s. The prevailing assumption was that developing countries were caught in vicious cycles of poverty. Because of low percapita incomes, saving were low. Due to low saving rates, investment was low, so that there were little prospects for future growth of national income and development of industrial sector (Szirmai, 1997; Nafziger, 1997). Capital was seen as the scarce factor in development. According to those theories, what was required was a large-scale investment programmed in industry and infrastructure, that would help economies break out of their vicious cycles.

Transformation of economic structure requires a large inflow of external financial resources in a short period of time. Foreign aid can contribute to the acceleration of economic growth and structural transformation by relieving crucial bottlenecks in the process of development. An external debt enables an individual or a nation to get things from other sources without having to give anything in return for the time being. LDCs (Less Developed Countries) obtain a capital inflow from abroad when institutions and individuals in other countries give grants or make loans or (equity) investments to pay for a balance on goods and services deficit (or import surplus).

This inflow of foreign funds enables a country to spend more than it produces, import more than it exports, and invest more than it saves, and thus fills the gaps that limit development. But eventually the borrowing country must service the foreign debt. Paying back the loan requires a country to produce more than it spends, save more than it invests, and export more than it imports (Nafziger, 1997; Lerner, 1961)

Table 1. Economic growth rate and debt stock in selected LDCs			
Country	Growth Rate		Debt (million)US$	
	1980-90	1990-98	1980	1998
1. Algeria	2.7	1.2	19,365	30,665
2. Argentina	-0.7	5.6	27,151	144,050
3. Bangladesh	4.3	4.7	4,230	16,376
4. Congo	3.3	0.9	1,526	5,119
5. Egyp, Arab Rep	5.4	4.2	19,131	31,964
6. Gabon	0.9	3.3	1,514	4,425
7. Haiti	-0.2	-1.7	302	1,048
8. India	5.8	6.1	20,581	98,232
9. Philippina	1.0	3.3	17,417	47,817
10. Thailand	7.6	5.7	8,297	86,172
Source: 2000 World Development Indicators, World Bank, quote from Tasrif, 2001				

The most complete information with regard to the line of thinking described above is Chenery and Strout's (1966) two gap model (Bhagwati, 1985; Todaro, 1982; Sundrum, 1983; Szirmai, 1997). Chenery and Strout distinguish two gaps: *the saving gap* and *the foreign exchange gap*. Economic growth requires large investments in industry and infrastructure during the time that domestic savings are insufficient to meet

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[1] The foreign aid term here actually refers to foreign debt. "Aid" here is used because the loan for LDCs contains the grant element. It depends on how much the interest rate below the commercial rates, the length of the grace period, how long the repayment period is and the extent to which repayment is in local currency. *See* Nafziger, 1997.

investment requirements. This is the first gap. The second gap refers to the shortage of foreign exchange. From the experience of the LDCs, their economic growth rate rises along with huge increases in the external debt (*See* Table 1).

External debt problems of developing countries have been studied and are topics of interest since it triggers some monetary problems in the long run. For example, external debt created a crises when Mexico, experiencing the combined effects of imprudent borrowing and an unfavorable world macroeconomics environment, was unable to service its debt. Soon, a host of countries—among them Brazil, Argentina, Bolivia, Venezuela and the Philippines—had similar problems. In 1982 analysis of the debt crises, revealed three reasons for the problem: 1) Excessive borrowing, with resources used to finance deficits and consumption trade deficits at overvalued exchange rates; 2) Over lending by banks, whose officers apparently believed that sovereign debt didn't need to meet ordinary banking test. 3) A sharp deterioration in the world economic environment, with a fall in commodity prices, strengthening of the dollar, record high interest rates and a decline in demand for manufactured goods (Dornbusch & Marcus, 1991; Prasetiantono, 1996).

Over the years numerous studies of developing countries' external debt and its impact have been carried out. These have focused on general aspects such as the correlation between external debt and economic growth (Avramovic, 1964); the impact of exports, imports and debt services burden on demand for external debt (Alun, 1992).

More specific studies on Indonesian external debt discuss some topics such as: the negative relationship between the foreign debt and deficit in current account (Prasetiantono, 1996); the impact on the macroeconomics situation (Wahyudi, 1998) and the influence of the foreign exchange rate on debt service burden (Nopirin & Anggito, 1987). Radelet (1995) discussed the possible external debt crises in Indonesia; Arief & Adisasono (1987) and Rachbini (1995) highlighted the burden on the Indonesian economy caused by external debt. Some studies have focused on the proposal to solve the international debt problem in developing countries (Jones, 1985; Hemmer, 1989). Theoretical examinations of external debt have emphasized econometric modeling and mathematical approaches. System dynamics approach to debt problem is discussed by Arenas (2003) in the case of Colombia, and by Parayno (1991) in the case of Philippines.

The financial shortage in financing public investment (known as *the fiscal gap*) is also a problem of LDCs's governments. Government saving generated by a surplus in current budget is not enough for financing the capital formation in public sector. The government is an important institution in the development process (Mashayekhi, 1998). The role of government's fiscal policy in securing stability and growth in LDCs is of fundamental importance (Musgrave & Musgrave 1989). Furthermore, Musgrave & Musgrave postulate four objectives of budgeting executed by the government:

- *allocation* – ensuring that an appropriate level of funding flows into sectors of the economy where it is required.
- *distribution* – ensuring that the balance in public funding between regions, between classes of people in society, between public and private sectors and between government and business reflects public policy;
- *stabilization* – using public spending to stabilize the macroeconomy.
- *growth* – using the power of government spending to facilitate economic growth and wealth creation.

Generally, financial transactions or fiscal instruments may be classified as government outlays or government receipts. These transactions have increased in their size and complexity over time. Outlays include purchase of goods and services (exhaustive expenditures), transfer payments, and

the acquisition of financial assets. Government receipts include taxes, fees and income from state property and enterprises, proceeds from sale and international institutions, *borrowing* and money creation (Kumar, 1994).

However , there are different perspectives among economists concerning how to finance the deficit in the government budget. One of accepted methods of financing the gap are internal and external borrowing. If a deficit budget is financed by internal borrowing, it merely diverts funds otherwise available for private investment and causes a *crowding-out effect* (Musgrave, 1989; Parkins, 1995)[2]. Although taxes will be raised in the future to finance these payments, and impose a burden on economy, there are no resources transfered abroad because the debt are withdrawn from the economy, or we "owe the debt to ourselves". For external or foreign debt, the primary real burden can be shifted forward in time since there need be no net domestic sacrifice of resources during the period of debt creation. But future generations will find their income reduced when debt is to be repaid and domestic resources must be transferred to foreigners (Kaounides & Wood, 1992).

This paper presents a system dynamics model to examine Indonesian external debt problems. This is an important approach because the various approaches typically used to examine the topic of external debt in Indonesia, ignore feedback relationships in fiscal policy. This study trys to emphasize analysis of government external debt. The following section describes the problems facing by the Indonesian government regarding the deficit budget and its external debt, both before and after the 1997 Asian financial crises –can situation very similar to the 1982 debt crises in Latin America.

B. External Debt Problem: Macroeconomic situations and the Government's Budget Deficit

As in other developing countries, in the early stages of of New Order Era (1968), Indonesia faced a lack of capital and funds to finance development. On one hand, domestic savings was low and couldn't be expected to rise quickly. On the other hand, tax revenues were also low, due to the low per capita income. The way out of this situation was to finance the development from external sources (foreign aid and foreign investment). Government external debt is used especially for poverty alleviation, infrastructure building in remote areas and other public goods that can't be provide by private sector (Kuncoro, 1997). Budget deficits became a policy of the New Order. The deficit gap is covered by Official Development Assistance (ODA) or in the government budget,[3] it is categorized as development revenue. Before the 1997 financial crisis, the New Order preferred to call foreign debt by the name "foreign aid".

For the short term, the external debt will be very helpful in helping the Indonesian government to cover the deficit of the budget (APBN) caused by the routine expenses and the huge development expenses. Therefore, the progress of economic development can be fastened according to the targeted growth rate. However, in the long term, it seems to be that the external debt can trigger monetary problems in Indonesia. In addition, there is continually increasing government or public debt .

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[2] It represents the Neoclassical point of view. But some economists don't believe that budget deficits crowd-out investment. On contrary, they argue, debt financing and paying for government spending with tax revenue are equivalent (known as *Ricardian Equivalent*). Under the Keynesian view, loan financing has an immediate and quantitatively significant impact on aggregate demand. Since deficits stimulate both consumption and national income, saving and capital accumulation need not be adversely affected and have beneficial consequences. *See* Bernheim, 1989.

[3] In the New Order, the government stated that its budgeting principal was a balanced budget (See Sagir, 1984). A balanced budget is a budget in which receipts are equal to or greater than outlays. However in the practice, expenses in government budget was always higher than the revenue or deficit budget were applied. Deficit financing is a situation in which a government's excess of outlays over receipts for a given period is financed primarily by borrowing.

The severity of Indonesian external debt burden can be measured by several indicators. The most widely used indicator is the debt service ratio. This is the relationship, expressed as a percentage, of the debt service payments (amortization of capital plus interest) to the foreign exchange earnings of the country in question over a given time period (usually one year). However, Payer (1991:10) states that the net transfer is a superior indicator of crisis. The net transfer measures the relationship between new inflows of money and the debt service on previously incurred debt. In other words, it is positive when the repayment of principal is higher than the new flow of debt stock. The net transfer problem is also a component of Indonesian external debt problem since it already occurred in 1985 (Ramli, 1991; Rachbini, 1995).

Other important indicators of Indonesian external debt which reflect negative impacts on macroeconomic situation in the long-run are:

- *The average of the Debt Service Ratio* (DSR) as an indicator of the economic capability to repay its debt reached 35 percent and even nearly 60% after the monetary crises, while the tolerable ratio is around 20 percent. This means that over half the country's hard currency, which could be used for economic recovery and for the social safety net, goes to the foreign countries and foreign creditors.
- The mechanism of Indonesian external debt is also dependent on the global system. A little change in international monetary situation can affect Indonesian external debt easily. This is especially true of a change in the value of the dollar. The 1997 monetary crises increased the dollar price almost 4-5 times compared to the Indonesian rupiah and this in turn affected the Indonesian external debt.
- Indonesian external debt now amounts to over 140 percent of the annual gross domestic product -- double what it was eight years ago.
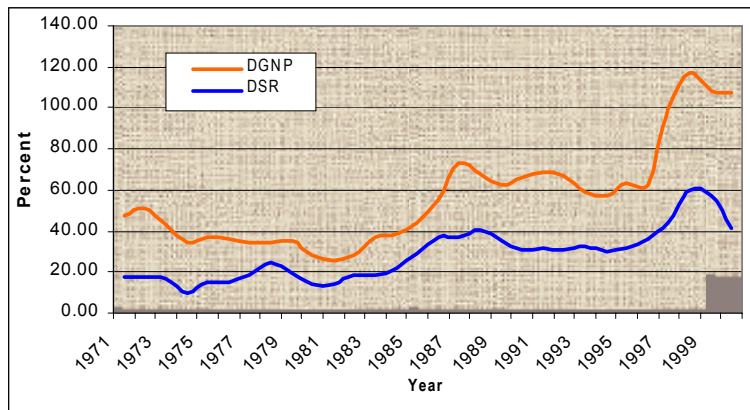

Figure-1
Macro-Indicators of External Debt Burden
(Debt Service Ratio and Debt to GNP Ratio)

In monetary crisis, the Indonesian's external debt, including the government's external debt, in terms of rupiah, has rapidly increased. Therefore, the Indonesian government has to add new external debt in order to be able to repay the previous external debt. Indonesia's debt has sky-rocketed to completely unsustainable levels since the 1997 Asian financial crisis, and is now seriously undermining Indonesia's ability to provide basic social services to its people. Since the Asian financial crisis, it is estimated that the number of poor people in Indonesia has increased almost four-fold. The financial crisis of 1997 became an economic crisis due to rapid devaluation, spiraling external debt, and a loss of investor confidence. When the IMF came to "help" Indonesian economy, it applied its classic prescription of increased taxes and reduced public spending, and increased interest rates. The package caused a dramatic surge in Indonesia indebtedness.

