THE ANALYSIS OF INSTRUMENT INTERDEPENDENCY OF MONETARY POLICY TO INDONESIA'S ECONOMIC GROWTH

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Abstract- This research excavates the instrument interdependency of monetary policy to Indonesia's economic growth during 2000-2011. Series time data were conducted that were collected from Bank Indonesia, Central Bureau of Statistics and other related sources. The methods used in this research were Vector Autoregression (VAR) that was continued by Structural Vector Aut0regression (SVAR). Shock was employed to the monetary instrument in order to predict the effect on Indonesia's economic growth and to display the effect of shock resulted in short, medium and long-term. There were some conditions need to be completed within this approach namely the test of unit root and integration degree in which it was to discover whether the data used was stationer or not. If it is not stationary, the regression resulted is not efficient. Co integration is one of the approaches that is often used in economic research to avoid counterfeit regression, in terms of putting more indolence variables (lag). The research findings conclude that import shock (ε IMP) in short-term dominantly contributed to the growth (GROW), while in medium and long-term, the variance of domestic interest rate level (ε rDOM) dominantly contributed to growth (GROW). The policy of increasing the shock OMO 5 % in 2010 was not effective to reduce the number of unemployment, to press the rate of inflation and to increase the economic development. Then, it is important to conduct another policy simulation to discover the result on target policy, for instance by degrading the domestic interest rate level to encourage the local investor to invest their funds in the country. This is an effective policy for long period so that the economic development keeps growing. Furthermore, the coordination between monetary and fiscal policies must be fully controlled to attain the ultimate achievement.

Keywords: Instrument of Monetary Policy, VAR, SVAR, Indonesia's Economic Growt

1. INTRODUCTION

Monetary policy is central bank policy of monetary control in order to achieve the expected development of economic activities which are the high job opportunities, stable inflation rates, payment balance and firmly established rates of economic growth (Pohan, 2008).

According to Mundell-Fleming, the efficiency of fiscal and monetary policy in influencing aggregate income depends on accepted regime of exchange rate. In floating or flexible exchange rate, effective monetary policy influences national incomes. In contrast, for the countries that apply stable exchange rate, it is only effective fiscal policy that influences the national incomes (Mankiw, 2000).

Partially, the increase of Legal reserve requirement (GWM) will affect to the reduction of money supply (Pohan, 2008) and the amount of credit channel. However, Figure 1.2 (b) and Figure 1.3 (a) do not tell the same. The trend of money supply increases and so does the amount of credit channel of investment loans. The findings of a research conducted by Julaihah (2004) were slightly different as at the time of the research, the increase of the money supply (JUB) was not channeled to the society, yet it was taken by the increase of GWM. Consequently, the increase of JUB did not give any effect to the increase of real sector.

Theoretically, the decrease of domestic interest rates gives an influence to the world of work by the increase of investment, work fields (the decrease of unemployment rates) and economic growth. This is in line with the findings of the research conducted by Julaihah (2004) that the increase of money supply affected the inflation rates that showed the trend decreased.

