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Do Credit Channel and Interest Rate Channel Play Important Role in Monetary Transmission Mechanism in Indonesia? : A Structural Vector Autoregression Model

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Abstract

This paper assesses the importance role of two monetary transmission mechanism channels in managing inflation and contributing to economic growth, by employing Structural Vector Autoregression (SVAR) model. The monetary transmission channels are interest rate channel and credit-bank lending channel. The model is then solved by implementing forecasting error variance decomposition to investigate the contribution of each variables to both inflation and economic growth. It is shown that interest rate channel plays important role in monetary transmission mechanism for maintaining inflation but has limited role in the economic growth. In the other hand, credit-bank lending channel can effectively affect economic growth.

1. Introduction

Bank Indonesia as the country's monetary authority is by law given a single objective of maintaining the value of its currency, this is interpreted as inflation targeting (IT). Beside the former objective, monetary policy must contribute to the country's economic growth.

The monetary transmission mechanism by which monetary policy is transmitted into real sector has been discussed by economist in recent years. How the monetary policy can transmitted into changes in

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output and managing inflation has received great attention related with the developing of economic scale of the country and also the changes of international markets condition. Actually there being a voluminous literature on the monetary mechanism topic but unfortunately still no consensus about the most important mechanism influence the real sector. The literature suggests that monetary policy decisions can influence the real sector via two channels – money channels and credit channels. The money channels requires a developed financial market hence its operation may not be significantly apparent in developing country where the financial markets are relatively unsophisticated. In such countries monetary policy can affect the real sector via credit channel. Ramlogan (2007) has analysed the monetary transmission mechanism in Trinidad Tobago, a small developing country context from an empirical perspective. The previous study by Monteil (1991) has analysed the monetary transmission mechanism in a developing country context from a theoretical perspective but little is known empirically about the way the mechanism operates despite the potential benefits to policy makers. According to the both previous study, this paper helps to find another perspective by measuring the relative impact of interest rate channel-as a part of money channel- and credit channel in big developing country : Indonesia.

The selection of the monetary transmission mechanism (mtm) channel is very important priority for Bank Indonesia in formulating monetary policy. This will be linked to the next step, the choice of policy instruments and procedures for implementing the policy. Bank Indonesia notes some mtm channels, including both of them are interest rate channel and credit-bank lending channel. As another developing countries Indonesia still develop its financial markets and banking is still dominated the financial sector. Due to this condition it is seemed that the response of banking sector is very important affecting the effectiveness of monetary policy transmission. Finally, by improving knowledge of the monetary transmission mechanism may help promote economic growth if we can get the better choice of target variables.

This paper attempts to find empirical results by using a structural vector autoregression (SVAR) analysis. SVAR analysis is useful in this context as it allows estimation of the response of inflation targeting (IT) and economic growth to monetary policy innovations through interest rate channel dan credit channel-bank lending channel. It can assist Bank Indonesia designing an effective monetary policy. The paper is organised as follows. In Section 2 Literature Background including the conceptual background and previous research. The Research design is described in Section 3. Data analysis and interpretation are presented in Section 4. Results are presented in Section 5 and Section 6 Concludes.

2. Literature Background

The monetary transmission mechanism by which monetary policy is transmitted into real sector has been discussed by economist in recent years. There are two channels via which monetary policy affects the real sector-money channel (or interest rate channel) and the credit channel (Ramlogan, 2007). According to Romer and Rommer (1990) there are two key conditions required for money (interest rate) channel to work. First of all banks must not be able to perfectly shield transaction balances from changes in reserves and second there must be no close substitutes for money in the conduct of transactions in the economy. According to the Keynesian interest rate channel, a policy induced increase in the short term nominal interest rate leads first to an increase in longer term nominal interest rate (Ireland, 2005). Interest rate channel stresses that monetary policy can influence aggregate policy through interest rate changes. In this case, the effect of changes in short-term nominal interest rate is transmitted to the medium and long term interest rate through the mechanism of balancing demand and supply in the money market. Any changes interest rates will affect the cost of capital and in turn will affect investment and consumption spending as component of aggregate demand (Mishkin, 1995).