There are some additional important issues that are connected to fiscal sustainability in Indonesia:

1. **Oil Revenue**. The dependency of the government on oil revenue to finance government budget. Oil exports and the rapid rise in the domestic oil consumption could have serious implications for country's development strategy and may lead to increasing dependence on a diminishing resource base. As oil resources run out, oil exports are likely to drop and oil revenue will decline (Tasrif, 1985). Indonesia's oil resources will be depleted by 2010. After 2010 Indonesia possibly would be no longer an oil producing country. In the mean while, the uncertainty in world oil prices influences the oil revenue as a source of revenue for Indonesia, while taxes revenue also can't be expected as main source of income.

2. **Tax revenue**. The government revenue from taxes sector is very low. Naturally tax is a function of economic activities. The low tax ratio situation exists for several reasons: 1) under taxation, 2) low income percapita, 3) ineffective national taxes administration system and 4) untouched potential tax bases. Average tax ratio to GDP in Indonesia was around 10-11% per year in 1990-2002. The government expects that the tax ratio should increase until around 15% in the future.

3. **Inefficiency in government owned enterprises**. There are three kind of government or stated-owned enterprises (SOEs): 1) SOEs that provide the public service, 2) SOEs that provide public utility (that are expected to yield a profit, besides providing a public service), and 3) SOEs which operate as a business for profit . However poorly managed public enterprises, or enterprises whose revenue targets were insufficiently specified by shareholders, often contributed to the negative rather than positive side of government finances. Privatization of SOEs is one policy to reduce the deficit in government's budget. There are about 16 SOEs that have become the target of privatization. It is also one prescription that is stated in the Letter of Intents (LoI) between Indonesia and the IMF as a part of economic recovery strategy.

4. **The dependency on foreign borrowing** to finance the development budget; the limitation of international foreign sources in the long run. Mismanagement in handling loan process [4] and also because Indonesia is not able to rely on domestic resources like manufacturing, oil and gas to gradually reduce the external debt. These make the government external debt continues to increase every year. The debt service composition is more than a half of operational (recurrent) expenses. It becomes a heavy burden in the government's budget.

5. **Subsidy**. Since the crisis, Indonesian Government has been pressured by the IMF to improve their energy policy based on the real economic situation rather than politics, as has been the case for more than 30 years under the Suharto regime. The energy subsidy also become a major factor behind the rapid growth of domestic oil consumption. One of the important things is pricing policy. The government prepared their pricing implementation by reducing oil/electric price subsidies (shadow prices) to improve national efficiency budgeting in the difficult era.[5]

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[4] Borrowing is a tool notoriously open to abuse (*See* Shafritz & Russel, 1997).
[5] The fuel issue is related to the fact that public is accostumed to find cheap-subsidized energy price and doesn't realize that fuel stock is actually limited and it is costly to produce. At some point, this will deplete and there is no technology to substitute. Thus, subsidy reduction policy is also difficult choice since public doesn't be aware of this problem. Latest estimation puts the cost of the fuel subsidy alone at around Rp.28 trillion in year 2000. This is equivalent to around US$3.2 billion (if 1 US$= Rp 8,500) and actually only a very small part of the energy subsidies directly benefit the poor. Moreover, serious price distortions are encouraging wasteful energy use.

6. The Problem of corruption in the government financial management of international projects.[6] Dudley (2000) says: "Project funded by international development banks seem to provide easy targets for corruption perhaps because of these fund are perceived as coming "from outside" and are subject to relatively little external monitoring." Mauro (1997) says that corruption slows economic growth. He points out the consequences of corruption of particular relevance to developing countries:

- Corruption might reduce the effectiveness of aid flows through the diversion of funds. Aid may ultimately help support unproductive and wasteful government expenditures.
- When it takes the form of tax evasion or claiming improper tax exemptions, corruption may bring about loss of tax revenue.
- By reducing tax collection or raising the level of public expenditure, corruption may lead to adverse budgetary consequences.
- The allocation of public procurement contracts through a corrupt system may lead to lower quality of infrastructure and public services
- Corruption may distort the composition of government expenditure. Large projects whose exact value is difficult to monitor may present opportunities for corruption.

Reducing corruption is also become an agenda, since it has a negative impacts not only to the government, but also to the overall economic performance.

This is a big challenge since the main objectives in Indonesian fiscal policy as highlighted by The Guiding Principles of State Policy, of 1999 (GBHN) are: to reduce the dependence on external debt in financing development expenses, to reduce subsidy and deficit in the government budget and to increase the tax revenue (Lembaga Administrasi Negara, 2003). The economic collapse has made the policy makers become conscious concerning the importance of designing adequate fiscal policy in order to avoid negative effects caused by today's decisions. This transition period creates tension among economists: which one is better, to cut government's spending so that the deficit budget is lower or still to hold higher deficits percentage to GDP in order to maintain fiscal sustainability and to avoid a negative impact on the GDP growth rate in the long run. The modeling purpose is strived to describe abovementioned situation and search the best policy to solve the problems.

II. Model Conceptualization

A. Problem statement

The problem addressed by the System Dynamics model is represented in the following questions:

1. What is the impact of external debt dependence on the fiscal sustainability?
2. Is the energy subsidy reduction policy an appropriate measurement to reduce the deficit budget and to retain fiscal sustainability?
3. What is the best policy to reduce dependence on external debt and also to maintain the fiscal sustainability of government's budget?

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[6] And the report from Transparency International has put Indonesia in the list one of the most corrupt countries. *See* http://www.transparency.de/documents/cpi/index.html .

B. Reference modes: Revenue and Expenditure Patterns

In the following paragraphs are some variables of interest and their historical dynamics which present some idea of the governmental budget and external Debt over the last 22 years (1980 – 2002).

In the expenditure side, there are two kinds of government outlays: recurrent budget and the development budget. However, after year 2000, there is a new classification in the government financial expenditures pushed by decentralization policy:
- Central government expenditures consist of recurrent expenditures and development expenditures.
- Regional expenditures [7] (revenue sharing, central allocation funds, specific allocation funds and specific autonomous fund and balancing out).

However, to maintain consistency with historical data before year 2000 for estimating the reference mode, this paper uses the old classification in the government budget so that some data is recalculated.[8]

The figures 2-5 show the revenue and expenditure pattern in the government financial structure. As Mashayekhi states [9]: "…in several oil-exporting countries has followed a familiar pattern: oil revenues come to constitute a major part of the government income and usually exceed tax revenue…" this also happened in Indonesia. Since early 1970's (oil boom) until mid 1980s, oil receipts still have an important role in government financial structure. They provide more than 50% of domestic revenue and its ratio to the recurrent budget is more than one during this period. This meant, oil revenue could cover the recurrent budget and also contributed to the development or investment expenses. However the situation changed after 1986. The effect of increases in the government recurrent budget made the portion covered by oil revenues lower.

A general downward trend occurred except in year 1986, when a slight increase is seen. Also before the economic crises, oil revenue increase almost two fold in 1997 and four fold in 1999. However it was only a temporary effect because of a fivefold increase in the dollar price during the monetary crises. As oil revenue cannot keep up with the rising government financial requirements, shortage of financial resources could create disorder in the functions of government.

Another common pattern in oil-exporting countries is that when oil revenue rise sharply and total revenues exceed total expenditures, expenditure then rise very quickly to overtake revenues. Rapid growth of expenditures leads to shortage of financial resources for the government and creates pressure to increase its income. From the figure 3, it is seen that tax revenue is always increase to the domestic revenue. However the trend to further increase seen after IMF's Letter of Intent recommending Indonesia to increase the tax revenue as a way to rescue economy and to maintain fiscal sustainability.

However, government expenditures increased faster than revenues, in spite of further increase in oil revenues or tax revenues, and the country still faced a budget deficit. These budget deficits indicate the inadequacy of government revenues, which creates pressure to expand other sources to cover the deficits, namely foreign borrowing.

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[7] In Old classification, regional expenditures named "subsidies to the regions" and was grouped into routine expenses.
[8] For example, in old category, interest payment and amortization of debt principal become a part of routine expenses. In the new classification, only interest payment is groupped into recurrent budget. Amortization is recorded in foreign financing post, namely net financing between gross drawing and amortization.
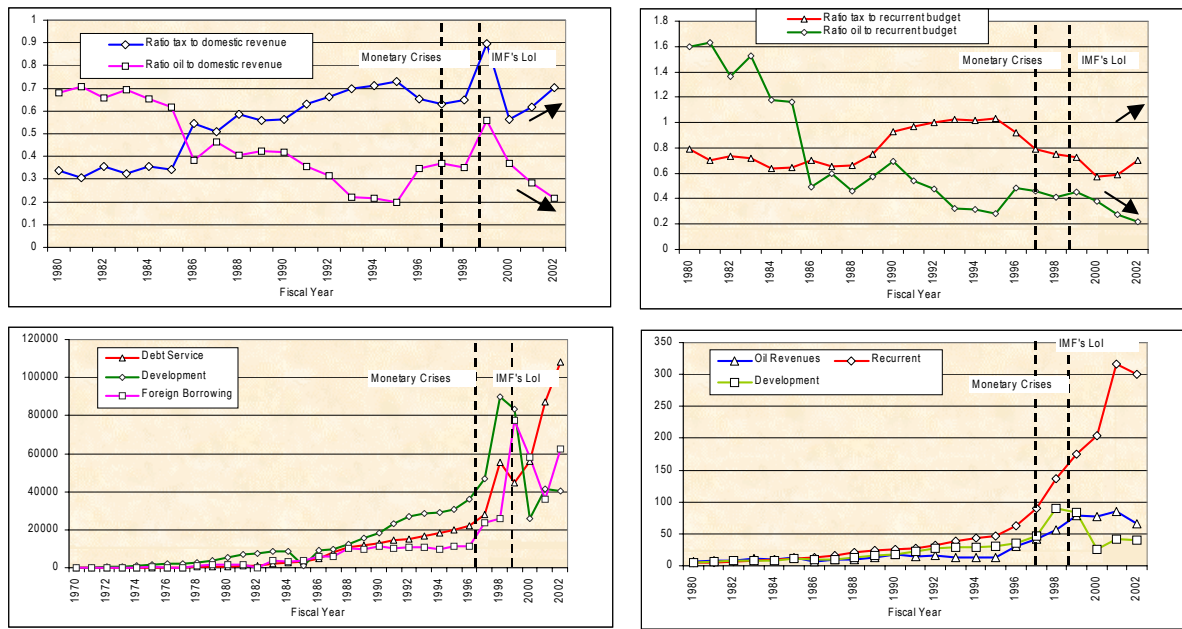[9] See Mashayekhi, 1998, page 192

Figure 2-5
Ratio of tax and oil revenue to domestic and recurrent budget

It is important to note that the drastic change in Indonesian government external debt occurred in early 1980s, when the country started to pay the debt service from previous debt. But, from the figure 2-5, we could see that the average revenue didn't changed too much.

