

# Effectiveness of the Monetary Transmission Mechanism in Achieving the Ultimate Goals of ASEAN-3

Sebastiana Viphindrartin<sup>1\*</sup>, Mohmmad Saleh<sup>1</sup>, Silvi Asna Prestianawati<sup>2</sup>

<sup>1</sup>*Economics and Business Faculty, Universitas Jember*

<sup>2</sup>*Economics and Business Faculty, Universitas Brawijaya*

\**corresponding email: sebastiana.unej@unej.ac.id*

## ABSTRACT

This study was intended to find out which channels (exchange rates, interest rates, credit and money) have the most significant effect on price stability and economic growth during 1997 Q1-2017 Q4 using the Vector Error Correction Model (VECM). Based on the estimation, Interest Rate and Exchange Rate were the most influencing channels, while in Malaysia were the Exchange Rate and Credit. In the Philippines, Credit and Interest Rate were relatively effective. In addition, in the countries, the monetary policies they applied had a significant correlation with two economic variables: inflation and economic growth.

**Keywords-** *effectiveness, monetary channels, VECM*

## 1. INTRODUCTION

The global economy is currently experiencing dynamic changes that are fluctuating and uncertain. This reflected in many events that have taken place over the past few decades, starting with the global crisis of 2008-2009, followed by European foreign debt in 2010-2012 and the realignment of global commodity prices in 2014-2016. A dynamism full of uncertainty as a result of changes in global conditions both in the political order, security and global geopolitics which is often referred to as VUCA (Volatility, Uncertainty, Complexity, Ambiguity) is one of the bases for the implementation of economic policies for the realization of sustainable economic development.

One of the policies that can be taken by the government and the Central Bank is Monetary Policy. Many researchers like it (Ahmad, D, M, Afzal. And U, Ghani, 2016) have found the fact that Monetary Policy as one part of Macroeconomic Policy has been proven to have an active and positive role in stabilizing the economy and increasing economic growth in a country. As one example, several developing countries in ASEAN that have similar economic characteristics and structures, namely Indonesia, Malaysia, and the Philippines, also have the potential for vulnerability to crises in a country. In the period 1996-2017, the Asian crisis originating from Thailand is a bad record for the economy of developing countries where output growth has declined to a minus level, especially Indonesia, which has the deepest correction when compared to other countries.

Therefore, to realize an effective Monetary Policy in achieving several economic end goals such as increasing output and stable inflation (Fuddin, M, K.2014), this study will further analyse several options for monetary policy transmission media such as interest rate channels, credit channel, money channel, exchange rate channel and asset

price channel to be analysed by comparison of how big and effective the five channels are when viewed from Malaysia, Indonesia, and the Philippines.

## 2. LITERATURE REVIEW

Monetary policy is all actions and activities of the central bank relating to how to control and influence the conditions of development and movement of monetary variables (money supply, controlling interest rates and conception of exchange rates) in order to achieve the goals of certain specified policies (Mishkin (2004: 457 ) both in the form of price stability (inflation), improvement in real output growth (economic growth) as well as a wide range of available employment/employment opportunities.

### 2.1 Monetary Policy Transmission Mechanism (MPTM)

MPTM theory initially referred to the functions and wars of money in the economy as outlined in the Quantity Theory of Money (Fisher, 1911) which sought to provide theoretical and empirical answers such as (i) how monetary policy has an important influence in the formation of the real sector and (ii) through the transmission mechanism by which monetary policy can influence existing economic conditions (Bernanke and Blinder, 1992). In its development, along with advances in the financial sector, there are several channels of monetary policy transmission mechanisms (Cecchetti, 1995; Mishkin 1996; Kakes, 2000; De Bondt, 2000) namely Direct Monetary Channels, Interest Channels, Exchange Rates Channels, Asset Price Channels, Credit Channels, Financial Balance Channels, and Expectations Channels.

The operation and operation of the MPKM itself starts from the decision of the central bank's monetary policy through policy interest rates and other monetary instruments that can occur through two stages, namely through (i) the interaction between the central bank and banks and financial institutions and (ii) the interaction between banks and other institutions with economic actors in the real sector in the process of financial intermediation.

### 2.1.1 Exchange Rate Channels

MPKM through the exchange rate channel in the "money view" affects the real economy through export and import variables in aggregate demand and the price of imported goods against inflation. According to research conducted by Hossain, 2015, the exchange rate has a direct influence on inflation generated through major components such as real interest rates and exchange rate volatility which will also affect economic growth. On the other hand, this direct influence is also based on exchange rate developments that will affect the formation of price patterns by companies and inflation expectations in the hands of the public, moreover on imported commodities from abroad which can be explained through the Purchasing Power Parity Theory. In this way, the central bank does not only focus on interest rate policy, central bank policy can also be implemented by applying foreign exchange interventions to maintain and achieve exchange rate stabilization. Central bank intervention will also directly influence the supply of foreign exchange and, therefore its development on the foreign exchange market. In this connection, there are several motives or targets for foreign exchange interventions, including to control exchange rate volatility, so that the exchange rate does not deviate from its expected value.