The contribution from interest rate channel to real activity is recognized as a black box mechanism according the fact had great difficulty in identifying a quantitatively effect of cost of capital variable (Bernanke and Gertler, 1995). The dissatisfaction prompted a new approach based on the role of credit. There are two main views of credit channel; bank lending channel and balance sheet channel (Mishkin,

1995). Bank lending channel emphasized the importance role of banks in the economy. The bank lending channel seems more relevant to developing countries because it is based on the premise that borrowers can only finance projects through loans and that the supply of loans is directly influenced by policy changes. Since alternatives sources of credit are very limited or even non-existent costumers cannot replace lost bank credit with other types of finance and so are forced to cut back on investment spending which results in a fall in output (Oliner and Rudebusch, 1996).

The previous majority studies into monetary transmission mechanism has focused in developed countries. The early literature concentrate money-output relationship in Mexico. The results seem to indicate a causation from money (nominal interest rate) to output, implying the interest rate channel effectiveness (Ansari and Ahmed, 2007). Another report has conducted by Kuttner and Mosser (2002) in US concluded that the economy's sensitivity to interest rate remains an open question although it seemed that the response of real activity to interest rate has diminished. The influenced factors not from less sensitivity to interest rate per se but from endogenous reaction of monetary policy. The previous study in US using structural VAR approach by Bernanke (1986) finds that credit shocks are important for output. Research on the monetary transmission mechanism in developing countries has conducted in Malaysia by Azali and Matthews (1999). The study found that in the prior periods to the liberalization the role of bank credit was dominated of economic development while the money and credit dominated the period after liberalization. Another research has carried out in Trinidad and Tobago by Ramlogan (2007). The results of the structural VAR analysis shows that the credit channel is more important than the money channel in transmitting impulse from the financial sector to the real sector. The previous study in Indonesia has conducted by Nuryati (2004). By using analysis of Impulse Response Function and Forecasting Error Variance Decomposition of VAR approach, the results showed that BI's monetary policy during the crisis only affects the short-term economic policy, and had little effect on prices in the long run. It has not been significantly supported the previous research doing by Kusmiarso, *et. al.* (2001) that monetary mechanisms in Indonesia for managing inflation mainly through interest rates but there still no finding the dominant channel affecting economic growth. Overall and consistent for developing countries, the bank lending channel and exchange rate channel is the major determinant of the transmission mechanism. Based on the above, one of the most important factors that influence the monetary transmission mechanism is the degree of sophistication (*the degree of complexity or degree of progress*) from the money market and the composition of financial influence investment decisions. In many developing countries the alternative non-monetary assets are not perfect substitutes; money channel can not play a major role and bank loans seem to represent a major source of financial investment.

3. Research Design

To support the important role of money we use the money demand theory Irving Fisher (1) and (2). It has explained relationship between the quantity of money by the number of total expenditure to purchase final goods and services produced in the economy (P x Y), where P is the price level and Y is income or aggregate output. The concept of providing a connection is called the velocity (V) which is the average amount of money spent for the purchase of goods and services produced in a year. Its function is as follows:

$$V = \frac{PY}{M} \tag{1}$$

by multiplying M and V, then we will get the equation of agregate output. From this equation we support the money causation theory following New Keynesian and Monetarist view that money plays important role in the determination of level of economic activity .

$$Y = \frac{MV}{P} \tag{2}$$

In order to explain the credit channel we use model of demand and supply of credit by Bernanke and Blinder (1988). Credit demand equation is formed by lending rates, interest rate on bonds, and output :

$$Ld = L (\rho, i, y) \tag{3}$$

Credit supply is formed by lending rates, interest rate on bonds, bank liabilities, and required reserves:

$$Ls = \lambda (\rho, i) D (1-\tau) \tag{4}$$

But in this study we did not use all of the variables for explaining credit channel-bank lending channel according to assumption that Indonesia, as the same as other developing countries, had unsophisticated financial market and banking has dominanted the financial sector. This implied that we exclude interest rate on bonds.