Tight money policy conducted in 2001 by increasing interest rates was expected to decrease the money supply (Dornbusch, 2008). However, the policy was not sufficiently effective to withdraw the money supply in society and raise the rupiah's value that continued to depreciate because of the ongoing capital flight. The conditions were caused by the lack of public trust to government and monetary sector.
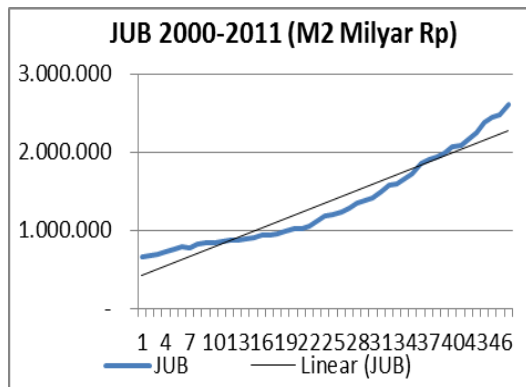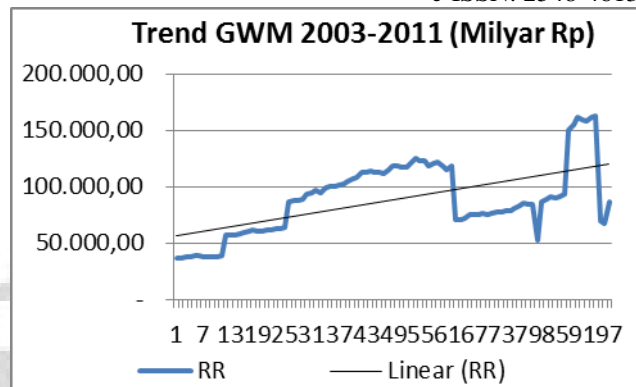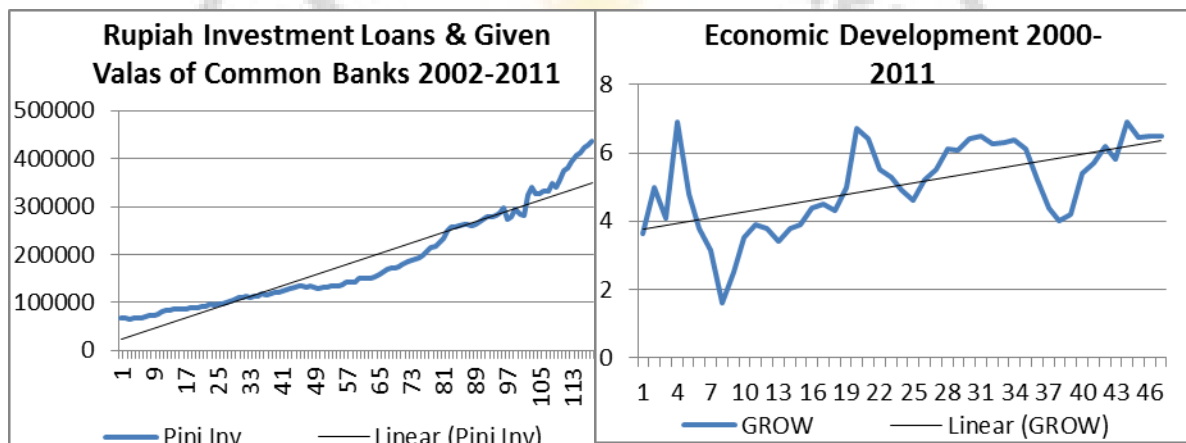
Figure 1a. Trend of Money Supply

Figure 1b. Trend of Legal Reserve Requirement

The objectives of the study

This study, generally, aimed to analyze the instrument interdependency of monetary policy to Indonesia's economic growth. Then, it was going to discover the effect of monetary instrument shock to Indonesia's economic growth in short, medium and long-term.

The Significance of the Study

According to the problems and objectives of this study, the findings of this study were expected to (1) enrich horizons in theories of economics, particularly Monetary Economics and Macroeconomics, and specifically in theories of dynamic models as Structural Vector Auto Regression in order to review and analyze the effect of monetary policy to the indicators of macro-economy, and (2) become references for further studies and policy-making.

2. REVIEW OF LITERATURE

2.1. Monetary Instruments and Indicators of Indonesia's Macro-Economy

According to the implementation, Bank Indonesia is still using base money as the operational target. Monetary instruments used in influencing the operational target are Open Market Operation (OPT), Discount window, Legal Reserve Requirement (GWM) and urges (Warjiyo and Solikin, 2003). OPT instrument is conducted through marketable securities auction focused on adding or reducing liquidity in money market. Open Market Operation (OPT) is the purchase and sale of government obligation by central bank (Mankiw, 2007).

Legal Reserve Requirement is a central bank regulation that demands banks to have the deposit ratio of minimum reserve. The raise of reserve requirement will increase deposit ration of reserve and decrease money multiplier as well as money supply (Mankiw, 2007). The money supply consists of two components which are M1 and M2. M1 consists of automatically and instantly applicable assets that have no obstacle of the payment. The diagram below shows the final target achieved.

2.2 Sollow Swan Theory of Growth

As time passes and the classicism shifted to neoclassicism, the process of neoclassical economic development happened as the consequence of capital accumulation in which the development was the gradual, harmonic and cumulative process. Neoclassical theory was optimistic to economic development. Neoclassicists considered that economic growth was a process of increasing the production of goods and services that was resulted by the development of the quantity and quality of production factors.