Table 2. Some important ratios in government budget			
Ratio	1980	1990	2000
Borrowing to Total Expenditure	0.15	0.25	0.26
Borrowing to Development Budget	0.27	0.61	2.25
Borrowing to Recurrent Budget	0.35	0.44	0.28
Development to Total Expenditure	0.56	0.42	0.12
Debt Service to Recurrent Budget	0.18	0.51	0.27*)
Debt Service to Total Expenditure	0.08	0.29	0.25*)
Debt Service to Borrowing	0.53	1.15	0.96*)
Source: Calculated from Nota Keuangan **) rescheduling phase*			

Table 2 shows some important ratios that show the relationship between the government budget and foreign borrowing. In year 1990, a quarter of the total expenditure was financed by foreign borrowing. and amount of debt service is bigger than the drawing of foreign borrowing (Indicated by the ratio 1.15). Year 2000 was a transition period where Indonesia started to recover from economic crises, to restructure the economy and the public finance as well. There is a rescheduling of debt, so that there is relieve in this period of transition. However, this action only shifts the today heavy burden in the budget to the future. Hence the sustainability of fiscal policy is still in questioned

One important issue in this transition period is an IMF prescription to reduce the energy subsidy in the government budget. It is assume that subsidy become a heavy burden to the government. During the monetary crises, amount of subsidy has increased drastically.[10] Even in year 1999, the subsidy alone is around 37% of the recurrent budget. However, energy subsidy stills the biggest portion in

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[10] In this period, beside oil, electricity and fertilizer subsidy, other kind of subsidies appear, such as for food, interest for credit program, medicine, and other (seed, vehicle and interest for plantation projects).

the whole subsidies expenditure. It is estimated above 75 percent of total subsidies expenses. It is also said that the energy subsidy reduction should have very important role in the effort to maintain fiscal sustainability and to reduce the dependency to the foreign borrowing in the crises. From Table 3, we know that after the IMF's pressure, the subsidy ratio to the recurrent budget is around 17%.

Table 3. Average subsidy ratio to recurrent budget	
Year	Ratio
1989-1996	0.03
1997-2001 (monetary crises)	0.31
2002-2003 (recovery)	0.17
Source: Calculated from BPS 2003	

However there are interesting patterns in the government budget after the economic crises. Subsidy decreases, tax revenue increases, recurrent budget also decreases, but the foreign borrowing still increases. This modelling effort tries to investigate and explain this behaviour and to answer questions formulated in problem statement.
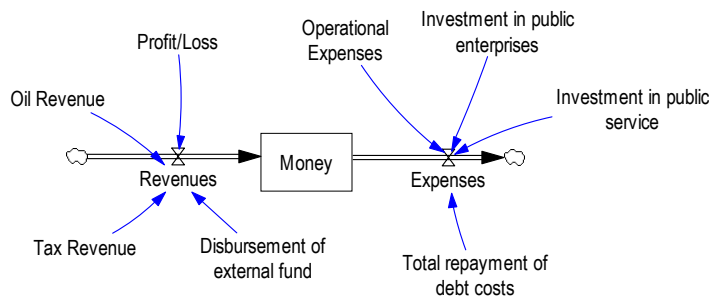
C. Description of the Model

Figure 6. Revenues and expenses modeled in the Government's financial structures

This section presents the basic causal structure system dynamics model that generates increasing dependency of government financial structure on external debt. However, before describing this structure further, the following figure tries to capture Indonesian government financial operations are incorporated into this model. Sources of revenue in the model are: oil and tax revenue, profit transfer from SOEs and disbursement of external fund

sources. In the expenditure side, the model shows some important components, namely: recurrent or operational expenses, investments or development expenses and total repayment of debt costs (the payment of principal and the interest of foreign debt).

Government uses its revenues to finance the operational (recurrent) and development budget. According to Shafritz & Russels (1997), there are two basic kinds of budget. The most common, is operating budget. This is a short-term plan for managing resources necessary to carry out a program. The second kind is the capital budget process that deals with planning for large expenditures for capital items. Capital expenditures should be for long term investments (such as bridges and buildings). Through the development budget, the government is able to invest in capital in public service and public enterprises. While the operational/ recurrent budget pays for financing personnel and other operational expenditures needed to maintain the public service capacity. The subsidies (oil, electricity, and others such as food and fertilizer subsidy) and interest payment, in Indonesia's government operation, are incorporated into the operational/ recurrent budget.

Figure 7 shows a simple feedback loop system about government's money condition. If the government use the "balanced-budget" principle in allocate the available budget then money condition will affect how much the government is able to spend.
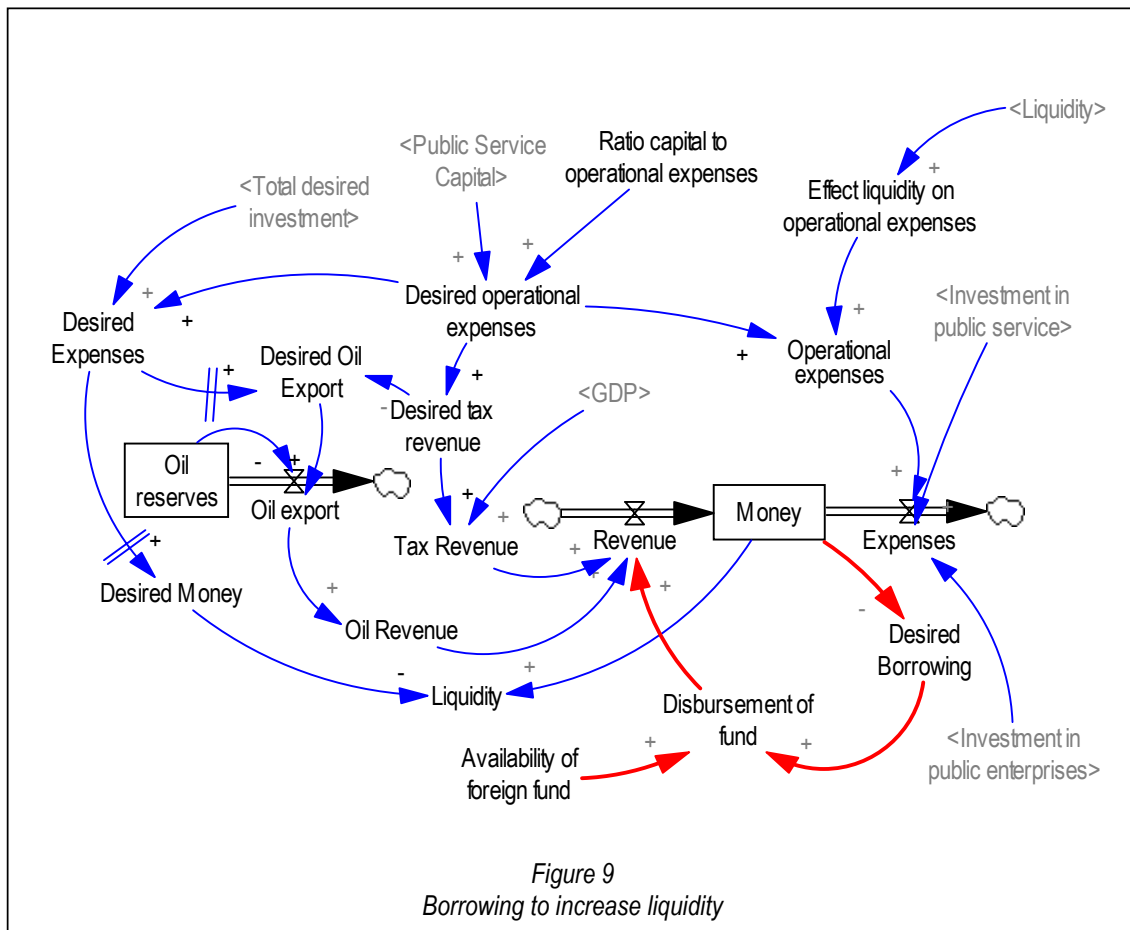
Figure 7
Government Financial Operation