3.1. Structural VAR

This study was designed with a quantitative approach using secondary and primary data from Bank Indonesia and other official sources. We used real GDP (LY), third party fund (LDEP), Loans (LKRD), statutory reserves (LGWM), narrow money (M1), 1-month SBI rate as policy rate (SBI), 1-month deposit rate (SBDEP), lending rate (SBKRD), and for proxy of inflation we used consumer price index (LIHK). Structural Vector Autoregression (SVAR or Structural VAR's) is a form of extension of the methods of Vector Autoregression (VAR). SVAR uses economic theory in making restrictions to identify structural innovation by the estimated residual (Enders 1998). Mc Coy (1997) support SVAR approach for identifying a number of disturbances (independent disturbances) use restrictions based on economic theory than a theory restriction-used in the VAR. SVAR model can be approached in two restriction standards (Hachica, 2009). The approaches are (1) SVAR AB by Amisano and Giannini and (2) SVAR Blanchard Quah (Siregar and ward, 2002). The first approach aimed to determine the relationship between variables in the short run (*contemporaneous*) so that the restriction is short-term restriction. According to McCoy (1997) and Siregar and Ward (2002) the number of restrictions to be applied as the model became over-identified $\geq (k^2 - k) / 2$. According to (1), (2), and (4), the final SVAR Model followed Siragar and Ward (2002).

Equation 5 and 6 showed that the SBI and reserves (LGWM) as instrument of monetary policy is autonomous. As instrument of monetary policy SBI has been assumed not influenced by other endogenous variables and structural shocks (structural innovation) in the second variable. The inovation has been solely due to the effect of changes in the variables itsself.

$$\begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 & 0 & 0 & a_{38} & 0 \\ a_{41} & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & a_{54} & 1 & 0 & 0 & 0 & 0 \\ 0 & a_{62} & 0 & a_{64} & 0 & 1 & 0 & a_{68} & 0 \\ 0 & 0 & 0 & 0 & a_{75} & a_{76} & 1 & a_{78} & 0 \\ a_{81} & a_{82} & a_{83} & 0 & 0 & 0 & a_{87} & 1 & 0 \\ a_{91} & a_{92} & a_{93} & 0 & 0 & 0 & a_{97} & a_{98} & 1 \end{pmatrix} \begin{pmatrix} \varepsilon^{SBI} \\ \varepsilon^{LGWM} \\ \varepsilon^{LM1} \\ \varepsilon^{SBDEP} \\ \varepsilon^{SBKRD} \\ \varepsilon^{LDEP} \\ \varepsilon^{LKRD} \\ \varepsilon^{LY} \\ \varepsilon^{LIHK} \end{pmatrix} = b_{ij} \begin{pmatrix} e^{sbi} \\ e^{gwm} \\ e^{m1} \\ e^{sbdep} \\ e^{sbkrd} \\ e^{ldep} \\ e^{lkred} \\ e^{ly} \\ e^{lihk} \end{pmatrix} \tag{5)-(13}$$

Equation 7 is a function of the money demand implied that narrow money has been affected by 1-month deposit rate and output level (LY). Equation 8 indicated that the structural shocks on 1-month

deposit rate has been affected by 1-month interest rate innovation. While at 9, lending rate has been affected by changes in 1-month deposit rate. Equation 10 and 11 based on equation (4) indicated that third party fund has formed by reserves (LGWM), 1-month deposit rate, and output level (LY). While the number of loans issued by banks has been affected by the availability of funds, interest rate, and output level. Equation 12 showed that the level of output is affected by the SBI, reserves (LGWM), M1, and the number of loans issued. While equation 13 suggests that inflation has been affected by SBI, reserves (LGWM), M1, the number of loans issued, and the level of output. SVAR model must be estimated to determine whether the restriction right and identified a value based Likelihood Ratio (LR) and the p-value (Siregar and Ward, 2002).

