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The Effect of Money Supply and Government Expenditure Shock in Indonesia: Symmetric or Asymmetric?

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The Effect of Money Supply and Government Expenditure Shock in Indonesia: Symmetric or Asymmetric?

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Fulfillment of the Requirements of

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Dr. Sally Wallace

By
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The Effect of Money Supply and Government Expenditure Shock in Indonesia: Symmetric or Asymmetric?

I. Introduction:

The economic crisis in Indonesia has taken place for more than 4 years. While other Asian countries such as South Korea and Malaysia have shown significant improvement, Indonesia seems to have the slowest economic recovery process. Table 1 shows the relatively poor economic recovery performance of Indonesia and that the growth rate has not been restored to the pre-crisis level. Other indicators such as exchange rate - which is still very volatile - also give the same conclusion.

Table 1:
ECONOMIC GROTWH THE SEVEN INDUSTRIAL COUNTRIES AND SEVERAL ASIAN COUNTRIES
(PERCENT PER ANNUM)

					2000				2001
Group of Countries	1996	1997	1998	1999	2000	Qrt.3	Qrt.4	Qrt.1	Qrt.2	Qrt.3
Seven Major Industrial Countries										
United States	2.60	3.40	3.40	3.20	4.20	5.30	3.50	2.50	1.20	0.80
Japan	3.10	1.70	(1.30)	0.70	1.50	0.50	2.80	(0.20)	(0.70)	...
Germany	0.50	1.20	2.10	1.50	2.90	2.80	1.90	1.60	0.60	...
United Kingdom	2.20	3.10	2.90	2.90	2.50	2.90	2.40	2.70	2.30	2.20
Italy	1.00	1.80	1.70	2.10	3.00	2.40	2.70	2.40	2.10	...
France	0.60	1.50	2.90	2.70	2.80	3.00	2.80	2.70	2.30	...
Canada	0.40	3.30	2.40	3.70	3.70	5.00	4.00	2.60	2.10	...
N I Es										
Korea Republic of	7.10	5.50	(7.00)	10.90	8.80	9.20	4.60	3.70	2.70	...
Hongkong	4.60	5.30	(5.00)	3.10	10.50	10.40	6.80	2.50	0.50	...
Taiwan	5.70	6.90	4.00	5.40	6.00	6.60	4.10	1.10	(2.40)	...
Singapore	6.90	7.80	1.30	5.90	9.90	10.40	10.50	4.50	(0.90)	(5.60)
A S E A N										
Indonesia 1)	7.80	4.70	(13.10)	1.00	4.80	5.10	5.20	3.20	3.50	...
Malaysia	10.00	7.30	(7.40)	5.80	8.50	7.70	6.50	3.10	0.50	...
Thailand	5.90	(1.40)	(10.80)	4.20	4.30	2.60	3.10	1.80	1.90	...
Philippine	5.80	5.20	(0.60)	3.30	3.90	4.80	3.60	2.50	3.30	...

1) Based on 1993 Constant Price
Source : Indonesian Economic and Financial Statistic (Several Editions), Central Bank of Indonesia

In order to deal with the economic crisis, the government has imposed several policies, both monetary and fiscal. Government spending, which is one of the fiscal policies used in the Keynesian model, has not yielded a significant improvement in aggregate demand. As can be seen in Table 2.a, nominal government expenditure has continuously risen by a significant amount since the crisis hit Indonesia in 1997. However, the amount of government expenditure decreased in real terms due to very high inflation (Table 2.b).

Theoretically, using only expansionary fiscal policy (i.e., increase in government expenditure) to stimulate the economy would create a crowding-out effect. The government also imposed an expansionary monetary policy after the exchange rate for domestic currency stabilized in the first semester of 1998. The money supply and interest rates are two indicators that can be used to reflect the monetary policy imposed by the central bank. Interest rates have been much lower compared to the 1998 level. The

Central Bank discount rate – SBI - (one month maturity) which achieved 70,81 percent in 1998 has gradually decreased until it reached its minimum rate in April 2000 of 11 percent, but then started to rise again until November 2001 to 17.6 percent. The reaction of the economy to monetary policy is not different from the reaction to fiscal policy. Even though the interest rate has been much lower than in 1998, investment spending has not been restored.

Table 2.a: GDP Indonesia By Expenditure at Current Price

Expenditure	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
HH CONSUMPTION	183,530.5	219,565.0	261,544.5	331,586.1	388,722.3	663,459.6	811,207.9	867,997.10
GOV CONSUMPTION	29,756.7	31,014.0	36,575.6	40,299.2	42,952.0	54,415.9	72,631.3	90,779.70
INVESTMENT	86,667.3	105,380.6	131,182.3	157,652.7	177,700.4	221,363.8	237,359.4	313,915.20
CHANGE IN STOCK	22,908.1	18,696.3	19,529.4	6,371.5	17,859.7	221,363.8	-90,662.7	-83,319.20
EXPORT	85,296.2	99,437.5	117,696.6	137,533.3	174,871.3	506,244.8	390,560.1	497,518.90
IMPORT	78,383.0	91,873.8	114,147.5	140,812.0	176,599.8	413,058.1	301,654.1	396,207.50
GDP	329,775.8	382,219.6	352,380.9	532,630.8	625,505.9	1,002,333.1	1,119,442.0	1,290,684.30

* First Three Quarter

Source: Central Bank of Indonesia

Table 2.b: GDP INDONESIA BY EXPENDITURE AT CONSTANT 1993 MARKET PRICE

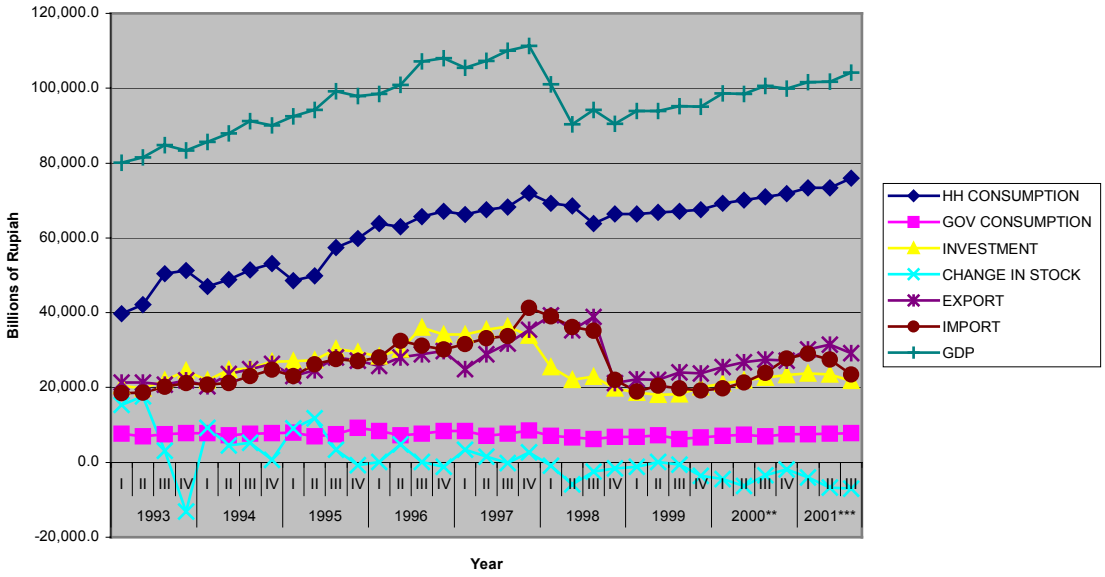
BILLIONS OF RUPIAH

	1993	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001**
HH CONSUMPTION	183,530.5	200,445.1	215,797.9	259,719.2	273,917.4	267,912.7	267,746.5	281,957.4	222,684.00
GOV CONSUMPTION	29,756.7	30,442.6	31,476.0	31,681.4	31,700.8	26,827.9	27,014.3	28,767.8	22,828.00
INVESTMENT	86,667.3	98,589.0	114,022.1	128,698.6	139,724.8	90,070.8	74,941.6	88,984.5	69,018.10
CHANGE IN STOCK	22,908.1	19,612.0	23,434.8	3,791.1	7,390.7	-11,066.3	-5,228.2	-16,138.3	-17,835.70
EXPORT	85,296.2	95,303.7	102,974.8	112,391.4	121,157.9	134,707.2	92,123.6	106,917.5	90,907.00
IMPORT	78,383.0	89,751.6	103,937.8	121,862.8	139,796.1	132,400.7	78,546.4	92,822.6	80,057.60
GDP	329,775.8	354,640.8	383,767.8	414,418.9	434,095.5	376,051.6	378,051.4	397,666.2	307,543.80

* First Three Quarter

Source: Central Bank of Indonesia

Graph 1: Quarterly GDP of Indonesia 1993 - 2000 (based on 1993 Constant Price)



Source: Processed by author using the data from Central Bank of Indonesia

The economic crisis in Indonesia is intertwined with a political crisis, which makes the recovery process more difficult. It is rational that economic recovery is highly correlated with and must be supported by political stability. However, this high correlation causes most Indonesians (including the economic observers) to instantly blame political factors for the negative movement of economic indicators. Slow economic recovery is believed to be the result of the political crisis.

Looking at the slow economic recovery and ignoring the political crisis for a moment, we encounter a big question: Is there a possibility of an asymmetric effect of monetary and fiscal policy on economic activity? If it does exist in Indonesian economy, then we cannot blame the slow economic recovery only on a political crisis. Besides, knowing the existence of an asymmetric effect is very important. From the policy point of view, failure to allow for asymmetric effects on output might result in the erroneous conclusion that distinguishing between anticipated and unanticipated monetary policy is unimportant (Chu, 1997).

There are two objectives to be achieved in this paper. First, determining the existence of an asymmetric reaction of output and inflation to government expenditures and the money supply. Second, finding the best policy to deal with the economic crisis, i.e., determining which policy generates a larger and quicker response to output.

This paper is divided into five sections. Section I discusses the background and objectives of this paper. Section II contains an overview of government expenditures and the money supply in the pre-crisis year. The theoretical background and previous studies about asymmetry are discussed in section III. Section IV examines the methodology, which

contains data used in the estimation process. Section V contains the analysis of the estimation from section V. The conclusions and policy implications are included in section VI.

II. Government Expenditure and Money Supply in Indonesia: An Overview

We define fiscal policy as used in this paper as the amount of government spending by all levels of government, which is shown in the national account from the expenditure side. The revenue side of the government budget is also a part of fiscal policy. The revenue collected by the government depends on the tax rate and the tax base. Changing the tax rate in order to increase revenue collection will take considerable time, since it must be approved by the parliament and requires debate between government and parliament. If the changes in tax rates are realized, people will not consider it as a shock since they will already be prepared. Since our focus is the effect of unanticipated policy shock, we consider government expenditures as representative of the shock instead of government revenue.