Figure 8 Public Service Capital and Public Enterprises Capital
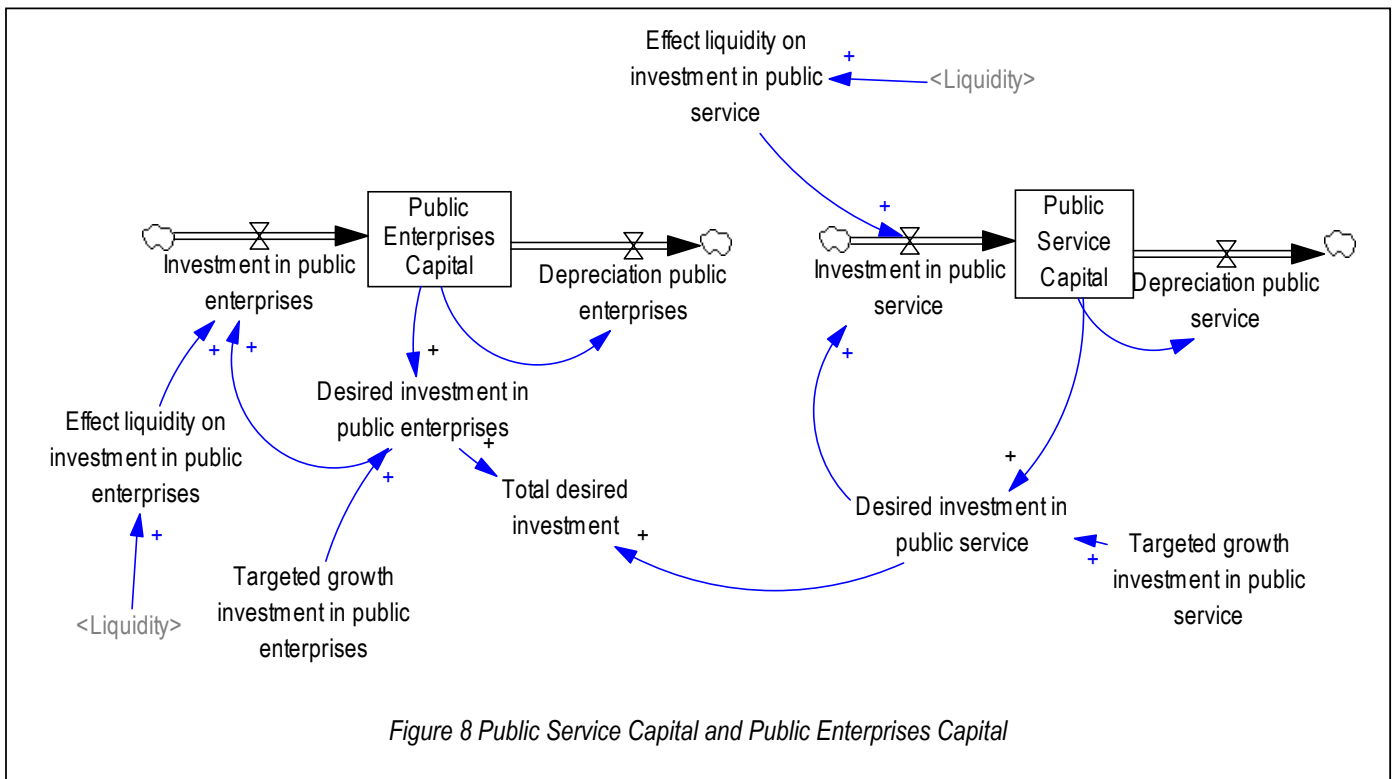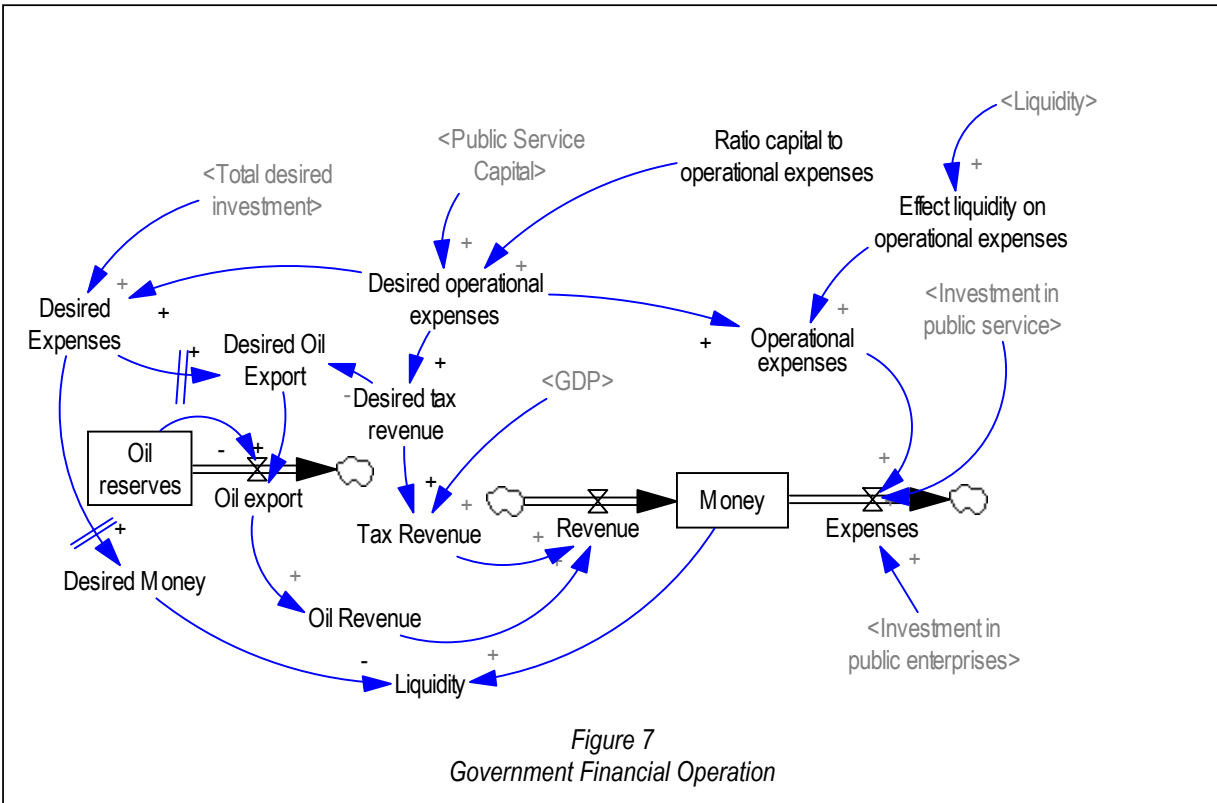
Figure 9
Borrowing to increase liquidity

The model shows that to operate public finance a government will assess the funds required to finance the budget (*desired investment* and *desired operational expenses*). The model assumes that to accelerate the development process, the government has to deliver public services. To increase the public service capacity, it is necessary to increase the investment in this sector.

The investment or development expenditure is divided further in the model into: *investment in public service capacity* and *investment in public enterprise*. *Desired expenses (*the sum *of desired investment* and *desired operational expenses)* will determine the *desired money*. Investment rate in government is determined by *targeted growth*. Since the main source of government's financial structures come from tax and oil revenue, both will affect the total revenues received by the government. The oil and tax revenue are affected successively by *desired oil exports* and *desired tax revenue*.

Ordinarily, government's *money* condition (rupiah) has an effect on the actual expenses. This effect is shown through "*liquidity*" concept to capture money adequacy, a ratio comparing *money* and *desired money*. The latter is determined by *average desired expenses*. Value one or more indicates the government could fulfill the desired expenses. In the case of LDCs, they aren't able to apply "balanced budget principle" since their domestic revenues don't meet the development budget. In fact, it is important expenditures to LDCs in order to help the economic development process. Since oil and tax revenue is insufficient to meet the required fund, higher desired revenue generated by higher desired expenses lead to higher desired borrowing.

A new loop is added to show a real decision taken by most LDCs as an easy way-out in facing limited domestic fund sources. As disbursement of foreign borrowing rises, total "revenues" of government rises. Eventually the government is able to increase the liquidity so that the desired expenses (including desired investment in capital public service capacity and public enterprises) can grow as the annual targeted growth rate. And finally, it will have increasing effect to the economic growth, represented by GDP.
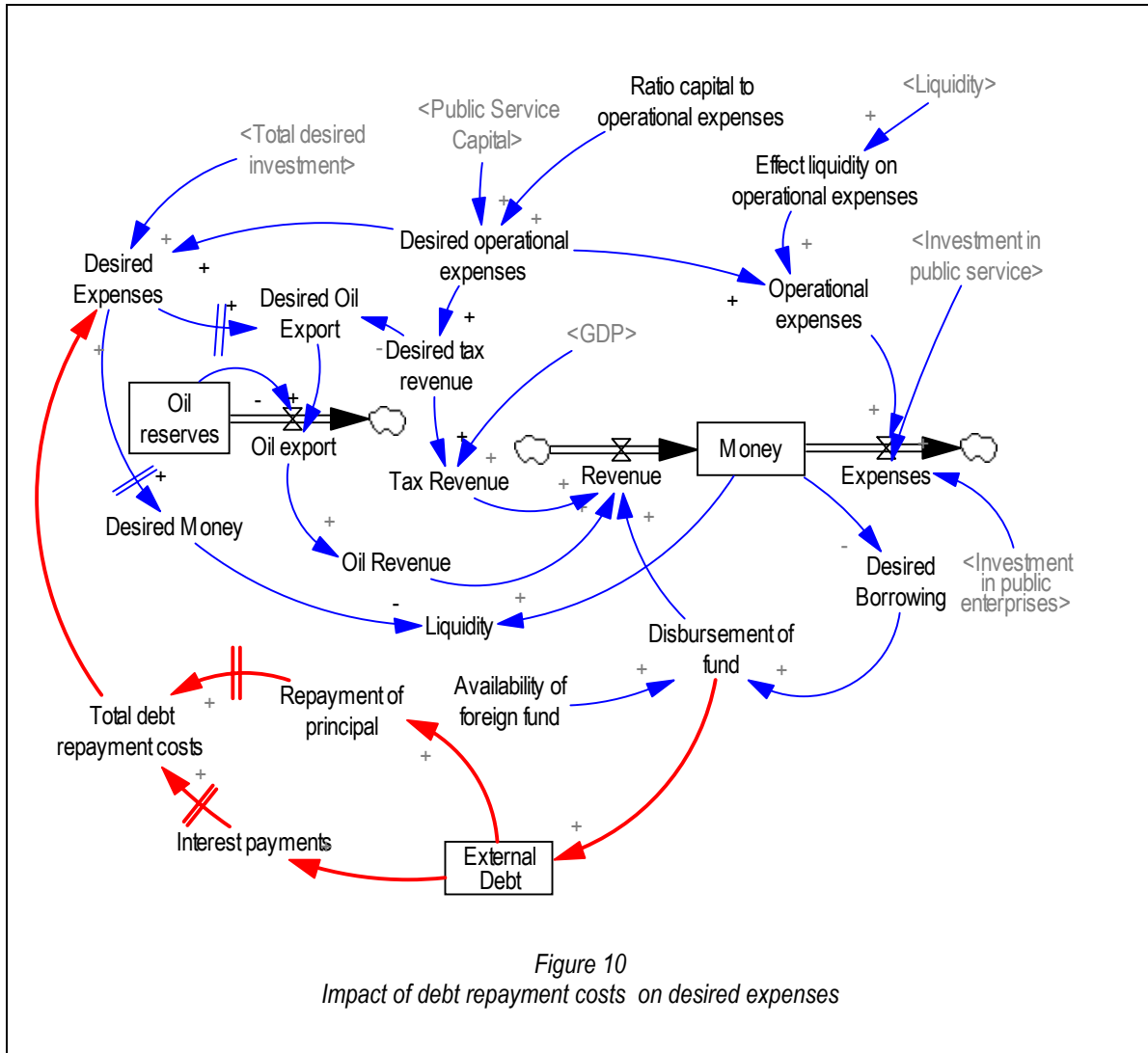

Figure 10
Impact of debt repayment costs on desired expenses

However this action only only provides a short-term solution to the problem of inadequate funds. Foreign borrowing increases debt stock. As the government should service its debt (represented by *total repayment of debt costs*), the problem arises: the desired expenses increase; shortage in government's financial structures is still present. But this time, it is also influenced by the burden in the recurrent/ operational expenses to pay the principal of debt. As a result, further borrowing is taken to cover the widening gap.