4. Data Analysis and Interpretation

4.1. Forecasting Error Variance Decomposition Of Output Level

The analysis of FEVD noted that the variability of output level which has been indicated by interest rate channel only 0.51 percent. The role of interest rate channel represented by SBI became greater from the beginning to the end of the period. Similarly, the role of lending rate (SBKRD) in explaining the variability of output level has been greater by the time period. On the other hand, the role of credit-bank lending channel represented by the LKRD showed that in the early period was 18.96 percent and stable until the last period at 14.15 percent. Overall more than 56 percent of the variability of output level in the short term until the end of the period has been affected by the changes in output level itself. However, after comparing the two channels it has been known that monetary transmission mechanism using bank lending channel gave more contribution to influence the output level compared to the interest rate.

Table 1. Forecasting Error Variance Decomposition Of Output Level

Endogenous Variabel	Period	Shocks								
		SBI	GWM	M1	SB DEP	SBKRD	LDEP	LKRD	LY	LIHK
Output level (LY)	1	0.344	0.147	0.000	0.999	0.005	13.697	18.964	65.844	0.000
	6	0.510	0.816	0.173	3.172	1.615	22.094	14.154	56.603	0.862
	12	0.509	0.816	0.173	3.223	1.742	22.050	14.131	56.494	0.862
	18	0.509	0.816	0.173	3.224	1.745	22.049	14.130	56.491	0.862
	24	0.509	0.816	0.173	3.224	1.745	22.049	14.130	56.491	0.862
	30	0.509	0.816	0.173	3.224	1.745	22.049	14.130	56.491	0.862
	36	0.509	0.816	0.173	3.224	1.745	22.049	14.130	56.491	0.862
	42	0.509	0.816	0.173	3.224	1.745	22.049	14.130	56.491	0.862
	48	0.509	0.816	0.173	3.224	1.745	22.049	14.130	56.491	0.862

The finding showed that the role of interest rate channel was insignificant for output level. It could be explained that interest rates itself was still high cost investment that led to the growth of investment–as component of aggregate demand-did not show significant growth. The central Bank of Indonesia has issued a policy rate by lower the nominal interest rate (BI 2009). But unfortunately this policy can not be transmitted properly by banks. Banks were still taking the lending rate at the high level and respectively for the level deposit rate. In order to gain high profit the banks will maintain the margin between interest rate on credit and deposit. This difference of the interest rates also led high investment costs. When compared with the study conducted by Kumiarso (2001), which used data from 1988 to 1998, the behavior of deposit rate and lending rate in this study were equal to the period after the 1998 crisis. Since the 1998 crisis the deposit rates and lending rates has not been responsive to the lower level of policy

rate. During this study it has found that the credit channel was more dominated supported economic growth. The monetary authority must be concern to the banking intermediary as the main player in financial system in Indonesia. This finding also supported the previous research in Malaysia(Azali and Matthews, 1999) and in Trinidad Tobago (Ramlogan, 2007).   The different finding that the bank lending channel in Indonesia was strongly influenced by third party fund (22.05 percent) and deposit rate (3.22 percent) as the source of credit supply. It is supported the previous finding by Oliner and Rudebusch (1996) since alternatives sources of credit are very limited or even non-existent costumers cannot replace lost bank credit with other types of finance.

4.2. Forecasting Error Variance Decomposition Of Inflation

Table 2. Forecasting Error Variance Decomposition Of Inflation

Endogenous Variabel	Period	Shocks								
		SBI	GWM	M1	SB DEP	SBKRD	LDEP	LKRD	LY	LIHK
Inflation (LIHK)	1	86.929	0.121	0.000	0.014	0.000	0.198	0.274	0.225	12.238
	6	58.655	7.099	2.670	6.412	6.766	4.669	2.107	3.031	8.591
	12	58.226	7.051	2.653	6.577	7.132	4.641	2.123	3.066	8.532
	18	58.217	7.050	2.653	6.580	7.139	4.640	2.123	3.067	8.530
	24	58.217	7.050	2.653	6.580	7.139	4.640	2.123	3.067	8.530
	30	58.217	7.050	2.653	6.580	7.139	4.640	2.123	3.067	8.530
	36	58.217	7.050	2.653	6.580	7.139	4.640	2.123	3.067	8.530
	42	58.217	7.050	2.653	6.580	7.139	4.640	2.123	3.067	8.530
	48	58.217	7.050	2.653	6.580	7.139	4.640	2.123	3.067	8.530