There are several policies that can be categorized as instruments in monetary policy. In this paper we use the M2 money supply as proxy for monetary policy. Since M2 is a more stable money supply measure (Case and Fair, 2001) it is expected that using the shock of M2 would give us a more sensitive impact on output - if it does exists – than the M1[1].

II.a. Government Expenditure

Graph 2 outlines the contribution of government spending in aggregate demand for the Indonesian economy. The share decreases over time, which matches economic theory. Starting in 1987, the share has reached a single digit (except for 1988), either in nominal or real terms (using 1993 constant prices).

The revenue and expenditures of all levels of government for fiscal year 1994/1995 to 1998/1999 are presented in table 3, as well as several other ratios in government financial operation[2]. We can see the considerable contribution of central government, either from the revenue side or from the expenditure side. The share of central government revenue from total consolidated government revenue always exceeds 90 percent; for the expenditure side its share is consistently above 78 percent.

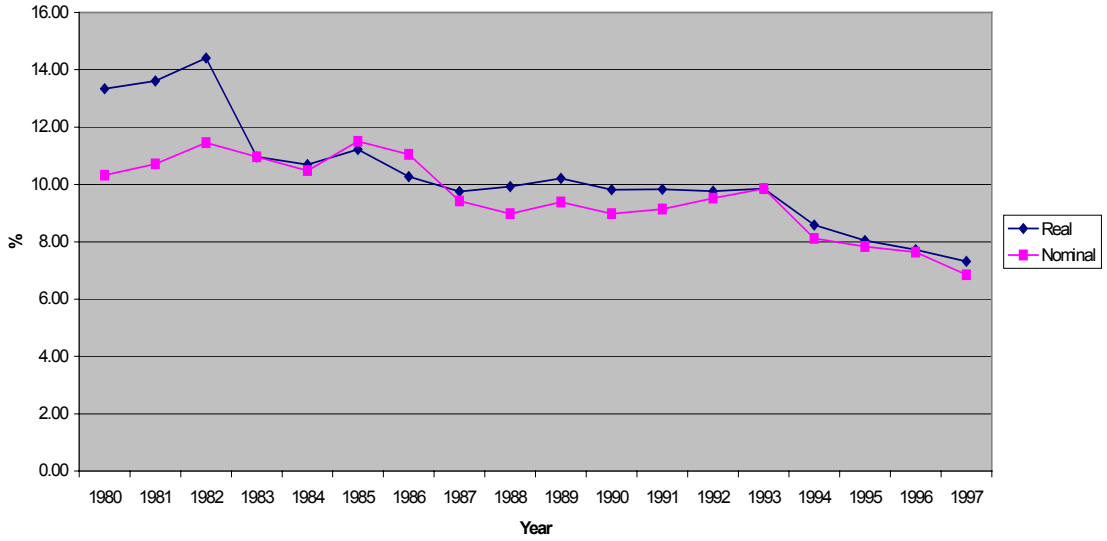
More than half of all government expenditures are allocated to routine expenditure. The share of routine expenditures gradually increased and reached its highest share in fiscal year 1997/1998. The reason for this significant increase is local currency depreciation,

[1] We find that using M1 as indicator of money supply would produce the same result. Therefore in this paper we only present the output using M2 as money supply indicator.

[2] We cannot present all the data in the time range of observation (1980 – 1997) due to the data availability for local government financial operation.

which led to a huge increase in interest rates and principal debt payments and an increase in subsidy expenditures in the central government budget.

Graph 2: Share of Government Expenditure on GDP



Source: Processed by author using the data from Central Bureau of Statistics

Table 3: Several Measures of Government Financial Operation

	Fiscal Year				
	94/95	95/96	96/97	97/98	98/99
Central Government					
Share of Revenue on Total Consolidated Revenue	94.05	93.20	93.53	94.36	96.84
Share of Expenditure on Total Consolidated Expenditure	81.62	80.27	78.82	81.88	89.43
Routine Expenditure Share on Central Government Expenditure	54.06	59.54	61.48	67.06	57.03
Development Expenditure Share on Central Government Expenditure	45.94	40.46	38.52	32.94	42.97
Local and Provincial Government					
Share of Revenue on Total Consolidated Revenue	5.95	6.80	6.47	5.64	3.16
Share of Expenditure on Total Consolidated Expenditure	18.38	19.73	21.18	18.12	10.57
Routine Expenditure Share on Total Local and Provincial Expenditure	54.01	53.77	58.67	60.15	65.52
Development Expenditure Share on Total Local and Provincial Expenditure	45.99	46.23	41.33	39.85	34.48

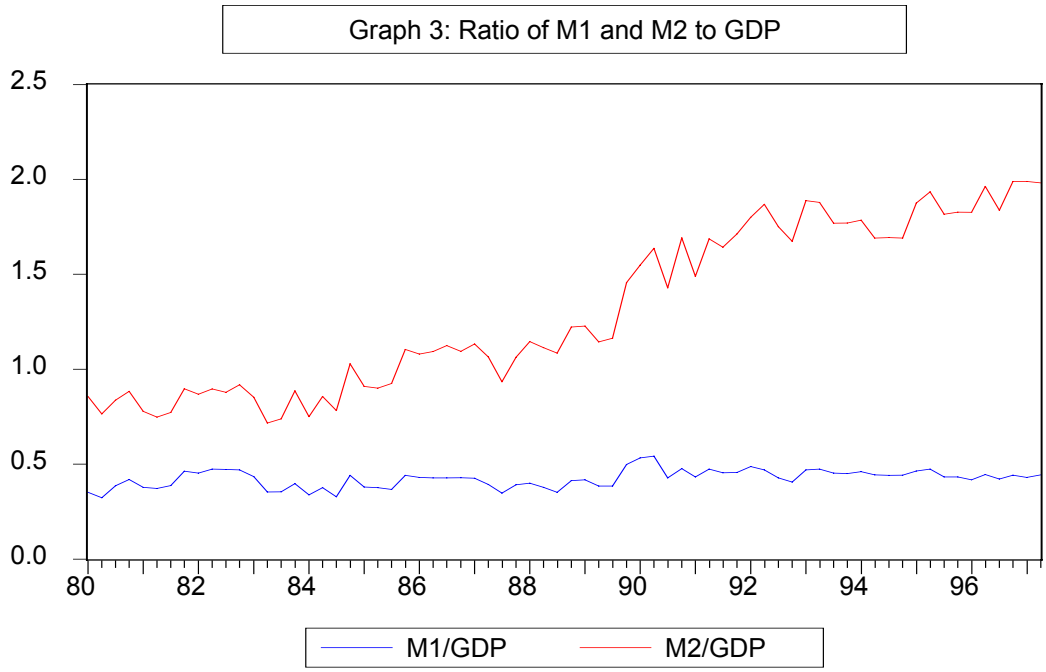
Source: Processed by author using the data from Central Bureau of Statistics

II.b. Money Supply

Graph 3 shows the ratio of the money supply (measured by M1 and M2) to quarterly GDP. The ratio of M2 to GDP shows a positive trend, while the ratio of M1 to GDP shows a relatively horizontal trend[3]. The ratio of M2 to GDP started to increase when the government abolished interest rate restriction in 1983. A further increase took place after

[3] The ratio of M2 to GDP exceeds unity since we used quarterly GDP. If we use the annual GDP, the ratio would fall to around 0.5.

the government deregulated the banking sector in October 1988, which stimulated the establishment of new banks.



Source: Processed by author using the data from Central Bank of Indonesia and Central Bureau of Statistics

III. Theory:

III.a. Previous studies investigating the existence of asymmetric effect

The study of the asymmetric effects of a particular variable or policy has been conducted over a long period of time by scholars. Johnson in 1962 recognized that tight and easy monetary policy produces asymmetric effects on economic activity. Studies conducted by De Long and Summer (1988), Cover (1992), Morgan (1993) and Karras (1996) support the conclusion that a negative monetary shock (either a decrease in the money supply or an increase in interest rates) reduces output more than monetary expansion raises it.

Garibaldi (1997) studied the asymmetric effects of monetary policy on job creation and destruction using cross-country data. He found that the effect of an increase in interest rate is immediately transferred into job destruction. Conversely, the effect of easing monetary policy produces a slow response in job creation, and in particular, does not result in a one-time increase in jobs as much as one-time decrease in jobs brought about by higher interest rate.

Kandil (2000) studied the effect of exchange rate fluctuations on output using cross-country data. Theoretically, exchange rate fluctuations determine aggregate demand through international trade (exports and imports) and aggregate output through the cost of imported goods. He found out that an unanticipated positive exchange rate shock (local currency devaluation) leads to output contraction due to the significant increase in price

inflation. In contrast, unanticipated appreciation does not restore output. It even decreases output, since net exports decrease in the demand channel, while on the other side, people are less willing to hold domestic currency, which contributes to price inflation.

III.b. Factors that cause the asymmetric effect to exist

Most of the microeconomic theory suggests that the reaction of individual behavior changes are symmetric - i.e. to the change in quantity demanded due to the change in the relative price of a certain good. This is not the case in macroeconomic theory. There are several factors that contribute to the existence of asymmetric effects of monetary and fiscal policy. The first source is price rigidity. Policy has an asymmetric effect if prices are less flexible downward than upward. In macroeconomic theory, this can happen when the aggregate supply curve is convex.

This asymmetric reaction can also be explained using the menu cost approach. In an economy with a positive trend of inflation, a positive shock to firms generates a greater adjustment than a negative shock of the same size. Inflation causes the relative prices of the firm to change. If there is a positive shock, firms have to adjust their relative prices and it creates menu costs, which do not happen in presence of a negative shock.

A shift in aggregate demand can also create an asymmetric effect due to price rigidity. If aggregate demand increases, output will not increase significantly since prices adjust quickly.

Information can also be the source of an asymmetric effect. For instance, in a banking sector with a relatively high interest rate, banks would be less willing to lend money to risky borrowers. This behavior results in credit rationing and a fall in output in a way that does not have a counterpart during a period of easy lending policy (Jackman and Sutton, 1982)

III.c. The importance of recognizing the asymmetric effect for Indonesian economy

If the asymmetric effect does take place in the Indonesian economy, then the government has to be more careful in implementing policy. For monetary policy, a negative shock (either a decrease in the money supply or an increase in interest rates) would cause a significant drop in output, while a positive shock could only result in a slight increase in output and could be time consuming. A negative shock in fiscal policy would reduce the output of the economy. Thus, the government would have to spend more money than the amount it has collected in order to restore output to the initial level. This is problem since Indonesia already has a high debt burden.