In the monetary crises, fiscal gap is so high that the pressure to reduce the gap is very strong. In addition, the pressure becomes higher since the *debt to GDP ratio* is also increase too high, above

the normal and tolerable ratio. The steps to reduce government spending through reducing energy subsidy and increasing the taxes are also shown in the model (Figure 10). There is an effect from tax revenue on the investment in private sector. This effect is shown through a ratio comparing normal tax ratio to GDP and actual tax ratio. If this indicator too high, it slows down the investment growth rate. An effect of energy subsidy policy on investment growth rate (in government and private sectors) is also present in this model.
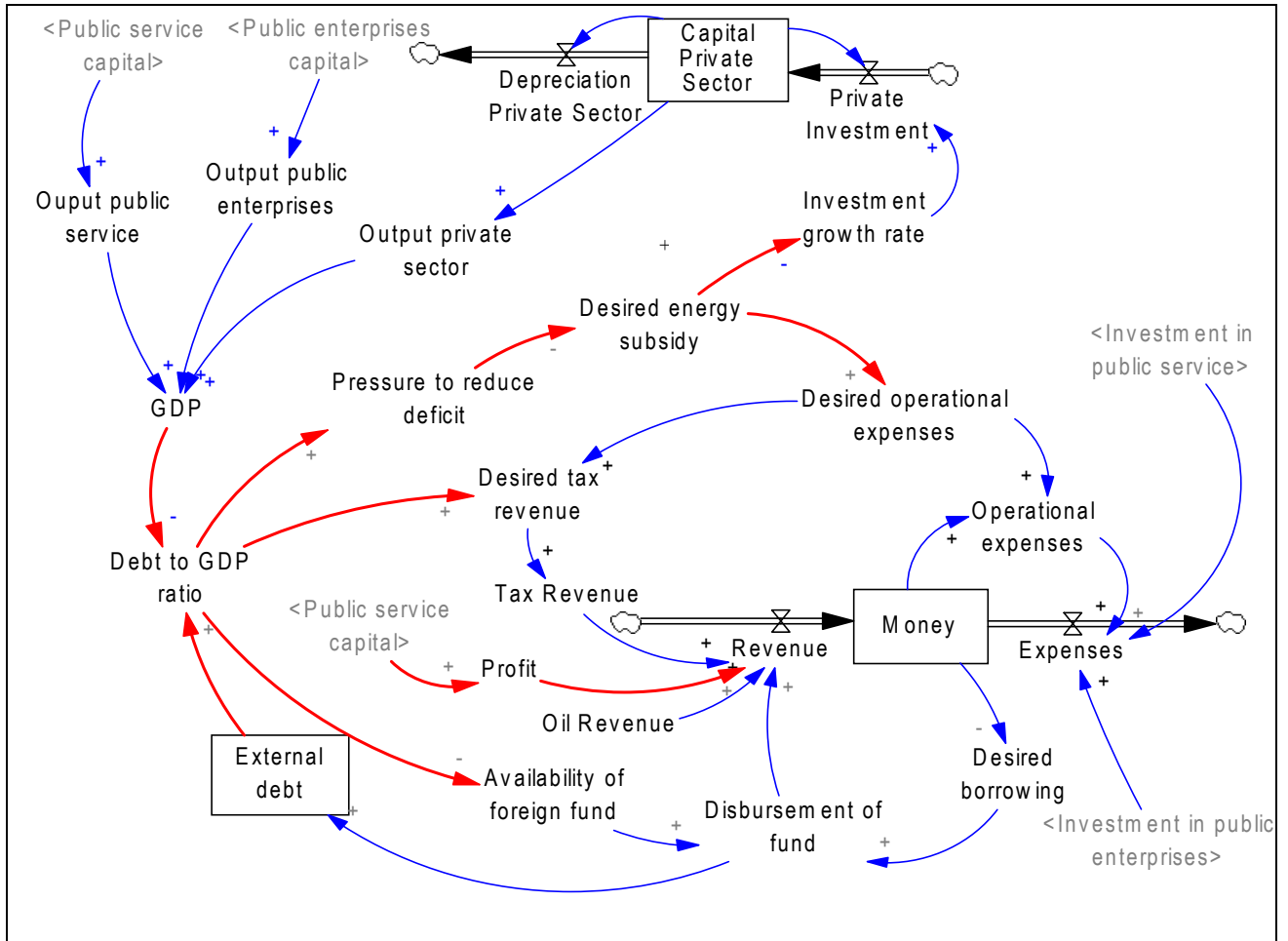
Figure 11
Pressure to reduce deficits

Table 6 Ratio of profit from SOEs to domestic revenue and development expenditure 2000-2002		
Year	Ratio to domestic revenue	Ratio to development expenditure
2000	0.02	0.15
2001	0.03	0.21
2002	0.03	0.24
Source: Calculated from BPS 2003		

One entry point in the model related to policy design examines how the government might manage government owned enterprises. As described earlier in this section, this model incorporates two kinds of investment expenses: investment in public service capacity and investment in public enterprises. The special characteristics of state-owned enterprises can be categorized into those relating to their management or administration, and aspects stemming from political considerations [11]. There are several forms of economic subsidies to state-owned enterprises which contribute to governmental financial losses such as tariff protection and import restrictions, low-interest borrowing with government guaranties, and legal restrictions to limit market entry by competitors. Potential problems arise from government ownership or control of enterprises, especially, operating losses by SOEs that have negative impacts on government's budget deficit and outstanding debt.

One step to increase the government financial sources is privatization of SOEs. The basic reason for privatization is the belief that government-owned enterprises are not efficient. It is a logical alternative because the government cannot afford to support and sustain resource-consuming SOEs. Commonly used methods of privatization are: public offering shares, private sale shares, sale of government or SOE assets, and reorganization into component parts (*See* Kumar, 1984). These methods are also be used by Indonesia. However, there is another important aspect to the issue of public enterprises: It is should also be possible to manage the SOEs better to make them profitable. As Shafritz & Russel (1997) say: "Profit from successful public enterprises can and should be a useful part of the revenue streams of governments". It is shown in the model (Figure 10) by the arrow connecting the capital in public enterprises to profit and then it will affect the total revenue.

Gambar 12
Unintended impact in the flow of government financial operation

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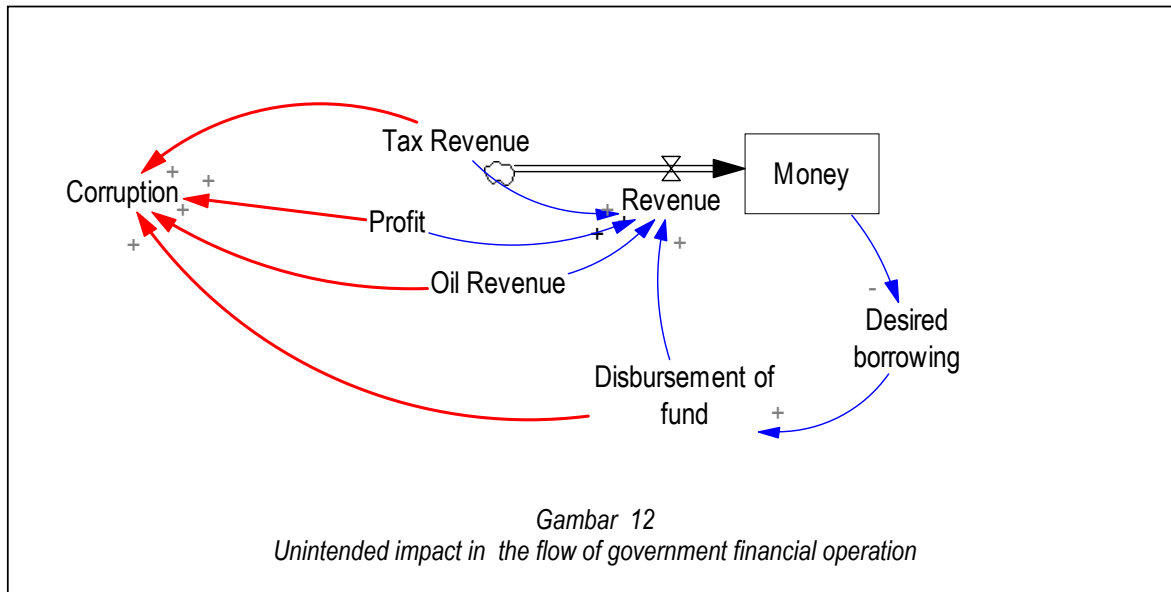
[11]. *See* Kumar, 1994.

Moreover, there is other unintended impact come to sight: corruption in the government revenue. As the desired revenue increase (taxes, oil, foreign debt flow), actually the leakage from this flow is also occurred. The model hasn't make feedback relationship or effect of this variable to other sector yet, but it has equipped by an entry point for policy to fight against corruption. It is done, when corrupted money becomes a part of government revenue.

III. Analysis

A. Model Behavior

This part will answer the first question: *what is the impact of the external debt dependence on fiscal sustainability and economic growth?* This section also will present the model behavior generated by model structure, with and without measurements to reduce the subsidy component in the government budget. We also try to answer the second question here: *is an energy subsidy reduction policy an appropriate measure to reduce the deficit budget and to retain fiscal sustainability*?

The description of this section analyzes the behavior of base-run model under three different conditions, namely:
1. Model behavior of "external debt to accomplish targeted growth"
2. Model behavior of "limited external fund sources and oil reserves"
3. Model behavior of "lowering heavy financial burden by reducing the energy subsidy"

EXTERNAL DEBT TO ACCOMPLISH TARGETED GROWTH

Figure 12 shows the behavior of the model when government is always able to finance its desired expenditure though oil and tax revenue don't fulfill the required fund for achieving targeted growth. Or, the gap is fulfilled by borrowing. The limited domestic revenue is shown in Figure 12.

The behavior of the model shown in this first condition is obtained by setting "unlimited loan availability". In other word, desired borrowing equals disbursement of external debt; or creditors always fulfill the demand for loan without considering some important debt burden indicators of the country. In addition, it is run with assumption that profit from public enterprises is zero.