### 2.1.2 Interest Rate Channels

The MPKM channel that might be said to be often used in the macroeconomic model is by involving the influence of interest rates on investment expenditures by companies and households, both in terms of investment in fixed assets and assets that are as durable as vehicles, machinery, and equipment. Thus the Macroeconomy model includes the effect of interest rates on community consumption. The transmission mechanism through the interest rate channel emphasizes that monetary policy can influence aggregate demand through changes in interest rates. In this case, the effect of changes in short term interest rates is transmitted to medium/long term interest rates through a balancing and bidding mechanism on the money market. The development of interest rates will affect the cost of capital "production costs" which in turn will affect investment expenditure and consumption which are components and aggregate demand.

### 2.1.3 Credit Channels

The first model of the credit channel was introduced and developed by Stiglitz and Weis in 1981 which based an understanding of the debtor who has personal information on the feasibility of his business. The transmission mechanism through the credit line can be divided into two lines. First, the bank lending channel 'bank lane channel' which emphasizes the impact of monetary policy on the financial condition of the bank, specifically the asset side. Second, the balance sheet channel 'the company's balance sheet' which influences monetary policy on the company's financial condition, and subsequently influences the company to get credit.

According to bank loans, in addition to the asset side, the liability side of the bank is also an important component of the monetary policy transmission mechanism. If the central bank carries out a contractionary monetary policy, for example, by increasing the ratio of minimum reserves at the central bank, the reserves at the bank will decrease so that the loanable funds that can be lent by banks will decrease. If the above is not done by adding and reducing securities, the ability of banks to provide loans will decrease. This condition causes a decrease in investment and subsequently pushes down output.

Meanwhile, the company's balance sheet path emphasizes that monetary policy undertaken by the central bank will affect the company's financial condition. In this case, if the central bank conducts expansionary monetary policy, interest rates on the money market will go down, which drives stock prices to increase. In line with this increase, the net value of the company (net worth) will increase, which further reduces adverse selection and moral hazard actions by the company. These conditions encourage an increase in bank lending, further increasing investment, and ultimately increasing output.

## 3. METHODS

This research was conducted in 3 ASEAN countries, namely Indonesia, Malaysia, and the Philippines, which were based on the adoption of the exchange rate regime adopted. The type of data used in this study is secondary data in the form of time series data with characteristics in the form of quarterly data from 1997 to 2017 obtained from the International Monetary Funds (IMF), World Bank and Asian Development Bank.

The decline in model specifications in this study adapted from the research of Gabriel Efe Olorin and Pius Effiong Akpan (2017) who examined the Effectiveness of Monetary Policy Transmission in Channels in A Recessed Economy. This research is based on an analysis of the impact on macroeconomics namely inflation, price / financial market stability and economic growth in Nigeria, using interest rate channels, asset prices, exchange rates, credit and monetary operations using the VAR method.

From the adoption of several models, the researcher formulates the model in the modification in accordance with

the scope of the variables that need to be further analysed through scientific studies, so that the economic model is obtained as follows:

$$INF = F(ER, SBR, SBD, SBP, EKS, IMP, CD, M2, GDP)$$

information :

INF	= Inflation
ER	= Exchange Rate
SBR	= Real Interest Rate
SBD	= Deposit Interest Rate
SBP	= Loan Interest Rate
EKS	= Export
IMP	= Import
CD	= Credit
M2	= Money Supply
GDP	= <i>Gross Domestic Product</i>

## Data Analysis Method

### Vector Autoregressive (VAR) Method / Vector Error Correction Model (VECM)

The VAR model was first developed by Sims, which assumes that if there is true stimulation between a set of variables, the variables must be treated equally, there are no distinguishing exogenous or endogenous variables (Sonderlind, 2002; Gujarati and Potter, 2009). VAR is a flexible model that is not theoretical and easy to use in the time series data model.

VAR also referred to as a non-structural model arises because often theories are not able to explain the behavior of economic variables well to answer a particular economic problem (Verbeek, 2004; Gujarati and Potter, 2009). The VAR model has special properties in which endogenous and exogenous variables are the same. It's just that the VAR model requires a number of inaction variables that exist to determine the relationship between variables (Gujarati: 2005). The following is a basic model of VAR in this study:

- a. Interest Rate Channel

$$INF_t = \alpha_{10} + \alpha_{11}SBR_{t-1} + \alpha_{12}SBD_{t-1} + \alpha_{13}SBP_{t-1} + \alpha_{14}GDP_{t-1} + e_t$$