Monetary transmission mechanism through interest rate stresses that monetary policy can influence aggregate policy through interest rate changes. During the period study showed that inflation variability has been explained by the role of the interest rate channel, represented by SBI. In a very short period the role of this channel reached 86.93 percent. In the next period until the end of the period, it reached more than 58.22 percent. The role of credit channel was insignificant in explaining the variability of inflation since the beginning. Based on these results the interest rate channel play a greater role than credit channel-bank lending channel in explaining inflation. This indicates that the role of the SBI as a short-term monetary instruments to maintain price stability is still a great degree. The results were consistent with inflation targeting research in Indonesia by Nuryati (2004).

5. Conclusions and Recommendations

5.1. Conclusion

The monetary transmission mechanism has been largerly studied in developed countrya but relatively little is known empirically in developing country. This research is needed due to the fact that Indonesia is a big developing country that assumed still had unsophisticated degree of financial market. The results of the structural VAR analysis showed both the credit channel and interest rate channel play important role in trasmitting monetary policy to the real sector. The two channels had different role influenced real sector. Interest rate channel is important for managing inflation. The monetary authority should focused to maintain inflation using SBI and short term interest rate. The credit-bank lending channel still dominated   the role for economic growth. Bank of Indonesia has been recognized this by issued regulation supporting banking intermediary.

5.2.Recommendation

As in other developing countries, it is likely that the monetary transmission mechanism in Indonesia will continue to develop in response to financial market development and economic liberalization. The researchs still important to support the development of real sector.

REFERENCES

Ansari, M.I. and S.M Ahmed. (2007). Does Money Matter?Evidence From Vector Error Correction For Mexico.Journal of Developing Area, 07(01):185-201

Azali, M. and Matthews, K. (1999). Money-Income and Credit-Income Relationship During Pre and Post Liberalization Periods : Evidence from Malaysia. Applied Economics,   31(10):1161-1170

Bernanke, B.S. and A.S.Blinder.(1988). Credit, Money, and Agregat Demand.The American Economic Review, 78(4) : 435-439.

Bernanke, B.S. and M. Gertler.(1995).Inside The BlackBox:The Credit Channel of Monetary Policy Transmission. Economic Research Report. New York University.

Ireland, P.N. (2005). The Monetary Transmission Mechanism. Boston College and NBER.

Kumiarso, B., E. Sukawati, S. Pambudi, D. Angkoro, A. Prasmono, I.S. Hafidz.(2001). Interest Rate *Channel* In Transmission Mechanisms of Monetary Policy in Indonesia. Directorate of Economics Research and Monetary Policy, Bank Indonesia. Jakarta.

Kuttner, K.N. and P. Mosser. (2002).The Monetary Transmission Mechanism:Some Answers and Further Questions. FRBNY Economic Policy Review. Federal Reserve Bank of New York.

Mishkin, F.S. (1995). Symposium on the monetary transmission mechanism. Journal of Economic Perspectives.(9): 3-10.

Nuryati, Y.(2004). Pelaksanaan Kebijakan Moneter Pentargetan Inflasi di Indonesia. Tesis Magister Sains. Program Pascasarjana, Institut Pertanian Bogor, Bogor.

Oliner, S. D. and Rudebusch G.D. (1996). Is there a broad credit channel for monetary policy?. Federal Reserve Bank of St. Francisc. Vol. 1 pp. 3-13.

Ramlogan, Carlyn.(2007). Anism of Transmission Mechanism Monetary Policy in Trinidad and Tobago. Journal of Economics Studies 31(5) : 435-447

Romer, C. and Rommer D. (1990). New Evidence on the Monetary Transmission Mechanism. Brookings. Papers on Economic Activity. Vol. pp. 149-198.

Siregar H and Bert D. Ward.(2002). Can Monetary Policy/Shocks Stabilize Indonesian -Macro-Economic Fluctuations? Chapter in Tan, A.H.H.(ed) 2002. Monetary and Financial Management in Asia in the 21st Century. World Scientific. New Jersey.