This assumption produces unlimited growth in the economy. From the base run simulation we can observe that some important variables (Figure 13) such as public service capacity, capital public enterprises, capital in private sector, investments level, and also GDP (Gross Domestic Product) will grow as the desired growth rate. This behavior occurs because the policy makers always fill any fiscal gap by foreign borrowing. This outcome represents the economic thinking prior to the Asian monetary crises.
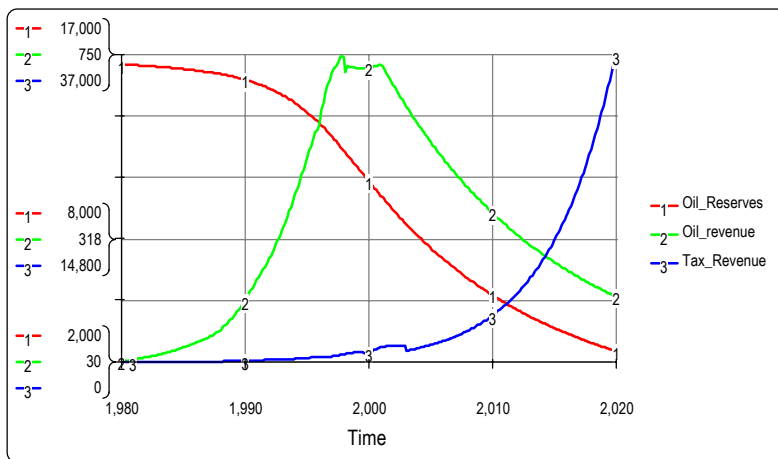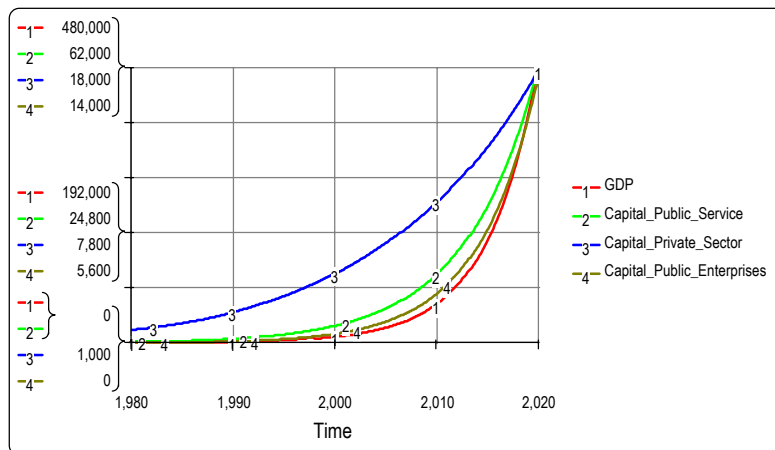

Figure 12. Revenue Condition

In addition, we can also observe the impact of this measurement on fiscal sustainability. If fiscal sustainability is measured by solvency of government funds, then in our base-run simulation, this policy succeeds to maintain liquidity. It is portrayed in Figure 14. Liquidity is a representation of actual money compared with desired money. Average ratio in the simulation is above 1. It means the budget is high enough to finance the desired expenditure.

However, what happen to external debt stock? It also continues to grow (Figure 15). Whether the increase in debt stock becomes burden for the government financial structures can be observed from "Debt Service to Operational Expenditure Ratio" and "Debt to GDP Ratio" (Figure 16). Unlimited growth becomes a

Figure 13. Capital public enterprises, public service capacity, private

heavy burden for the budget, since the debt service to operational expenses ratio moves around 0.4 and 0.5. Half of domestic income is used for servicing the debt. It also become a burden to the average citizen, since the debt to GDP ratio go up from around 0.4-0.5 as its historical behavior until it reaches more than 1.

Clearly, the exponential growth cannot continue, even without a monetary crises. There is an oil reserve restriction, so that the flows of other fund sources outside oil revenue have to increase to pursue targeted growth. Availability of foreign fund sources will also be limited, if the debtor has too heavy a debt burden. The worst consequences of above condition is that the tax needed from the citizenry will increase. However there is also a limitation on tax collecting, since excessive tax rates will decrease public welfare and create a disincentive for investment.
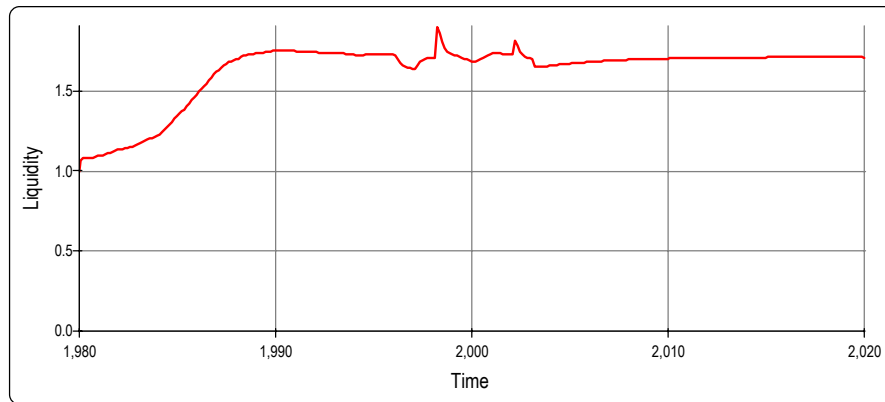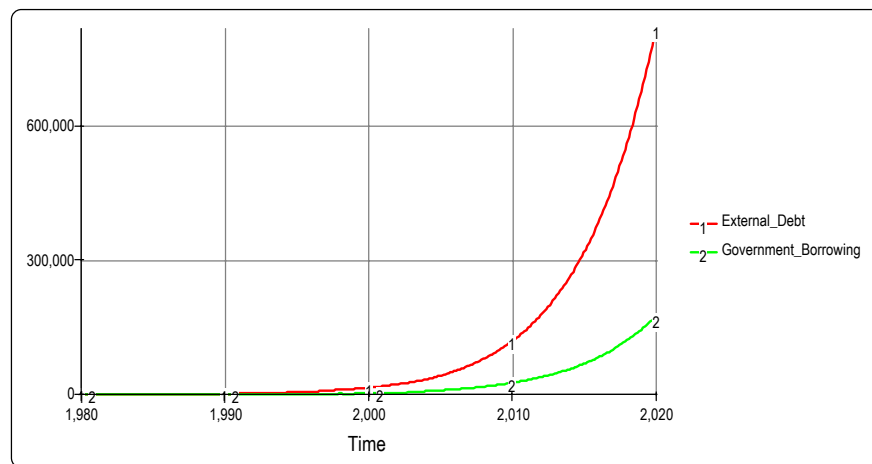

Figure 14. Liqidity

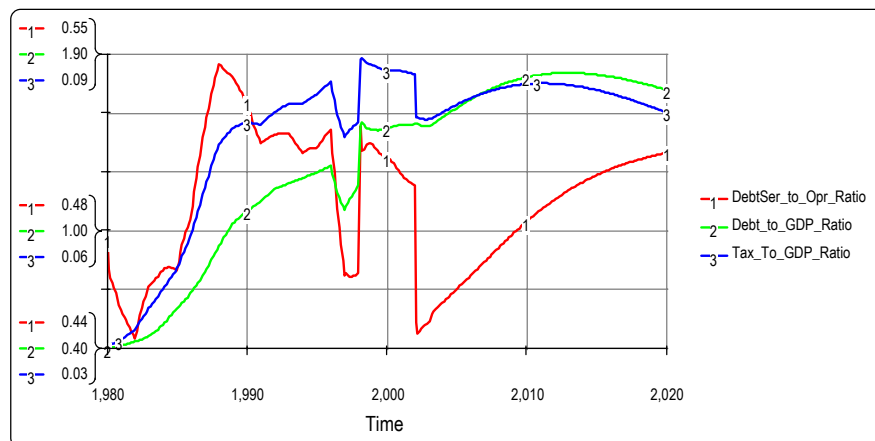*Figure 15. External debt stock and flow of government borrowing*

Figure 16. Indicators of debt burden and tax to GDP ratio
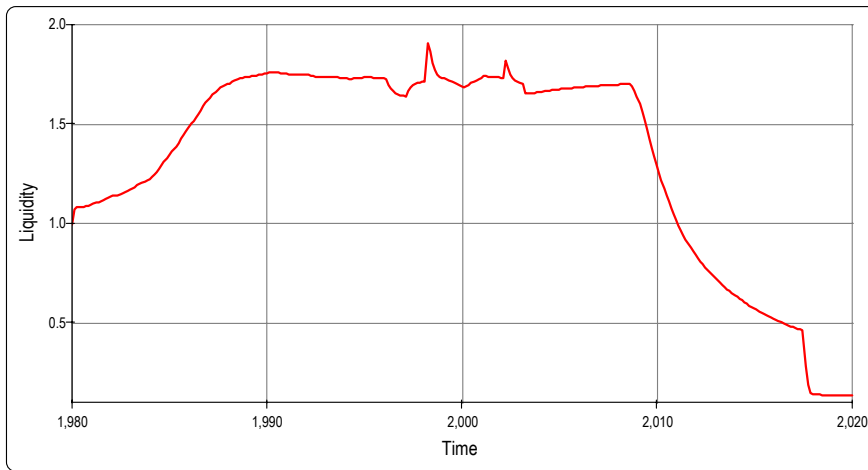
LIMITED EXTERNAL FUND SOURCES

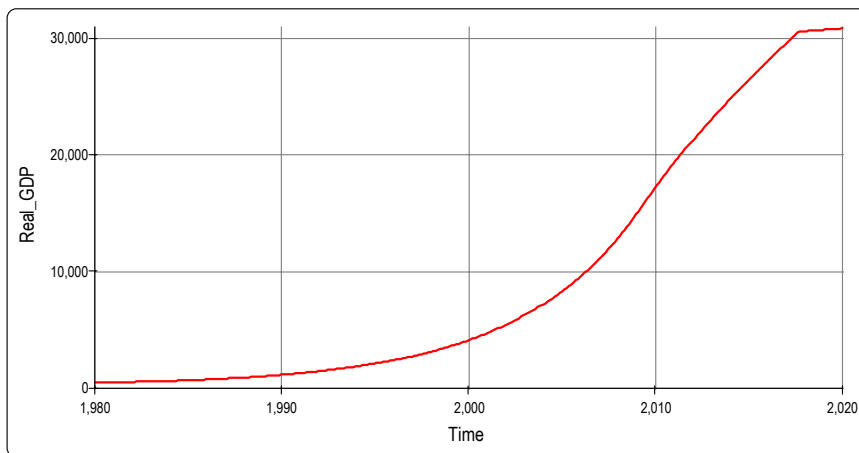*Figure 17. Liquidity condition overtime when external fund sources are limited.*

Figure 18. Constrained real GDP growth

In this simulation, the model settings are changed. Facts indicate that both foreign loan availability and oil reserves actually are limited. In this model run loan availability is restricted. Figure 17 demonstrates the behavior of the model when limited external fund sources restrict exponential growth of recurrent and development budget. When the model start with initial value, exponential growth based on foreign loan can only continue until about year 2018. As public service capacity grows, recurrent budget and investment requirements rise, the need rise. However, as debt to GDP ratio and debt service to operational budget increase (as indicators of the debt burden), they influence the availability of foreign loans. When desired borrowing can't be fulfilled, the exponential growth would be slowed down or constrained. Figure 18 portrayed, the growth reach their maximum in year 2018 and is constrained thereafter. As the liquidity of government slows down, the development budget and investment in public sector stop growing and also begin to decline. The decline of liquidity is portrayed by Figure 17. At the time that international fund sources couldn't fulfill the desired borrowing, the government liquidity will decline.