IV. Methodology:

The technique that has been developed in order to discern the presence of asymmetric effects of a policy is a partial equation model. The most well-known technique to

investigate the response of the economy if there were an asymmetric impact is TARCH (Threshold Auto Regressive Conditional Heteroscedasticity). This technique was developed by Zaokian in 1990.

However, in this paper, we are going to use an approach developed by Cover (1992) and refined by Kandil (2000) to find the asymmetric effect of exchange rate fluctuation. Using this approach we can distinguish the policies that have an asymmetric effect.

The above models will estimate effect of the money supply, government expenditures, and exchange rates on two main macro indicators: output and the price level. Over time, real output fluctuates around its steady state in response to aggregate demand shocks, energy prices, the money supply and government expenditures. Shocks from each variable are assumed to be randomly distributed over time. To investigate the asymmetric effect, we assume that each variable is symmetrically distributed around its steady state value. A positive shock is defined when a value of a variable in a certain time exceeds its trend value, and conversely for the negative shock.

IV.a. Data

In this paper, quarterly data for Indonesian from 1980:1 –1997:4 is used. The reason for choosing this period is to neutralize the political factors which occurred beginning in 1998. We expect the reaction of the Indonesian economy to these three factors to reflect the reaction to the fundamental economic variables and to not be influenced by political factors.

The data are collected from the Central Bank of Indonesia (BI), Central Bureau of Statistics and Department of Finance, and Ministry of Mining and Energy. The output data used in this paper is based on 1993 constant prices; for the consumer price index (CPI) we use the same year as the benchmark (1993=100). For the price of energy, which will be used in the inflation estimation, we calculate the weighted average price for each type of oil. This data is collected from Ministry of Mining and Energy, and the monthly consumption data can only be obtained from 1997. The data available from 1980 are only annual data. Therefore we divided the consumption of each fuel type by a factor of four to estimate the quarterly consumption. In order to get the weighted price, we multiply the price of each fuel type with its share of total fuel consumption.

IV.b. Estimation Process

The first step is to find the steady state for output, inflation, the money supply, interest rates, government expenditures and exchange rates. This is done by using the Hodrick Prescott filter technique, a widely used smoothing parameter among macroeconomists. The formula of Hodrick Prescott Filter is as shown in the equation below, and it chooses the smoothed series (s_t) by minimizing the variance of y around s. The penalty parameter (λ), which controls the smoothness of s_t series, takes a value of 1600 for quarterly data.

$$\sum_{t=1}^{T}(y_t - s_t)^2 + \lambda \sum_{t=2}^{T-1}\left((s_{t+1} - s_t) - (s_t - s_{t-1})\right)^2$$

The results of the smoothed series are presented in graph 4 – 9[4].

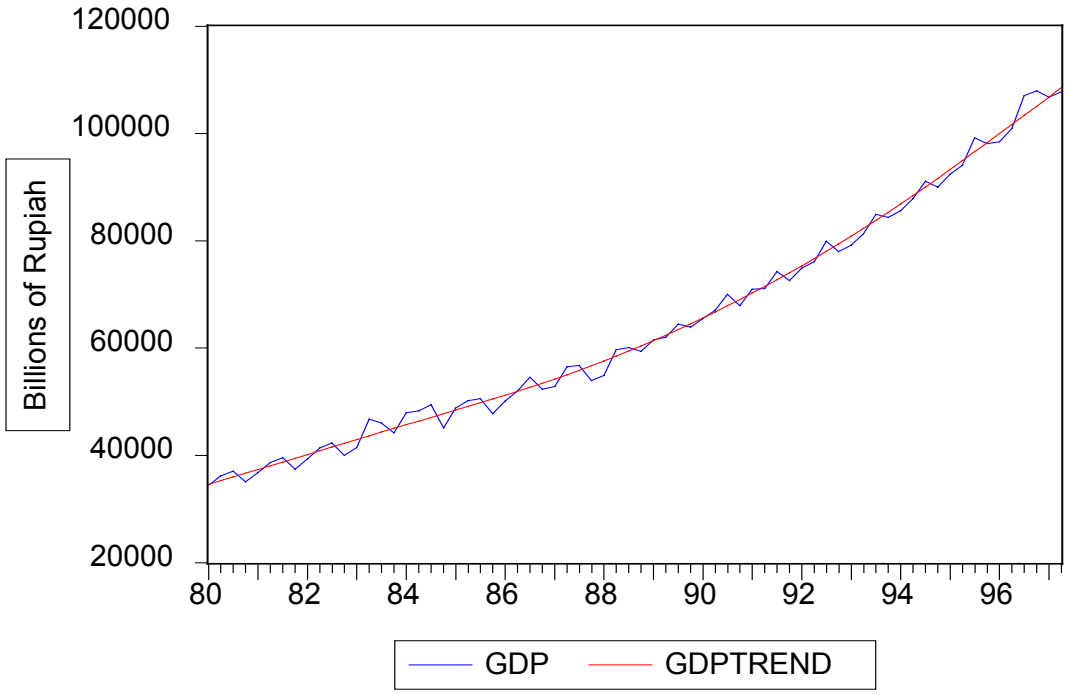
After obtaining the steady state of each variable, we then define the positive and negative shocks for government expenditures and the money supply. The positive shock takes the value of the difference between actual government spending and its steady state value if it is positive; otherwise it takes the value of zero. The negative shock takes the value of the difference between actual government spending and its steady state value if it is negative; otherwise it takes the value of zero[5]. Since we expect the sign of negative shock to be negative on the dependent variable, we take its absolute value. For the exchange rate variable, positive shock refers to the depreciation of local currency against US dollar, while negative shock refers to appreciation.

For the case of monetary policy, we choose the money supply as an indicator of monetary policy, instead of the interest rate. The reason behind this decision is that the interest rate in Indonesia was pegged by the central bank before 1983. Therefore, using the interest rate as a policy instrument in this research would limit the period of observation.

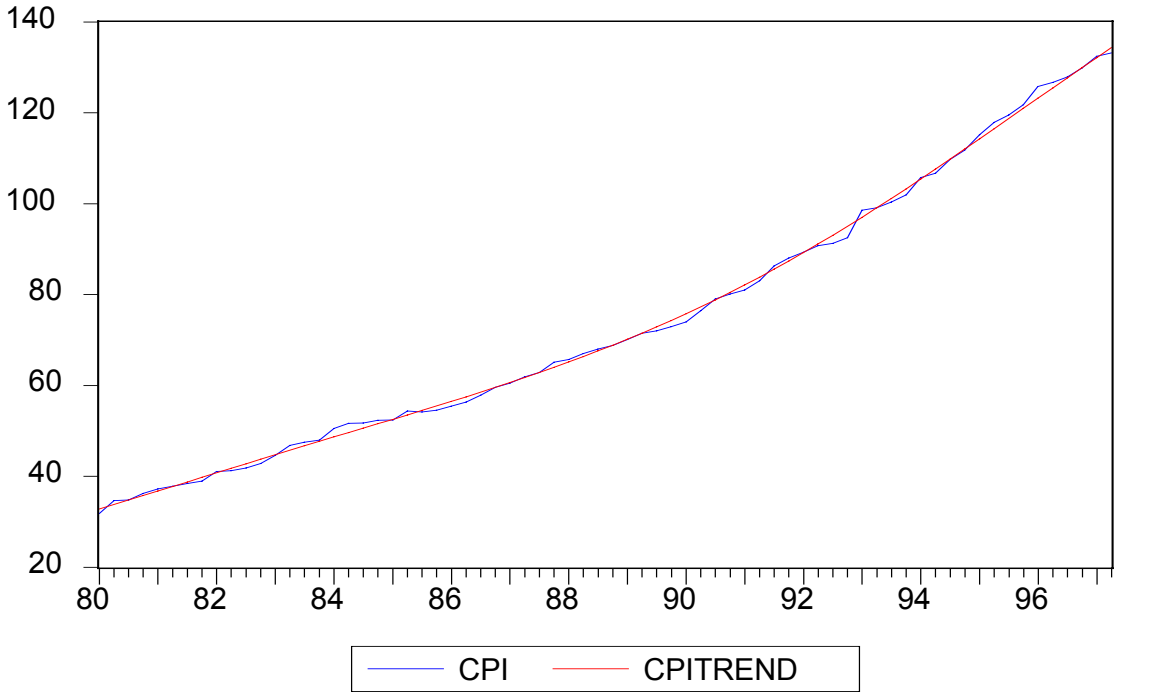
[4] Note that there is a weakness in estimation of steady state of GDP. Theoretically, its steady state value should reflect the potential output. Therefore, natural rate of unemployment should be considered in the calculation of potential (steady state of) GDP. However, the problem is that there is no data available for unemployment for quarterly data.

[5] The formula to define positive shock is $pos_{mt} = -\frac{1}{2}\left[abs(m_t) - m_t\right]$ and negative shock is $neg_{mt} = \frac{1}{2}\left[abs(m_t) - m_t\right]$

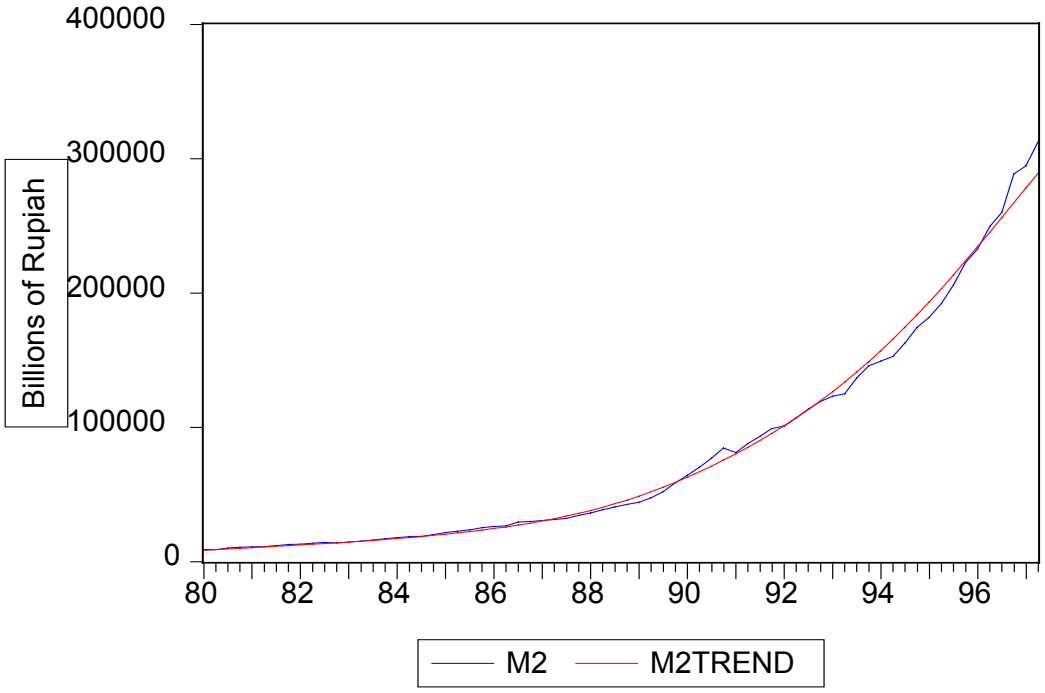
Graph 4: Actual and Trend of Real GDP of Indonesia