In 1960's, the theory of economic development was dominated by neoclassicism. The most essential contribution of Sollow and Swan's work was focused on the importance of savings and capital formation for economic development and developmental sources of a country. Neoclassical production has function in which the specification of the model assuming that "constant return to scale, diminishing return" is for every input and good elasticity of substitution among inputs.

2.3 Mundell-Fleming Model

Mundell-fleming model explains the balance of money market and goods market in an open economy and believes in exchange value (Andysmith, AtD, et.al, 1995; Mankiw 2000; Taylor, 1999). The main assumptions of the model are elaborated in the following.

1. Domestic economy is a small scale economy of a nation compared to the world economy in which the variable of incomes, values and interest rates are exogenous.
2. Domestic economy produces goods containing imported raw materials that are traded in international markets and are a perfect substitution for goods in international markets.
3. Domestic demand is determined by the value of P constant. The value of foreign currencies from world production P* is also assumed constant. The representation of exchange value e = nominal exchange value, measured as the amount of domestic currency units per foreign currency units, for instance £ 0,645 = 1 Euro. The increase of exchange value is the depreciation of the value of domestic currency.

3. METHOD

3.1. Research Design

In general, the steps of the process conducted in this study are shown in Figure 2. The process was started by the background of the study. Then, the problems of the study were formulated, supported by the review of literatures and set hypotheses.
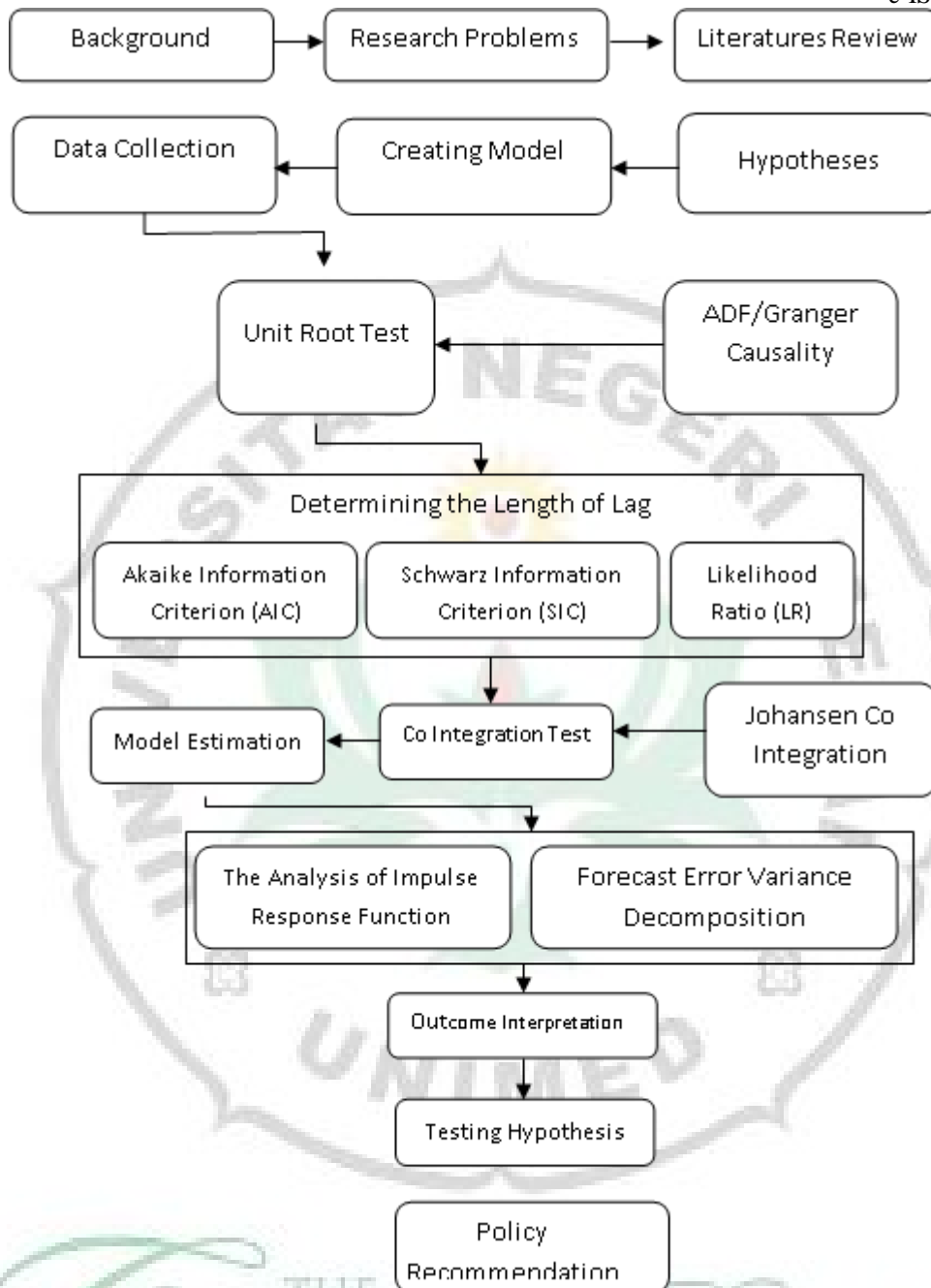
Figure 2. Research Design