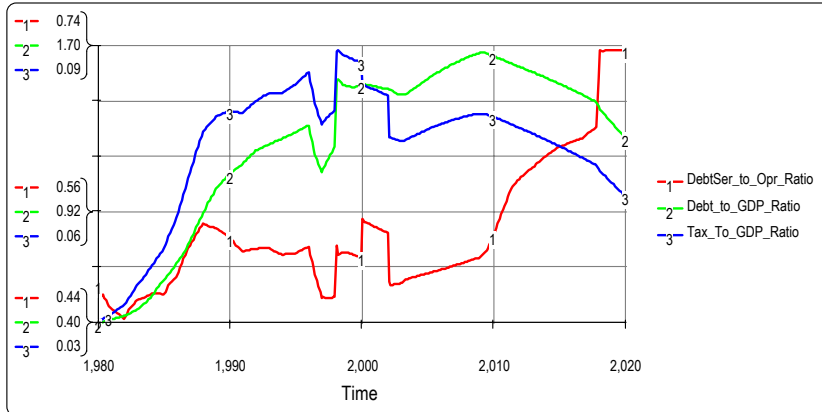LOWERING HEAVY BURDEN BY REDUCING THE ENERGY SUBSIDY

Figure 19. Indicators of debt burden and tax to GDP ratio with energy subsidy reduction

One controversial fiscal policy which was implemented after the monetary crises was to reduce the energy subsidy component in recurrent budget. This was controversial because it triggers inflation. This base run simulation is to observe whether energy subsidy reduction has a significant impact on trimming down heavy burden in government budget. For this base-run simulation, the setting of the model incorporates the reduction from 30% subsidy to 10% subsidy in recurrent budget, besides using limited loan availability assumption. This action is taken based on IMF's prescription to recover the economy after the crises and requirement to disburse foreign loan. Therefore this model also strives to capture this policy through the change in subsidy . The base run using following assumptions: limited fund resources and subsidy policy demonstrate very little changes in some important variables in this model. This experiment indicates that subsidy reduction alone can't make the public finance and economic performance better.

B. Policy Analysis

This section will examine the dynamic consequences of different policies with regard to the external debt issue and fiscal sustainability. This will describe three policy simulations to address the question: *What is the best policy to reduce the dependency on the external debt and to maintain fiscal sustainability of government's budget?*

The concept of fiscal sustainability refers to the question of whether the government can maintain its current fiscal stance, or whether it will need to make some adjustment in tax or expenditure policies in order to assure solvency. Sustainability is essentially an analysis of whether a government is headed towards excessive debt accumulation. Fiscal policy therefore has to maintain a level of deficit and debt that a country can afford without excessive increases. Fiscal sustainability is also related to the solvency of the government. An unsustainable policy will eventually lead to the insolvency of the government.

There are three policy design experiments to investigate these questions :

The first approach is to test "the classic policy" as a way to keep up fiscal sustainability in the difficult economic situation (it is also stated in the Outline of Indonesian Policy, of 1999). Some parameter changes in this policy are:

- To cut government spending in order to reduce the deficit in government's budget. This is an important part in the fiscal policy, since the reduction is applied too to the development budget, besides the reduction in operational (recurrent) budget. The latter is done primarily by reducing

energy subsidy component within operational budget. In this simulation, the policy tries to test two different points of view between policy makers and economists regarding deficit spending. Some economists support spending cut to maintain sustainability while other don't want to rely on fiscal sustainability indicators alone to the exclusion of other considerations. Sustainability may be less important than short run economic recovery since the economy has suffered a negative shock. Therefore, to support long run health economy (high employment and output), increased ratio of deficits or debt to GDP may sometimes be optimal.

- To increase the tax revenue.

The second approach is called as "SOEs-Mix Policy", to restructure the public enterprises economic performance and to combine with "Classic Policy". It is very important alternative since the policy try to explore further possibility tapping domestic income sources instead of relying on foreign borrowing or decreasing oil revenue to finance the government budget. In the model it is implemented by changing the loss-profit ratio of SOEs.

The third approach is called the "corruption policy". As what has been described in previous section, corruption becomes a part of government's financial problems. Experiment using this policy option appears because of one big question: do we have to have such huge debt to finance the government budget in order to achieve the targeted growth? For simulation purposes, some parameter changes of the "classic policy" are combined with corruption reduction measures. It is assumed that corruption fraction reduces costs by around 30%. In the real world it would be manifested by clearer regulations and clearer punishment/ legal sanction to corruption cases.

There are some criteria to evaluate the success of above policies:
- liquidity
- external debt stock
- debt to GDP ratio
- debt service to recurrent budget ratio
- real GDP

The base run system behaviors with *unlimited external debt* assumption show, dependency on external debt and oil revenue won't produce sustainability of fiscal policy, although it turns out good liquidity condition (the value around 1.5-1.8). It can be observed from Debt to GDP Ratio indicator reaching 1.8 in the long-run.

The base run (run #1) as a point to compare with simulation result from other various policies utilized in this section is "limited foreign fund sou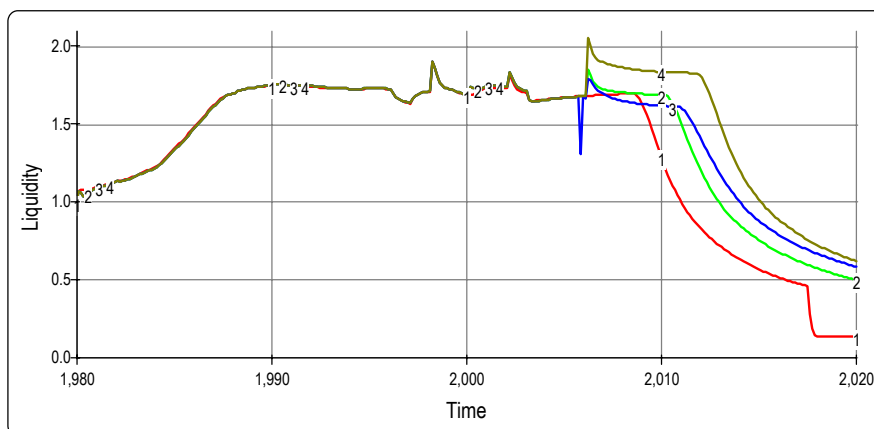rces". The reason behind this assumption is these facts: scarcity of soft loan availability, more difficult requirements to borrow, country-risk status, and also the desired from the government itself to reduce the dependency on external debt. The result of the policy test is as follows:

Figure 20
Simulation result of liquidity
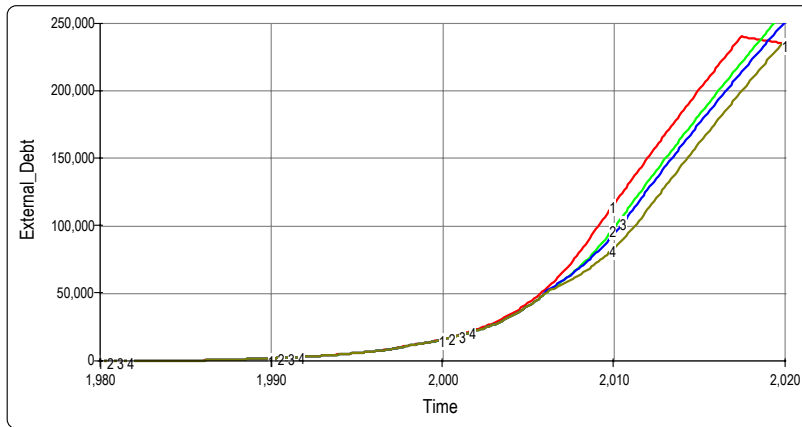
"CLASSIC" POLICY (RUN #2)

Figure 21
Simulation result of external debt stock

In "classic" policy, it is able to increase the liquidity condition in short run but then it is also fall (Figure 20). This behavior appear because the desired expenses still increases overtime, domestic sources still can't keep up with this increase. And, in this policy, the external debt accumulation lower than the base-run (Figure 21, run #2). Although the policy push the increasing in investment rate in public service capacity, public enterprises, but don't affect too much the investment in private sector. It is because the tax increasing becomes disincentive for the later sector. With regard to debt burden, it is shown that the debt burden still high in this policy since the *debt to GDP ratio (DGDP)* is around 1-1.5 and the lowest point is approximately 0.8 (Figure 25, run #2) and *debt service to operational budget ratio (DSOB)* even is higher than the base-run (Figure 26, run #2).
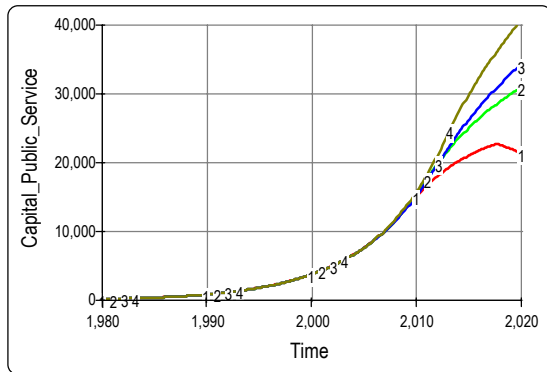

Figure 22
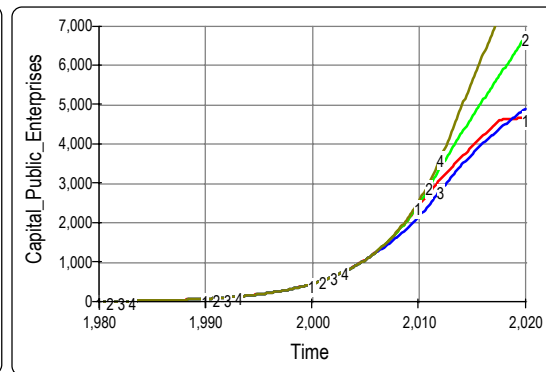*Simulation result of capital public service capacity*

Figure 23
Simulation result of capital public enterprises

Figure 24
Simulation result of real GDP
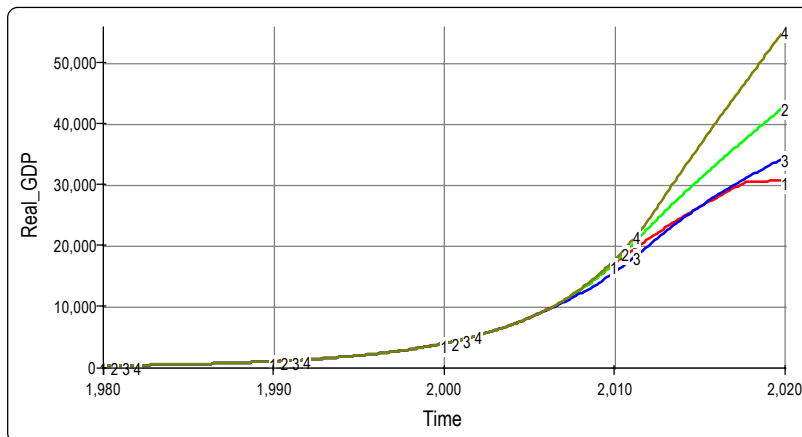
SOEs-MIX POLICY (RUN#3)