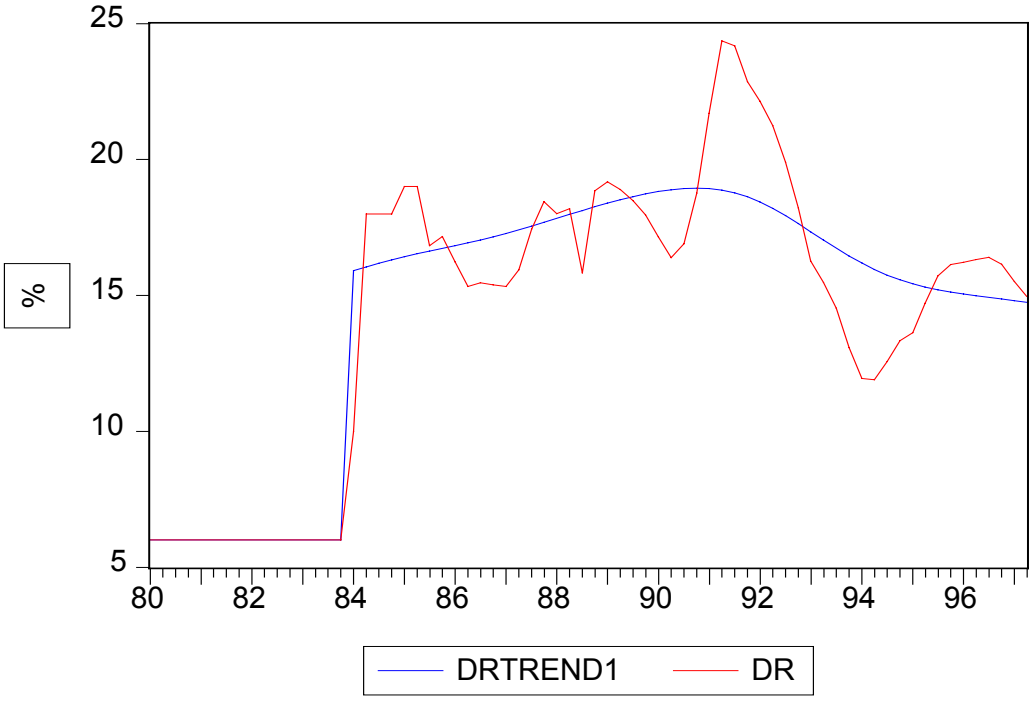
Graph 5: Actual and Trend of CPI of Indonesia (1993=100)



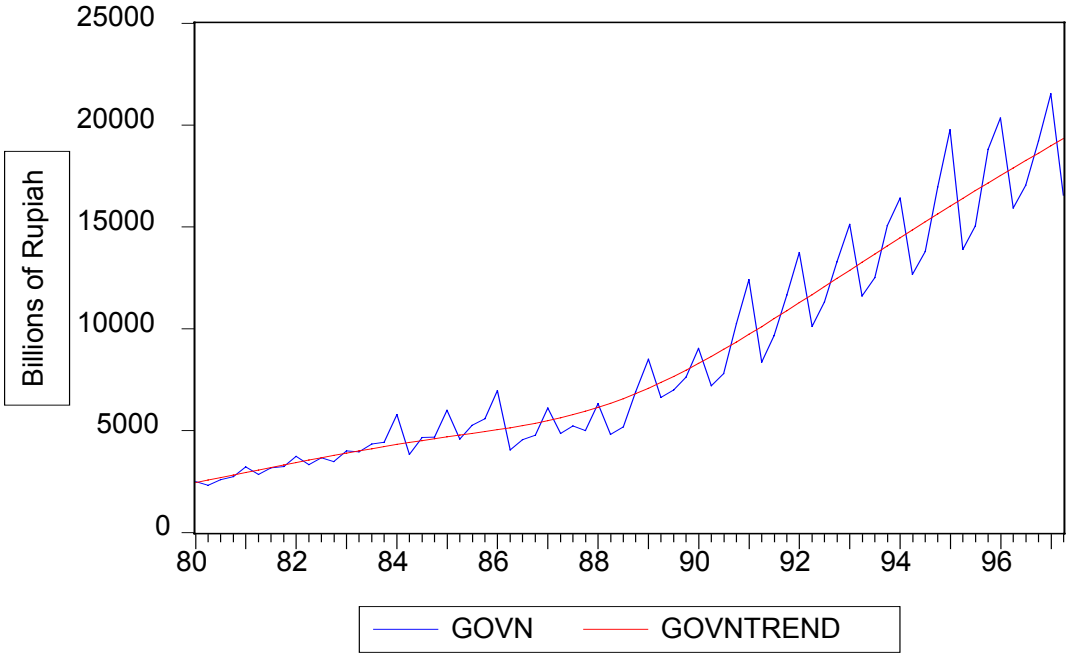
Graph 6: Actual and Trend of Money Supply (M2) of Indonesia



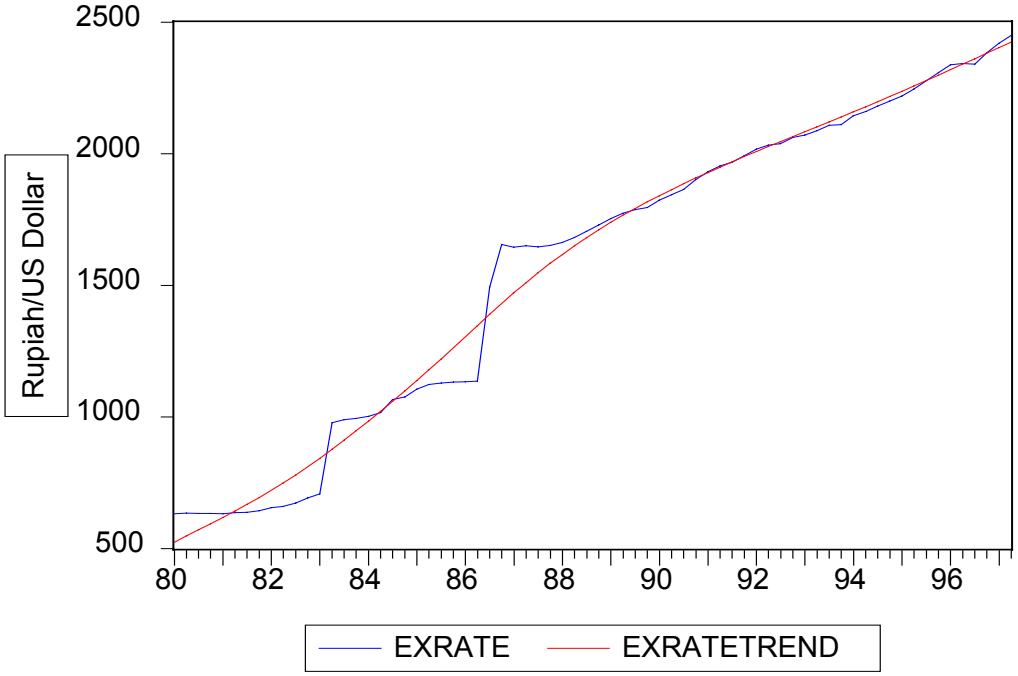
Graph 7: Actual and Trend of Short Run Interest Rateof Indonesia



Graph 8: Actual and Trend of Nominal Government Expenditure of Indonesia



Graph 9: Actual and Trend of Nominal Exchange Rate of Indonesia (Against US Dollar)



IV.b.i. Output Estimation

In order to discern the output reaction, we conduct several regressions. There are two general types of regressions conducted in this paper. First is the estimation of the level form of the dependent variable. This type of regression gives us an indication that the asymmetric reaction does take place in Indonesian economy. However, one problem with this regression result is autocorrelation. Theoretically, the presence of autocorrelation will not cause the estimated parameter to be biased, but we cannot make an inference. The second type of regression uses the difference form of the dependent variable. The problem of autocorrelation is solved, but since the dependent variable takes the difference value, while the independent variables are in the same form with the first type of regression, we have to be careful in interpreting the result.

In order to find evidence of an asymmetric effect, we first conduct a joint hypothesis for each shock (F test). That is, we want to discover whether the effect of positive shock from the current period to the lags included is jointly statistically significant in affecting output. The same procedure applies to negative shocks. After conducting an F Test for positive and negative shocks, we then test whether the magnitude of positive and negative shocks is statistically significant. Summary of regression results are presented in the appendix.

The equations for each estimation are also presented in the appendix. The summary of result is presented in tables I and II. Running the regression from equation 1.a, gives us the result that the effect of government expenditures (GOVN), the money supply (M2) and exchange rates (EXRATE) are positive to the level of output (which means that the depreciation of local currency affects the level of output). However, note that this result is due to the existence of autocorrelation problem, since the Durbin-Watson Statistic is far below the best threshold (1.19 compared to 2). Running the regression in difference form (equation 1.b) changes the probability level (the independent variables become insignificant affecting the dependent variable), but on the other hand, this reduces the autocorrelation problem.

Table III presents the estimation results for output in the logarithm form, while the table IV presents the estimation result for growth of output. From the statistical point of view, the result presented in table III is much better than in table IV. It is shown by Aikaike Information Criterion (AIC) that table III is lower than the results presented in table IV. The only variable that does not significantly influence output is government expenditures. According to the other results, only depreciation of exchange rate affects the growth of output.

Running the regression from equation 3.a also generates a serious autocorrelation problem as shown by the low DW statistic value. Therefore, even though many of the variables seem to have a probability below 10 %, we cannot make any inferences due to type I errors. Running the regression from equation 3.b gives us better results, since the autocorrelation is not so severe as the previous regression. The only significant variable affecting output is negative shock of government expenditure (NEGGOV), but the

direction is not as we would expect. This unexpected sign is perhaps due to the low predictability of the model, shown by the low value of the adjusted R-square.

Table V shows the result of output reaction in difference form (from equation 4.b). Autocorrelation is not a problem in this estimation, shown by the DW statistics near to the benchmark (2.14 compared to 2). The effect of positive shocks in government expenditures in the current period (POSGOV) is statistically significant in increasing output. Surprisingly, the sign of negative shock effect of government expenditure in the current period (NEGGOV) is positive for a change in output.