3.2. Types and Sources of Data

The data used in this study were secondary data which were taken from Bank Indonesia, Central Bureau of Statistics and other relevant sources. The data were time series ones annually, quarterly and monthly started from 2001 until 2011.

Table 1. Types and Sources of Data

No	Data/Variabel	Symbol	Sources	Types
1	Open Market Operation	OPT	BI	
2	Legal Reserve Requirement	GWM	BI	
3	Interest Rates Discount	Rdiskonto	BI	
4	The Amount of Money Supply	JUB	BI	
5	Domestically Commercial Interest Rates	RDOM	BI	Time series monthly; annually 2001-11
6	Rupiah Exchange Value	EXC	BI	
7	Export Value	EXPOR	BPS	
8	Import Value	IMP	BPS	
9	Investment Value	INV	BPS	
10	Inflation Rate	INF	BI	
11	The Rate of Economic Growth	GROW	BPS	
12	Unemployment Rate	UNEM	BPS	
13	Payment Balance	BOP	BI	

3.3. Model Vector Autoregression (VAR)

VAR is mostly used to discover the effects of monetary policy as the dynamic effect of monetary policy and the effectiveness of monetary policy (Gordon and Leeper, 1994; Rudebusch, 1998; Hakim, 2003).

The specification of VAR according to the conceptual framework in Chapter III is as follows:

$$\mathrm{V}AR(k), Z_t = A_1 Z_{t-1} + A_2 Z_{t-2} + ... + A_k Z_{t-k} + \varepsilon_t$$

with

Z_t = specified time series variable,

A_k = parameter matrix (nx1)

K = ordo or lag

4. RESULTS AND DISCUSSION

4.1 The Analysis of the Models

After the data completing the required assumptions, the results of the data were gained and made the interpretation,

Tabel 1. The Estimation Results of SVAR and Shock Effects OPT5% Year 2010

	Before Shock OPT		After Shock OPT		Shift
	Coefisien	Prob	Coefisien	Prob	Coef
C1 (OPT)	-1.367774	0.0041	1.834591	0.0891	3,202365
C2 (GWM)	-1.698417	0.0000	-2.009942	0.0046	-0,311525
C3 (rDisk)	-0.845875	0.0030	-1.329271	0.0000	-0,483396
C4 (rDOM)	1.636008	0.0000	2.080652	0.0000	0,444644
C5 (EXC)	-5.090151	0.0074	-1.767656	0.0007	3,322493
C6 (EXPOR)	5.636611	0.0000	4.858220	0.0000	-0,77789
C7 (IMP)	-7.356434	0.0000	-1.797756	0.0000	5,558678
C8 (INV)	-0.063818	0.9031	-0.279942	0.0929	-0,216124
C9 (UNEMP)	2.091569	0.0006	-0.473848	0.0712	-2,565417
C10 (BOP)	0.126896	0.4110	0.280409	0.0592	-0,153513
C11 (INF)	-0.148985	0.3123	0.172498	0.2420	0,321483

4.2 Impulse Response Function (IRF)

The interpretation of SVAR results can be used to analyze the response function to balance rate and the accumulated response function to balance rate and proportion of variance. This analysis is known as Impulse Response Function (IRF). It is used to discover the effects of the change of one

variable deviation standard to the variable or other variables. The analysis of IRF is categorized into three periods which are short-term period for 1-5 years, mid-term period for 6-10 years and long-term period more than 10 years.