Restructuring SOEs produce better liquidity condition than the base run or the classic policy. However the *external debt* is almost the same, in the long term, as what was produced with the classic policy. Nevertheless, what is interesting here is that the policy didn't give better effect in the growth of *capital public enterprises* and in turn it affect

output, *real GDP growth* and *DGDP ratio*. Although the real GDP is better than the base run but still worse that policy run #2. Concerning with debt burden indicators, downward trend in *DGDP ratio* is happened but it is still above value of 1.5 until year 2010, and slightly decreases to around value of 1.3 after that. *DSOB ratio* indicates higher value than the base run but a bit lower than "classic" policy in the long run.
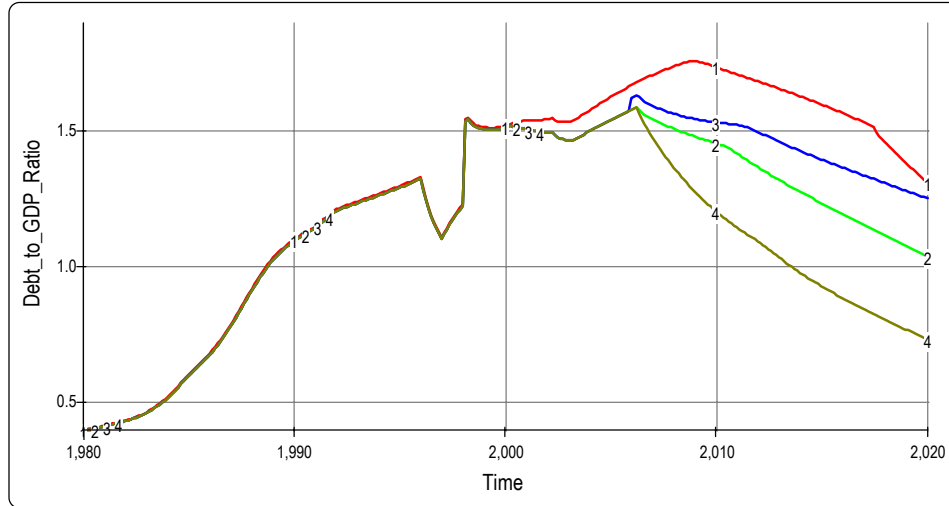

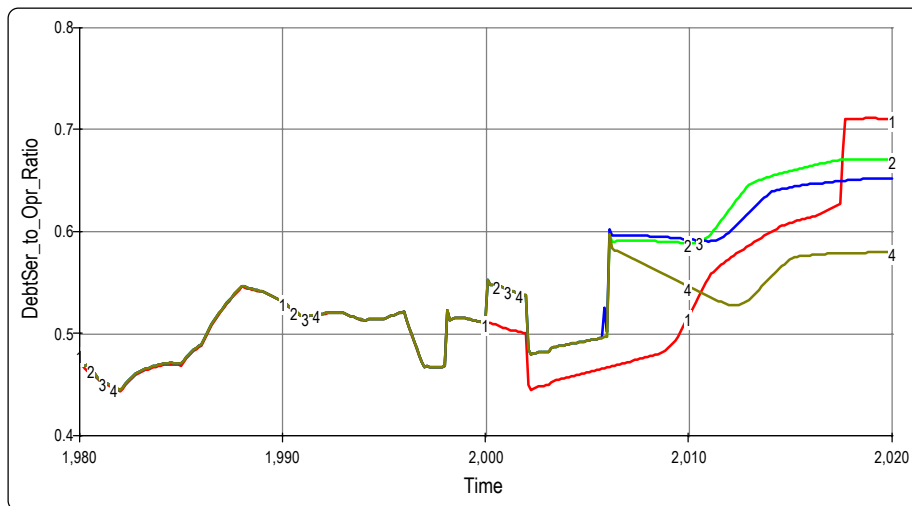*Figure 25*
Simulation result of debt to GDP ratio

Figure 26
Simulation result of debt service to operational budget ratio

CORRUPTION POLICY (RUN #4)

Some criteria to evaluate the success of the policy show the best performance in some indicators. Liquidity is increase above one and longer, though it is finally still fall when desired expenses increase and limited foreign fund sources cause the actual revenue decrease. The growth in capital public service and public enterprises reflect good investment flow and produce higher output of both sector. This performance affects higher the real GDP growth, demonstrated in Figure 26 (#4). However the most important result is the performance of debt burden indicators. It is shown that the increasing trend reaches the peak until year 2006 and then decreases to the lowest ratio compared with other policy's runs (ratio around 0.6-0.65). Downward trend in *DSOB ratio* after the year 2006 is also observed and reach approximately 58% in the end of simulation time (2020).

All policies simulation results can be summarized as follows:

Indicators	Base-run	Classic	SOEs-Mix	Corruption
liquidity	Worst	--	--	Best
external debt accumulation	"Best"	--	--	Worst
debt to GDP Ratio	Worst	--	--	Best
debt service to operational expenditure ratio	Worst	--	--	Best
capital in public service	Worst	--	--	Best
capital in public enterprises	--	--	Worst	Best
real GDP	Worst	--	--	Best

Table 5.
The overview of the policy-experiments

Policy lessons learnt

The policy tests through simulation process are performed by using "limited external fund sources", and it has stated in previous section. Therefore, the whole efforts to search a better policy in every step of simulations are directed toward how to maximize domestic sources, how to reduce the demand for loan and what the impact of each option on selected abovementioned indicators.

The overview of the policy-experiments show, even in limited condition for foreign sources, the economy and government financial structures headed toward excessive burden of debt, except in "corruption policy". Insights can be drawn from this experiments that an effort to limit the debt (through government policy such as to cut spending, or because of creditworthiness and other external factors) can't help to create better condition to reduce the economy's debt burden. The heavy debt burden is still occurred. The explanation for this is not excessive borrowing, but very low GDP growth rate.

To increase the taxes and to cut spending (by reducing the expenditure including energy subsidy) as a trade-off from limited borrowing, still produce heavy burden even higher than the base-run. Also an almost similar condition is taken place, if this policy combines with effort to restructure the SOEs.

We can learn from our simulation that corruption problem is not "small" challenge and is not able to be neglected. It is true; corruption case is not an easy task to solve. But fact demonstrates, it has

very great impacts on overall indicators of public finance and economic performance. Simulation results show this situation primarily from debt to GDP ratio and debt to operational budget ratio indicators. This is only simple effort to show how high the influence of this measurement on many aspects of public finance, growth and welfare level of community.

In addition, the experiment with above policy options is also able to demonstrate unintended impacts. Although the GDP grows better in the three policy options than the base run, nevertheless constrained growth behavior is emerged in experiment with all policy options. What is further insight we can derive from these behavior? At certain level, the flow of borrowing money is still needed to sustain the economic growth when desired expenses is higher than expected revenue. We can play furthermore with the same policy options by changing the assumption permitting the foreign fund as the desired borrowing while applying the best policy in our simulation here.

In sum, IMF's strategy alone couldn't work without applying other policy: corruption problem. And the fiscal sustainability alone as a criterion for successful fiscal policy is still not enough to the exclusion of economic growth in the government's policy. Hopefully, what has been stated in Guiding Principles of State Policy, of 1999 regarding the fiscal policy: to reduce the dependence on external debt in financing the development expenses, to reduce subsidy and deficit in government budget and to increase the taxes could be accomplished, without having to sacrifice one important government role in creating economic growth.

Finally, what has been depicted here is only a result from an effort to build a model and perhaps contain some weaknesses (for example, it doesn't take exchange rate and current account balance into consideration). In addition, further tests to the model are needed in order to avoid biased conclusions.

IV. Conclusions

This study shows some important results regarding the fiscal sustainability issue and impact of external debt dependence on the government's budget.

What feared from the dependency on external debt to finance the development is that the existing economic growth is only quasy growth. It is not generated by community's own capability. The worst, that public external debt in fact is not government's responsibility alone, since eventually it becomes the burden of all people through increased taxes. And then, a big part of revenues is transferred to the foreign creditors for servicing the debt and not for giving better service to the tax payers. It is the conclusion can be drawn to answer impact of external debt dependence on fiscal sustainability and economic growth.

Besides, it appears that energy subsidy reduction alone is only short run solution to answer the scarcity problem of government fund sources and only temporary way out to answer liquidity problem, but not a sustainable action to reduce the heavy burden caused by external debt.

Some prescriptions offered as a way out from the monetary crises (to increase taxes, to cut spending, to restructure the SOEs) also help the government for the short term, but heavy burden problem still appears in the long run. It is shown in our simulation using this solution. Alternatively, it appears that fighting against the corruption should become the heart of government fiscal policy. Policy experiment in this study supports this conclusion. Nevertheless at certain level, the policy makers also should take economic growth into consideration. Because, all policies directed to sustain fiscal

sustainability and reduce the dependency on external debt cause slow down economic growth and lower income percapita.

This study is only small effort to show an approach which is able to show feedback relationship in government financial problem. If it is done better, it should be able to give new insights, why a new problem comes into view from the decisions looking like to be good.

The next steps for further research are:

- This study only shows the public external debt problem. However, private external debt is also become a problem since some of them eventually become the government burden too. So, further research by considering this factor might bring more complete pictures about Indonesian external debt.

- It also doesn't take exchange rate into consideration. To incorporate this factor is also important since it affect debt accumulation and debt service burden of the country.

- Policy design for government enterprises is also performed in very simply way. Perhaps, it is needed better design that is not only able to illustrate restructuring issue and how to make the SOEs profit, but also is able to represent privatization issue. What will be happened if hand over of a part of public enterprises capital to private sector to the economy and government financial structures?

- To explore further about the impact of subsidy to the overall economic performance, since subsidy causes price distortions. In developing countries, subsidy is "justified" as a mean to help the poor people temporarily. However, based on experience in Indonesia, especially in energy subsidy case, the subsidy fall into inappropriate groups. In this study, energy subsidy problem is modeled in very simple way. To strengthen the government choice to reduce the subsidy, instead of stating the reason behind subsidy reduction is to lessen heavy burden in government budget, it is better to elaborate feedback relationships of subsidy sub model with other important sub models so that it enables to show how energy subsidy policy actually didn't benefit the poor. On contrary, rich people enjoy this facility. Or, to make people understand how subsidized energy price generates wasteful energy use behavior.

- To incorporate corruption feedback relationships as an endogenous variable in order to be able to evaluate what is the short and long run impact of this problem (effectiveness of aid flow, loss of tax revenue, raising the level of public expenditure, quality of public service and distortion in the composition in the government expenditure).

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