Using AIC statistics, the lag structure in equation 4.b gives us the best response of output to the shock of changes in the money supply and government expenditures. In the next step, we compare the result of excluding exchange rate using the same lag structure as equation 4.b. The reason for this is that Indonesia imposed a managed floating regime until 1997. The regression result is presented in table VI. This regression provides us better statistics than table V (including the exchange rate variable). Using the joint hypothesis (F-test), we find that the shock of government expenditures has a positive effect on changes in output. The negative government expenditure shock is not statistically significant in reducing output (F-test for joint hypothesis is 0.818). If we conduct an asymmetric test, we would conclude that government expenditures in Indonesia have a positive asymmetric effect on output, i.e. a positive shock in government expenditure increases output while negative shock would not reduce output. If we sum up the coefficient of positive shock from government expenditures, we would get the multiplier effect from positive government expenditure shock. The value of this multiplier is 1.688191.

IV.b.ii. CPI and Inflation Estimation

The summary of CPI and inflation estimation results are presented table II. Table VII presents the inflation estimation from equation 5.b. From a statistical point of view, this result is very good since it produces a low AIC (-6.28) and a very good DW statistic (2.06). From this estimation we can conclude that the growth of government expenditures and the money supply do not have statistically significant effects on the inflation rate. The depreciation of the exchange rate has a statistically significant effect on inflation, as well as on the percentage change in oil price.

Table VIII shows the result of inflation estimation, defines shock and uses no lags. Even though the DW statistic is close to 2 and the AIC is low, none of the variables used in the regression are statistically significant on the inflation rate. Table IX provides us the reaction inflation to shocks using two lags for each variable. From this table, only exchange rate and fuel price shock are statistically significant in affecting the inflation rate.

V. Findings

V.a. Output estimation

Using the Akaike Information Criterion to choose the best estimate, we would conclude that the output estimation - with respect to the shock of government expenditures and the money supply - presented in table VI is the best. From that regression, the effect of government expenditure is asymmetric; fortunately the effect of positive shock is larger than that of negative shock. This implies that if the government does not increase its expenditure in the next period, we do not have to worry about the output contraction. The effect of the money supply shock – either positive or negative - is not statistically significant to output.

V.b. CPI and Inflation Estimation

Using the Akaike Information Criterion to choose the best estimation, we can conclude that the results presented in table IX are the best estimate, since they give us the lowest value of AIC, which is –6.429. Changes in government expenditures and the money supply do not contribute significantly to the inflation level, while two important variables affecting the level of inflation are fuel price and exchange rate. The inflation estimation in this paper is far from perfect, but this result at least gives us an initial indication that inflation in Indonesia can be explained from a structural approach.

V.c. Fiscal Policy in Crises Year

As shown in table 2.a, nominal government expenditures rose significantly after the crisis hit Indonesia. However, the amount of government expenditures in real term (using 1993 constant prices) decreased due to very high inflation. The share of government expenditures in GDP in the period of 1993 – 2001 ranges from 5.4 % to 10.4% in nominal terms, while in real terms ranges from 7.1 to 9.0 percent. The share in real terms is always bigger than in the nominal terms (except for during 1995), meaning that inflation for the other components of GDP is relatively high compared to government spending.

The regression results presented in table VI conclude that a shock in government expenditures has a significant effect and that the effect is asymmetric (positive shock generates a larger effect on output than a negative shock does). The question then: Why there was no significant improvement in output given that government expenditure rose significantly during the crisis year?

The explanation arises by looking into the details of the government budget. If we take a look at the government budget in the crisis period, there is a significant change in the spending composition. This happens in all levels of government. Graphs 10.a - 10.c present the composition government spending for central, provincial and local governments respectively, for the period of 1994/1995 to 1999/2000. The share of routine expenditures has an upward trend, and consequently the share of development

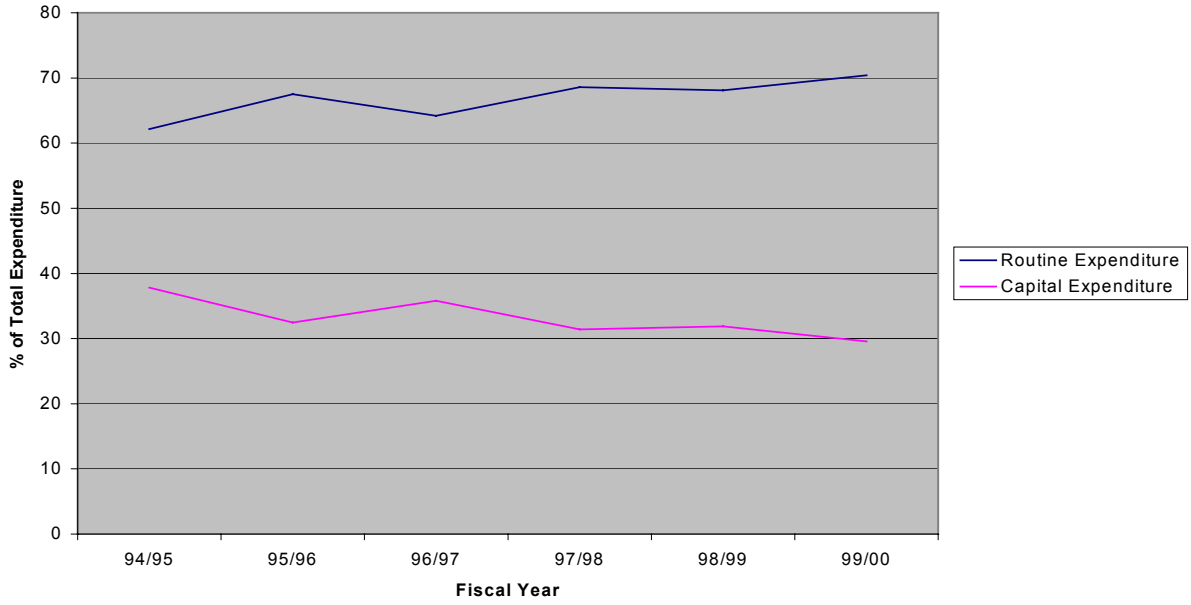
expenditure has a downward trend. In the local government, the share of routine expenditures is almost two thirds of its total expenditures (graph 10.c)

Why did routine expenditures rise significantly during the crisis year? Before we answer this question, please note that due to the data availability, we can only analyze the central government budget. However, this is justifiable since the share of central government in the total consolidated government revenue and expenditure is considerably high (as explained in part II).

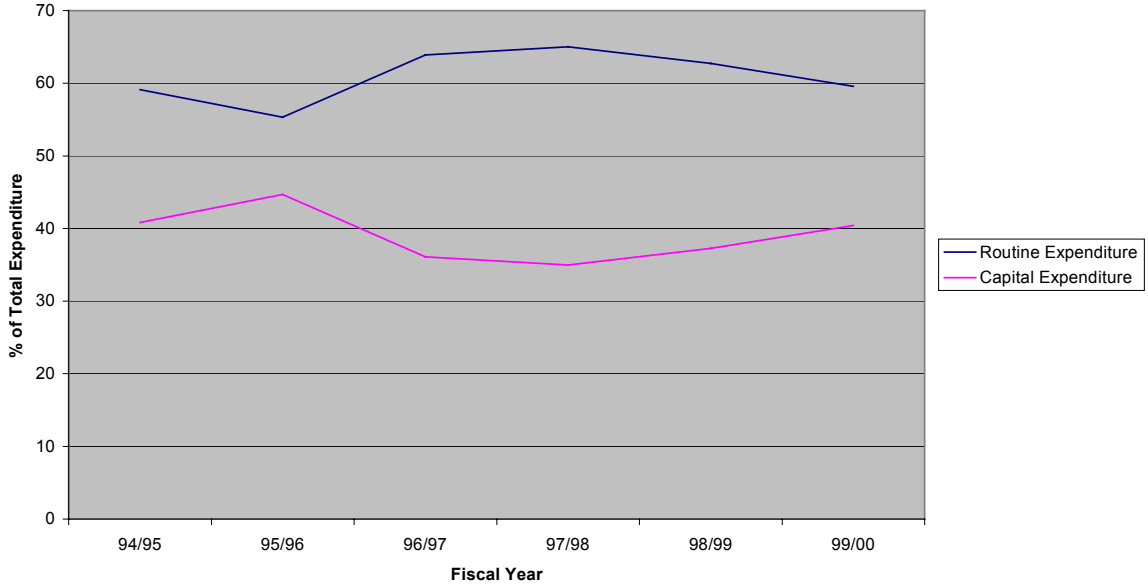
The most important factor that caused routine expenditures to rise significantly during the crisis year was the exchange rate. Local currency depreciation caused the payment for foreign debt (principal and its interest) and subsidy expenditures to increase significantly. Subsidy expenditures rose considerably because of increases in fuel subsidy expenditures[6]. Therefore, it is not surprising that although there was a huge increase in government expenditures during the crisis years, this increase did not have any impact on output, since it mainly took place in the sector that did not increase the productive capability.

[6] Fuel price in Indonesia is not based on market mechanism. Government set the price of fuel and the amount of subsidy depends on difference between the selling price and production cost. The selling price is in domestic currency, while 90 percent of production is calculated in foreign currency.