Tabel 2. The Summary of the Results of Impulse Response Function Growth

No	Variable	Short-Term	Mid-Term	Long-Term
1	ε OPT	-	-	+
2	ε GWM	-	+	-
3	ε rDiskonto	-	-	-
4	ε rDOM	+	-	-
5	ε EXC	-	-	-
6	ε Expor	-	+	+
7	ε Impor	-	+	+
8	ε INV	-	+	-
9	ε Unemp	-	+	+
10	ε BOP	+	+	-
11	ε INF	-	+	+
12	ε GROW	+	-	-

It can be seen from Table 4.2 that the accumulation of random shock response in short-term or multiplier effect of the variables was relevant to the theory in which the increase of BOP and GROW would increase the economic growth. However, the increase of rDOM was still far from the expectation as it was able to increase the rate of GROW. This condition was used to overcome the inflation as the high rate of inflation was potential to hinder the economic growth. Whereas the increasing accumulation of random shock response of OPT, GWM, rDiskonto, EXC, EXPOR, IMPOR, INV, UNEMP and INF would decrease GROW in short-term period. It was known that the increase of export that affected the decrease of economic growth was not relevant to the theory. It was caused by the most contributed sector of Gross Domestic Income for 2004-2010 which was from processing industry sector. It was from both oil and gas industry and non-oil-gas industry which had proportion 24%-28%, and the sector of agriculture, farming, forestry and fishery that had proportion 13%-15% to PDB including exported sectors. In mid-term, the increase of OPT, EXPOR, IMP, INV, UNEMP, BOP, INF, GROW would increase GROW. It was found that some conditions were relevant to the theory. However, INF and IMP were parallel that this condition was irrelevant to the theory. The low rate of INF (below 10%) was able to increase the rate of economic growth as this condition was able to encourage the manufacturers to gain more profits. However, if the rate of inflation kept increasing, the condition would interrupt the economic activities. It was same as IMP as the high demand of imports would interrupt the stability of payment balance. The increase of imports was able to raise the rate of economic growth if the rate of exports was also increased. Therefore, export nets were expected to become the source of foreign exchange to increase the output.

In long-term, OPT, EXPOR, IMP, UNEMP and INF had parallel connection with economic growth. The high demand of imports in society in long-term period was still able to increase the economic growth. The high consumption rate of society was still the source of national income even though this condition encouraged the inflation.

4.3 Variance Decomposition

Variance decomposition aims to measure the estimate of variance error of a variable by discovering the differences before and after the shock, whether it is from the variable or other variables. The analysis of variance decomposition is divided into three major periods which are short-term periods for 1-5 periods, mid-term periods for 6-10 periods and long-term period for more than 10 periods.

5. CONCLUSIONS

According to the previous explanation, generally, it was found that the interpretation of VAR and SVAR had a connection between monetary instrument and Indonesia's economic growth. Meanwhile, it was specifically concluded that:

1. According to the interpretation of VAR and SVAR, specifically, it was found that there was a connection between monetary instrument and the rate of economic growth. Moreover, some variables did not significantly affect the growth (GROW), like investment (INV), payment balance (BOP) and inflation (INF). The relationship between the two variables also had positive connection as in domestic interest rate (rDOM), export (EXPOR), unemployment (UNEMP) and payment balance (BOP). In contrast, the negative connection happened in open market operation (OPT), legal reserve requirement (GWM), discount interest rate (rDiskonto), exchange rate (EXC), export and unemployment (UNEMP). Then, after increasing shock OPT to 15% in 2010, it was found that the variables that had significant effect to GROW were rDiskonto, rDOM, EXC, EXPOR and IMP, while OPT, GWM, INV, UNEMP BOP, INF and GROW did not give any significance to GROW. The most significant effect after increasing shock was found in IMP, whereas EXPOR had the most significant coefficient in influencing the growth.

2. In short-term, the import shock variance (ε IMP) dominantly contributed to the growth (GROW), while in mid- and long-term the variance of domestic interest rate (ε rDOM) dominantly contributed to the growth (GROW). It meant that the shock of domestic interest rate obviously gave a contribution to the growth. If the shock of domestic interest rate increases, the growth rate will also increase and vice versa. After increasing the shock of OPT to 5% in 2010, it was shown that in short-term the import shock variance (ε IMP) dominantly contributed to the growth, while in mid- and long-term the shock variance of domestic interest rate (ε rDOM) dominantly contributed to the shock variance of growth.

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