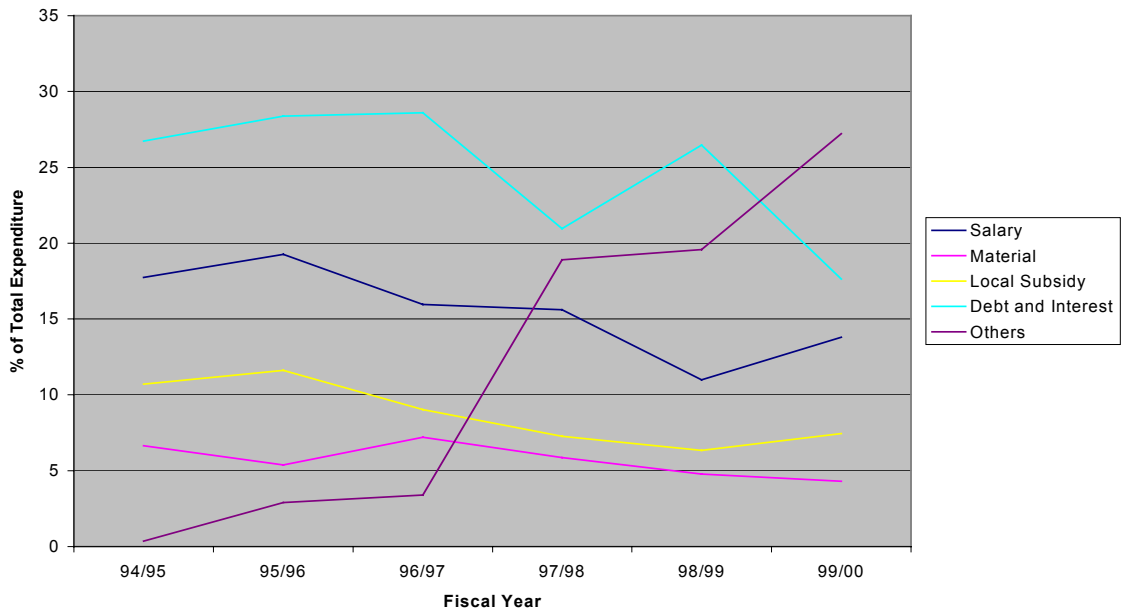
Graph 10.a: Composition of Central Government Expenditure
1994/1995 - 1999/2000



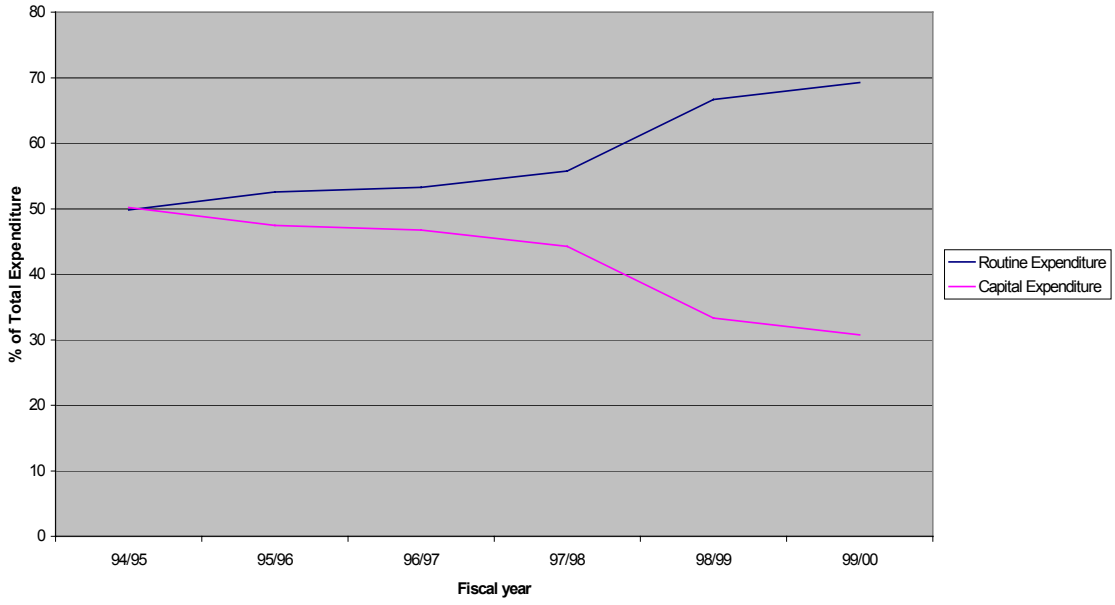
Graph 10.b: Composition of Provincial Government Expenditure
1994/1995 - 1999/2000



Graph 11: Central Government Routine Evpenditure by Type 1994/1995 - 1999/2000



Graph 10.c: Composition of Local Government Expenditure 1994/1995 - 1999/2000



VI. Conclusions and Policy Implication

VI.a. Conclusions and Policy Implication

From the above result, we can conclude that a shock in government expenditures has a significant effect on changes in output, and that the effect is asymmetric (positive shock has a larger impact than negative shock). If government expenditure is lower than the steady state value (in other words, a negative shock), it does not reduce output significantly. But if government expenditure is above the steady state value (a positive shock) it would generate a higher output, with a multiplier of 1.688191. This is not surprising, since we only considered one side of government operations[7].

One possible explanation as to why output did not respond to the increase in government expenditures is the change in the composition of spending. More than one half of total government spending was allocated to routine expenditures, such as fuel subsidy expenditures and payments to foreign debt and interest, and these did not increase the productive capacity.

The findings above give us two policy implications. First, the government must reallocate its spending, i.e. allocate more to development expenditures which will increase the productive capacity. Second, since Indonesia currently has a huge debt burden, it is not necessary for the government to increase its expenditures, since the effect on output reduction is not statistically significant. Moreover, the increase in government expenditures is likely to be financed by new debt. Also, there is no guarantee that the government will spend efficiently, since corruption is still a big problem in Indonesia.

For monetary policy, we conclude that a money supply shock does not have a statistically significant effect on output. This result suggests that monetary authority should not use a shock in money supply to boost output. In other words, the monetary authority should focus on its function in delivering a low level of inflation.

In the inflation equation, it is important to stabilize the exchange rate. The effect of the exchange rate is statistically significant in affecting the inflation rate. The benefit of maintaining a stable exchange rate comes from its effect on domestic fuel prices. Since fuel prices in Indonesia are not based on market mechanisms and the subsidy depends on the level of exchange rates (since 90 percent of production cost is in foreign currency), the benefit of maintaining a stable exchange rate comes from two sources. First, it reduces the impact on inflation, and second, it reduces subsidy expenditures for the central government.

[7] Note that if we include revenue in the estimation, we cannot consider the change in tax rate as a shock, since the process that enables people to prepare for the change in tax rate takes a long time.

VI.b Suggestion for Further Work

For further work we suggest two points. First, in this paper, in order to find out the steady state for output, we use the Hodrick Prescott technique. Theoretically, the steady state value should reflect potential output. In order to estimate potential output, unemployment data is required. However, in this paper we cannot obtain quarterly data for unemployment. Therefore, we suggest that the unemployment data be taken into account in order to get a better estimation of potential output (the steady state value). Second, since fiscal policy also includes government revenues, it is better to use the net domestic impact approach on the analysis of government budget in further work.

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Appendix I.

Estimate Equations

1.a $$GDP_t = \alpha_0 + \beta_1 GOVN_t + \beta_2 M2_t + \beta_3 EXRATE_t + \varepsilon_t$$

1.b $$\Delta GDP_t = \alpha_0 + \beta_1 \Delta GOVN_t + \beta_2 \Delta M2_t + \beta_3 \Delta EXRATE_t + \varepsilon_t$$

2.a $$\log(GDP_t) = \alpha_0 + \beta_1 \log(GOVN_t) + \beta_2 \log(M2_t) + \beta_3 \log(EXRATE_t) + \varepsilon_t$$

2.b $$\Delta \log(GDP_t) = \alpha_0 + \beta_1 \Delta \log(GOVN_t) + \beta_2 \Delta \log(M2_t) + \beta_3 \Delta \log(EXRATE_t) + \varepsilon_t$$

3.a
$$GDP_t = \alpha_0 + \beta_1 POSGOV_t + \beta_2 NEGGOV_t + \beta_3 POSM2_t + \beta_4 NEGM2_t + \beta_5 POSEXR_t + \beta_6 NEGEXR_t + \varepsilon_t$$

3.b
$$\Delta GDP_t = \alpha_0 + \beta_1 POSGOV_t + \beta_2 NEGGOV_t + \beta_3 POSM2_t + \beta_4 NEGM2_t + \beta_5 POSEXR_t + \beta_6 NEGEXR_t + \varepsilon_t$$

4.a
$$GDP_t = \alpha_0 + \beta_1 POSGOV_t + \beta_2 POSGOV_{t-1} + \beta_3 POSGOV_{t-2} + \beta_4 NEGGOV_t + \beta_5 NEGGOV_{t-1} + \beta_6 NEGGOV_{t-2} +$$
$$\beta_7 POSM2_t + \beta_8 POSM2_{t-1} + \beta_9 POSM2_{t-2} + \beta_{10} NEGGOV_t + \beta_{11} NEGM2_{t-1} + \beta_{12} NEGM2_{t-2} +$$
$$\beta_{13} POSEXR_t + \beta_{14} POSEXR_{t-1} + \beta_{15} POSEXR_{t-2} + \beta_{16} NEGEXR_t + \beta_{17} NEGEXR_{t-1} + \beta_{18} NEGEXR_{t-2} + \varepsilon_t$$

4.b
$$\Delta GDP_t = \alpha_0 + \beta_1 POSGOV_t + \beta_2 POSGOV_{t-1} + \beta_3 POSGOV_{t-2} + \beta_4 NEGGOV_t + \beta_5 NEGGOV_{t-1} + \beta_6 NEGGOV_{t-2} +$$
$$\beta_7 POSM2_t + \beta_8 POSM2_{t-1} + \beta_9 POSM2_{t-2} + \beta_{10} NEGGOV_t + \beta_{11} NEGM2_{t-1} + \beta_{12} NEGM2_{t-2} +$$
$$\beta_{13} POSEXR_t + \beta_{14} POSEXR_{t-1} + \beta_{15} POSEXR_{t-2} + \beta_{16} NEGEXR_t + \beta_{17} NEGEXR_{t-1} + \beta_{18} NEGEXR_{t-2} + \varepsilon_t$$

5.a
$$CPI_t = \alpha_0 + \beta_1 GOVN_t + \beta_2 M2_t + \beta_3 EXRATE_t + \beta_4 WOILP_t \varepsilon_t$$

5.b
$$\Delta \log CPI_t = \alpha_0 + \beta_1 \Delta \log GOVN_t + \beta_2 \Delta \log M2_t + \beta_3 \Delta \log EXRATE_t + \beta_4 \Delta \log WOILP_t \varepsilon_t$$

6.a
$$CPI_t = \alpha_0 + \beta_1 POSGOV_t + \beta_2 NEGGOV_t + \beta_3 POSM2_t + \beta_4 NEGM2_t + \beta_5 POSEXR_t + \beta_6 NEGEXR_t + \beta_7 WOILP_t + \varepsilon_t$$

6.b
$$\Delta \log CPI_t = \alpha_0 + \beta_1 POSGOV_t + \beta_2 NEGGOV_t + \beta_3 POSM2_t + \beta_4 NEGM2_t + \beta_5 POSEXR_t + \beta_6 NEGEXR_t + \beta_7 WOILP_t + \varepsilon_t$$

7.a
$$CPI_t = \alpha_0 + \beta_1 POSGOV_t + \beta_2 POSGOV_{t-1} + \beta_3 POSGOV_{t-2} + \beta_4 NEGGOV_t + \beta_5 NEGGOV_{t-1} + \beta_6 NEGGOV_{t-2} +$$
$$\beta_7 POSM2_t + \beta_8 POSM2_{t-1} + \beta_9 POSM2_{t-2} + \beta_{10} NEGGOV_t + \beta_{11} NEGM2_{t-1} + \beta_{12} NEGM2_{t-2} +$$
$$\beta_{13} POSEXR_t + \beta_{14} POSEXR_{t-1} + \beta_{15} POSEXR_{t-2} + \beta_{16} NEGEXR_t + \beta_{17} NEGEXR_{t-1} + \beta_{18} NEGEXR_{t-2} +$$
$$\beta_{19} WOILP_t + \beta_{20} WOILP_{t-1} + \beta_{21} WIOILP_{t-2} + \varepsilon_t$$

7.b

$$\Delta \log CPI_t = \alpha_0 + \beta_1 POSGOV_t + \beta_2 POSGOV_{t-1} + \beta_3 POSGOV_{t-2} + \beta_4 NEGGOV_t + \beta_5 NEGGOV_{t-1} + \beta_6 NEGGOV_{t-2} +$$
$$\beta_7 POSM2_t + \beta_8 POSM2_{t-1} + \beta_9 POSM2_{t-2} + \beta_{10} NEGGOV_t + \beta_{11} NEGM2_{t-1} + \beta_{12} NEGM2_{t-2} +$$
$$\beta_{13} POSEXR_t + \beta_{14} POSEXR_{t-1} + \beta_{15} POSEXR_{t-2} + \beta_{16} NEGEXR_t + \beta_{17} NEGEXR_{t-1} + \beta_{18} NEGEXR_{t-2} +$$
$$\beta_{19} WOILP_t + \beta_{20} WOILP_{t-1} + \beta_{21} WIOILP_{t-2} + \varepsilon_t$$

Definition:
GDP: Gross Domestic Product (Billion of Rupiah)
GOVN: Nominal Government Expenditure (Billion of Rupiah)
M2: Money Supply (Billion of Rupiah)
EXRRATE: Exchange Rate Rupiah Against US Dollar (Rupiah / US Dollar)
WOILP: Weighted Oil Price (Rupiah)
CPI: Consumer Price Index
POS GOV: Positive Shock of Government Expenditure (Billion of Rupiah)
NEGGOV: Negative Shock of Government Expenditure (Billion of Rupiah)
POS M2: Positive Shock of Money Supply (Billion of Rupiah)
NEGGOV: Negative Shock of Money Supply (Billion of Rupiah)
POS EXR: Positive Shock of exchange rate / Depreciation (Rupiah
NEGEXR: Negative Shock of Exchange rate / Appreciation (Rupiah)
Δ: Difference Operator

Table I: Summary of Output Estimation

LEVEL OF OUTPUT				CHANGE OF OUTPUT			
GDP = f (GOVN, M2, EXRATE)	Adj R2	0.988613	GOVN**(+), M2***(+), EXRATE***(+)	D(GDP) = f(GOVN, M2, EXRATE)	Adj R2	-0.00158	
	DW	1.193757			DW	2.641285	
	AIC	18.36181			AIC	18.23697	
LOG(GDP) = f [LOG(GOVN), LOG (M2), LOG(EXRATE)]	Adj R2	0.98976	LOG(M2)***(+), LOG(EXRATE)***(+)	D(LOG(GDP),1) = f [D(LOG(GOVN),1), D(LOG(M2),1), D(LOG(EXRATE),1)]	Adj R2	0.036566	D(LOG(EXRATE),1)**(+)
	DW	1.358583			DW	2.55508	
	AIC	-3.89496			AIC	-3.67159	
GDP = f (POSGOV, NEGGOV, POSM2, NEGM2, POSEXR, NEGEXR)	Adj R2	0.699699	POSGOV***(+), NEGGOV***(+),	D(GDP,1) = f (POSGOV, NEGGOV, POSM2, NEGM2, POSEXR, NEGEXR)	Adj R2	0.083064	NEGGOV***(+)
	DW	0.864837	POSM2***(+), NEGM2***(+),		DW	2.64289	
	AIC	21.67329	POSEXR**(-), NEGEXR***(-)		AIC	18.18838	
GDP = f [POSGOV, POSGOV(-1), POSGOV(-2), NEGGOV, NEGGOV(-1), NEGGOV(-2), POSM2, POSM2(-1), POSM2(-2), NEGM2, NEGM2(-1), NEGM2(-2), POSEXR, POSEXR(-1), POSEXR(-2), NEGEXR, NEGEXR(-1), NEGEXR(-2)]	Adj R2	0.903105	POSGOV***(+), POSGOV(-1)***(+), POSGOV(-2)***(+), NEGGOV***(+), NEGGOV(-1)**,(+), NEGGOV(-2)***(+), POSM2***(+), POSM2(-2)***(-)	D(GDP,1) = f [POSGOV, POSGOV(-1), POSGOV(-2), NEGGOV, NEGGOV(-1), NEGGOV(-2), POSM2, POSM2(-1), POSM2(-2), NEGM2, NEGM2(-1), NEGM2(-2), POSEXR, POSEXR(-1), POSEXR(-2), NEGEXR, NEGEXR(-1), NEGEXR(-2)]	Adj R2	0.312797	POSGOV***(+), NEGGOV**(+), NEGGOV(-2)*(-) Government Expenditure: Symmetric
	DW	0.847196			DW	2.146201	
	AIC	20.65151			AIC	18.04860	
				D(GDP,1) = f [POSGOV, POSGOV(-1), POSGOV(-2), NEGGOV, NEGGOV(-1), NEGGOV(-2), POSM2, POSM2(-1), POSM2(-2), NEGM2, NEGM2(-1), NEGM2(-2)]	Adj R2	0.319564	POSGOV***(+) POSGOV(-2) **(+) NEGGOV**(+)
					DW	2.164109	
					AIC	17.97775	Government Expenditure: Asymmetric

*** indicate the variable is significant at 1%
** indicate the variable is significant at 5%
* indicate the variable is significant at 10%
(+/-) indicate the effect on dependent variable

Table II: Summary of CPI and Inflation Estimation

CPI				INFLATION			
CPI = f (GOVN, M2, EXRATE, WOILP)	Adj R2 DW AIC	0.995796 0.600252 4.197366	GOVN***(+), M2***(+), EXRATE***(+), WOILP***(+)	D(LOG(CPI),1) = f[DLOG(GOVN),1), D(LOG(M2)1), DLOG(EXRATE),1), D(LOG(WOILP),1)]	Adj R2 DW AIC	0.567979 2.063679 -6.281376	D(LOG(EXRATE),1)***(+) D(LOG(WOILP),1)***(+)
CPI = f (POSGOV, NEGGOV, POSM2, NEGM2, POSEXR, NEGEXR, WOILP)	Adj R2 DW AIC	0.937247 0.459535 6.938968	NEGGOV*(+), POSM2***(+), POSEXR**(-), NEGEXR***(-) WOILP***(+)	D(LOG(CPI),1) = f (POSGOV, NEGGOV, POSM2, NEGM2, POSEXR, NEGEXR, WOILP)	Adj R2 DW AIC	0.005638 2.200933 -5.408802	
CPI = f [POSGOV, POSGOV(-1), POSGOV(-2), NEGGOV, NEGGOV(-1), NEGGOV(-2), POSM2, POSM2(-1), POSM2(-2), NEGM2, NEGM2(-1), NEGM2(-2), POSEXR, POSEXR(-1), POSEXR(-2), NEGEXR, NEGEXR(-1), NEGEXR(-2), WOILP, WOILP(-1), WOILP(-2)]	Adj R2 DW AIC	0.956799 0.591417 6.684241	NEGGOV***(+), NEGGOV(-2)**(+), POSM2***(+) POSM2(-2)**(-) NEGM2(-2)**(+) WOILP**(+)	D(LOG(CPI),1) = f [POSGOV, POSGOV(-1), POSGOV(-2), NEGGOV, NEGGOV(-1), NEGGOV(-2), POSM2, POSM2(-1), POSM2(-2), NEGM2, NEGM2(-1), NEGM2(-2), POSEXR, POSEXR(-1), POSEXR(-2), NEGEXR, NEGEXR(-1), NEGEXR(-2), WOILP, WOILP(-1), WOILP(-2)]	Adj R2 DW AIC	0.587571 2.742616 -6.429508	NEGEXR**(-), NEGEXR(-1)**(+), WOILP***(+) WOILP(-1)***(-)

*** indicate the variable is significant at 1%
** indicate the variable is significant at 5%
* indicate the variable is significant at 10%
(+/-) indicate the effect on dependent variable

Table III: Output Estimation: Without Defining Positive and Negative Shock (in Log Form)

Dependent Variable: LOG(GDP)
Method: Least Squares
Date: 03/25/02 Time: 09:13
Sample: 1980:1 1997:2
Included observations: 70

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.491894	0.115726	64.73832	0.0000
LOG(GOVN)	-0.002260	0.028135	-0.080329	0.9362
LOG(M2)	0.281845	0.019535	14.42794	0.0000
LOG(EXRATE)	0.070047	0.023894	2.931562	0.0046

R-squared	0.990206	Mean dependent var	11.01811
Adjusted R-squared	0.989760	S.D. dependent var	0.331742
S.E. of regression	0.033569	Akaike info criterion	-3.894957
Sum squared resid	0.074376	Schwarz criterion	-3.766472
Log likelihood	140.3235	F-statistic	2224.165
Durbin-Watson stat	1.358583	Prob(F-statistic)	0.000000

Table IV: Output Estimation: Without Defining Positive and Negative Shock (in Difference of log form / growth rate)

Dependent Variable: D(LOG(GDP),1)
Method: Least Squares
Date: 03/25/02 Time: 09:14
Sample(adjusted): 1980:2 1997:2
Included observations: 69 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.015047	0.009185	1.638257	0.1062
D(LOG(GOVN),1)	-0.013038	0.023662	-0.551002	0.5835
D(LOG(M2),1)	-0.043264	0.153460	-0.281923	0.7789
D(LOG(EXRATE),1)	0.208096	0.090212	2.306751	0.0243

R-squared	0.079071	Mean dependent var	0.016528
Adjusted R-squared	0.036566	S.D. dependent var	0.038227
S.E. of regression	0.037521	Akaike info criterion	-3.671594
Sum squared resid	0.091510	Schwarz criterion	-3.542081
Log likelihood	130.6700	F-statistic	1.860298
Durbin-Watson stat	2.555080	Prob(F-statistic)	0.145066

Table V: Reaction of Output to Positive and Negative Shock With 2 Lags

Dependent Variable: D(GDP,1)
Method: Least Squares
Date: 03/25/02 Time: 09:23
Sample(adjusted): 1980:3 1997:2
Included observations: 68 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	398.9398	631.5789	0.631655	0.5305
POSGOV***	1.528455	0.477897	3.198291	0.0024
POSGOV(-1)	-0.771388	0.544459	-1.416799	0.1629
POSGOV(-2)	0.891111	0.545151	1.634612	0.1085
NEGGOV**	1.631021	0.730747	2.231992	0.0302
NEGGOV(-1)	-0.332542	0.767896	-0.433056	0.6669
NEGGOV(-2)*	-1.203266	0.678773	-1.772708	0.0825
POSM2	0.056594	0.098118	0.576799	0.5667
POSM2(-1)	-0.133000	0.125370	-1.060860	0.2940
POSM2(-2)	-0.083607	0.129890	-0.643675	0.5228
NEGM2	-0.023144	0.168748	-0.137153	0.8915
NEGM2(-1)	-0.040596	0.253705	-0.160013	0.8735
NEGM2(-2)	0.012015	0.186033	0.064585	0.9488
POSEXR	15.66077	18.94626	0.826589	0.4125
POSEXR(-1)	-15.69952	18.63422	-0.842510	0.4036
POSEXR(-2)	5.700833	11.82296	0.482183	0.6318
NEGEXR	-5.956725	10.36798	-0.574531	0.5682
NEGEXR(-1)	15.01344	11.49647	1.305917	0.1977
NEGEXR(-2)	-14.10922	13.48723	-1.046117	0.3006

R-squared	0.497419	Mean dependent var	1052.827
Adjusted R-squared	0.312797	S.D. dependent var	2158.905
S.E. of regression	1789.682	Akaike info criterion	18.04860
Sum squared resid	1.57E+08	Schwarz criterion	18.66876
Log likelihood	-594.6524	F-statistic	2.694263
Durbin-Watson stat	2.146201	Prob(F-statistic)	0.003088

Asymmetric Test

Wald Test: Positive Government Expenditure Shock Equation:

Null Hypothesis:	C(2)=0 C(3)=0 C(4)=0		
F-statistic	5.548035	Probability	0.002330
Chi-square	16.64410	Probability	0.000836

Wald Test: Negative Government Expenditure Shock Equation:

Null Hypothesis:	C(5)=0 C(6)=0 C(7)=0		
F-statistic	3.451525	Probability	0.023467
Chi-square	10.35457	Probability	0.015781

Wald Test: Positive Government Expenditure Shock Equation:

Null Hypothesis:	C(2)+C(3)+C(4)=0		
F-statistic	5.417620	Probability	0.024108
Chi-square	5.417620	Probability	0.019935

Wald Test: Negative Government Expenditure Shock Equation:

Null Hypothesis:	C(5)+C(6)+C(7)=0		
F-statistic	0.009355	Probability	0.923342
Chi-square	0.009355	Probability	0.922948

Wald Test: Asymmetric Test of Government Expenditure Equation:

Null Hypothesis:	C(2)+C(3)+C(4)=-(C(5)+C(6)+C(7))		
F-statistic	2.291285	Probability	0.136526
Chi-square	2.291285	Probability	0.130102

Table VI: Reaction of Output to Positive and Negative Shock With 2 Lags (Excluding Exchange Rate Variable)

Dependent Variable: D(GDP,1)
Method: Least Squares
Date: 04/08/02 Time: 12:07
Sample(adjusted): 1980:3 1997:2
Included observations: 68 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	339.9465	430.4526	0.789742	0.4331
POSGOV	1.507933	0.468447	3.219007	0.0022
POSGOV(-1)	-0.873875	0.525375	-1.663334	0.1019
POSGOV(-2)	1.054133	0.521336	2.021984	0.0481
NEGGOV	1.669524	0.697462	2.393713	0.0201
NEGGOV(-1)	-0.428227	0.758576	-0.564514	0.5747
NEGGOV(-2)	-1.033062	0.629263	-1.641701	0.1064
POSM2	0.071128	0.093519	0.760572	0.4502
POSM2(-1)	-0.164248	0.119250	-1.377342	0.1740
POSM2(-2)	-0.062471	0.125750	-0.496784	0.6213
NEGM2	0.004146	0.167212	0.024793	0.9803
NEGM2(-1)	-0.080042	0.250418	-0.319632	0.7505
NEGM2(-2)	0.012037	0.184295	0.065315	0.9482

R-squared	0.441433	Mean dependent var	1052.827
Adjusted R-squared	0.319564	S.D. dependent var	2158.905
S.E. of regression	1780.850	Akaike info criterion	17.97775
Sum squared resid	1.74E+08	Schwarz criterion	18.40207
Log likelihood	-598.2434	F-statistic	3.622184
Durbin-Watson stat	2.164109	Prob(F-statistic)	0.000514

Asymmetric Test

Wald Test: Positive Government Expenditure Shock Equation

Null Hypothesis:	C(2)=C(4) C(3)=C(4)		
F-statistic	5.192542	Probability	0.008596
Chi-square	10.38508	Probability	0.005558

Wald Test: Negative Government Expenditure Shock Equation:

Null Hypothesis:	C(5)=C(7) C(6)=C(7)		
F-statistic	4.924187	Probability	0.010783
Chi-square	9.848374	Probability	0.007269

Wald Test: Positive Government Expenditure Shock Equation:

Null Hypothesis:	C(2)+C(3)+C(4)=0		
F-statistic	6.864051	Probability	0.011346
Chi-square	6.864051	Probability	0.008795

Wald Test: Negative Government Expenditure Shock Equation:

Null Hypothesis:	C(5)+C(6)+C(7)=0		
F-statistic	0.052877	Probability	0.818984
Chi-square	0.052877	Probability	0.818131

Wald Test: Asymmetric Test For Government Expenditure Equation: EQ01			
Null Hypothesis:	C(2)+C(3)+C(4)=-(C(5)+C(6)+C(7))		
F-statistic	3.079283	Probability	0.084865
Chi-square	3.079283	Probability	0.079295

Wald Test: Positive Money Supply Shock Equation:

Null Hypothesis:	C(8)=C(10) C(9)=C(10)		
F-statistic	0.792226	Probability	0.457935
Chi-square	1.584451	Probability	0.452836

Wald Test: Negative Money Supply Shock Equation:

Null Hypothesis:	C(11)=C(13) C(12)=C(13)		
F-statistic	0.026172	Probability	0.974180
Chi-square	0.052344	Probability	0.974167

Table VII: Inflation Rate Estimation: Without Defining Positive and Negative Shock (Log Form)

Dependent Variable: D(LOG(CPI),1)
Method: Least Squares
Date: 03/25/02 Time: 09:41
Sample(adjusted): 1980:2 1997:2
Included observations: 69 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.017125	0.002575	6.650674	0.0000
D(LOG(GOVN),1)	-0.008884	0.006438	-1.379914	0.1724
D(LOG(M2),1)	-0.029130	0.041717	-0.698285	0.4875
D(LOG(EXRATE),1)	0.086431	0.024408	3.541046	0.0007
D(LOG(WOILP),1)	0.112309	0.012326	9.111217	0.0000

R-squared	0.593392	Mean dependent var	0.020737
Adjusted R-squared	0.567979	S.D. dependent var	0.015378
S.E. of regression	0.010107	Akaike info criterion	-6.281376
Sum squared resid	0.006538	Schwarz criterion	-6.119484
Log likelihood	221.7075	F-statistic	23.34992
Durbin-Watson stat	2.063679	Prob(F-statistic)	0.000000

Table VIII: Inflation Estimation: Positive and Negative Shock Without Lag

Dependent Variable: D(LOG(CPI),1)
Method: Least Squares
Date: 03/25/02 Time: 09:44
Sample(adjusted): 1980:2 1997:2
Included observations: 69 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.026509	0.006129	4.324951	0.0001
POSGOV	5.39E-06	3.28E-06	1.642714	0.1056
NEGGOV	2.50E-06	4.10E-06	0.610286	0.5439
POSM2	-1.55E-07	5.13E-07	-0.302372	0.7634
NEGM2	3.71E-07	7.85E-07	0.472597	0.6382
POSEXR	6.03E-05	4.68E-05	1.287238	0.2029
NEGEXR	-2.15E-05	4.64E-05	-0.462978	0.6450
WOILP	-4.24E-05	2.77E-05	-1.530998	0.1309

R-squared	0.107999	Mean dependent var	0.020737
Adjusted R-squared	0.005638	S.D. dependent var	0.015378
S.E. of regression	0.015334	Akaike info criterion	-5.408802
Sum squared resid	0.014344	Schwarz criterion	-5.149775
Log likelihood	194.6037	F-statistic	1.055080
Durbin-Watson stat	2.200933	Prob(F-statistic)	0.403204

Table IX: Inflation Reaction to Positive and Negative Shock With 2 Lags

Dependent Variable: D(LOG(CPI),1)
Method: Least Squares
Date: 03/25/02 Time: 09:47
Sample(adjusted): 1980:3 1997:2
Included observations: 68 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.019659	0.004180	4.703001	0.0000
POSGOV	1.53E-06	2.81E-06	0.544787	0.5885
POSGOV(-1)	2.51E-06	2.96E-06	0.849231	0.4002
POSGOV(-2)	-2.38E-06	2.90E-06	-0.818907	0.4171
NEGGOV	4.44E-06	3.70E-06	1.202624	0.2353
NEGGOV(-1)	2.26E-07	3.97E-06	0.056809	0.9549
NEGGOV(-2)	3.62E-06	3.83E-06	0.942861	0.3507
POSM2	1.15E-07	5.03E-07	0.228576	0.8202
POSM2(-1)	1.40E-07	6.15E-07	0.227400	0.8211
POSM2(-2)	-8.73E-07	6.41E-07	-1.362166	0.1798
NEGM2	-5.98E-08	8.43E-07	-0.070938	0.9438
NEGM2(-1)	4.96E-08	1.22E-06	0.040690	0.9677
NEGM2(-2)	6.46E-07	9.06E-07	0.713608	0.4791
POSEXR	7.96E-05	9.16E-05	0.869684	0.3890
POSEXR(-1)	-7.68E-05	8.92E-05	-0.860591	0.3939
POSEXR(-2)	3.87E-05	5.71E-05	0.678119	0.5011
NEGEXR	-0.000119	5.09E-05	-2.336119	0.0239
NEGEXR(-1)	0.000124	5.66E-05	2.197651	0.0330
NEGEXR(-2)	8.68E-06	6.60E-05	0.131621	0.8959
WOILP	0.000635	7.60E-05	8.364633	0.0000
WOILP(-1)	-0.000721	0.000101	-7.136859	0.0000
WOILP(-2)	4.76E-05	7.46E-05	0.638542	0.5263

R-squared	0.716840	Mean dependent var	0.019790
Adjusted R-squared	0.587571	S.D. dependent var	0.013314
S.E. of regression	0.008550	Akaike info criterion	-6.429508
Sum squared resid	0.003363	Schwarz criterion	-5.711432
Log likelihood	240.6033	F-statistic	5.545351
Durbin-Watson stat	2.742616	Prob(F-statistic)	0.000001