- b. Exchange Rate Channel

$$INF_t = \alpha_{10} + \alpha_{11}LOGER_{t-1} + \alpha_{12}EKS_{t-1} + \alpha_{13}IMP_{t-1} + \alpha_{14}SBR_{t-1} + \alpha_{15}GDP_{t-1} + e_t$$

- c. Credit Channel

$$INF_t = \alpha_{10} + \alpha_{11}CD_{t-1} + \alpha_{12}SBD_{t-1} + \alpha_{13}SBP_{t-1} + \alpha_{14}GDP_{t-1} + e_t$$

- d. Money Channel

$$INF_t = \alpha_{10} + \alpha_{11}M2_{t-1} + \alpha_{12}GDP_{t-1} + e_t$$

A VECM model is a form of VAR that is due to the existence of data forms in research that are not stationary but cointegrated. VECM is known as the VAR design for non-stationary series that has cointegration relations. The specifications of the VECM model restrict the long-term relationship of endogenous variables but still allow for short-

term dynamics. The following is a basic model of VECM in this study:

- a. Interest Rate Channel

$$INF_{t-1} = \alpha_{10} + \alpha_{11}SBR_{t-1} + \alpha_{12}SBD_{t-1} + \alpha_{13}SBP_{t-1} + \alpha_{14}GDP_{t-1} + e_t$$

- b. Exchange Rate Channel

$$INF_{t-1} = \alpha_{10} + \alpha_{11}LOGER_{t-1} + \alpha_{12}EKS_{t-1} + \alpha_{13}IMP_{t-1} + \alpha_{14}SBR_{t-1} + \alpha_{15}GDP_{t-1} + e_t$$

- c. Credit Channel

$$INF_{t-1} = \alpha_{10} + \alpha_{11}CD_{t-1} + \alpha_{12}SBD_{t-1} + \alpha_{13}SBP_{t-1} + \alpha_{14}GDP_{t-1} + e_t$$

- d. Money Channel

$$INF_{t-1} = \alpha_{10} + \alpha_{11}M2_{t-1} + \alpha_{12}GDP_{t-1} + e_t$$

In estimating the VAR / VECM Model there are several stages of testing that must be carried out in order to obtain optimal results by testing data stationarity, cointegration testing, optimum lag selection, estimation of the VAR / VECM model, Impulse Response Function (IRF) and Variance Decomposition (VD) :

### Statistical Test of Roots - unit-roots or Stationarity of Data

Analysis using an autoregressive vector model (VAR) for more accurate and reliable results, the data used to answer the problems that have been formulated in the modeling must meet stationary requirements, the test to determine the stationarity of the data is to do a unit root test. There are several tests in unit-roots testing, one of which is: Dicky-fuller test, Augmented Dicky Fuller test or using the Philips-Perron Test (Wardhono, 2004). In principle, the unit root test has the purpose of observing whether certain coefficients of the model are thought to have a value of one or not. If it is not stationary, then differentiation is needed until the time series type data becomes stationary. This research will use the unit root test in the form of the Augmented Dicky Fuller (ADF) test (Gujarati: 2015).

### Cointegration Test

A cointegration test is a test used to find out whether or not there is a long-term relationship between selected variables whether independent or dependent. The cointegration test itself is a continuation of unit roots and integration tests, but it must be ensured beforehand that the variables in the study have the same degree of integration or not. To find out the cointegrating nature can be seen from the regression equation with the Engel-granger Cointegration Regression Durbin-Watson (CDRW) test and the johannes test. Whereas in this study to find out using the Johannes test to find cointegration on a number of variables. Cointegration variables are variables that do not contain root units and do not have intercepts (Wardhono, 2004: 70).

**Optimum Lag Test**

Another important thing in testing the VAR estimation model is the determination of lag in the VAR system. Optimal lag is needed in order to capture the effect of every other change in the VAR system (Mikhael, et al., 2010). In determining the optimum lag, there are several criteria, namely Akaike Information Criterion (AIC), Schwarz Information Criterion (SCI), Final Prediction Error (FPE), and Hannan Quinn (HQ) where the optimum lag is indicated by an asterisk recommended by the AIC, SCI criteria. FPE, and HQ (Ukhfuani, 2010).

**Granger Causality Test**

Granger causality test is used to test the causality relationship between two variables. This initiative stems from the knowledge of interdependence between variables. If there are two variables y and x, then does x cause y or y to cause x or does both apply or there is no relationship between the two. For example, the variable y causes the variable x means how much the value of x in the current period can be explained by the variable x in the previous period and the value of u in the previous period (Wardhono, 2004). Therefore, Granger's causality test illustrates the relationship between variables.

**Impulse Response Function (IRF)**

After estimating the VAR / VECM model, an explanation is needed regarding the structure produced by VAR / VECM. Impulse Response Function (IRF) can be formed to describe the dynamic structure of the VAR / VECM model, which is to determine the effect of shock between other independent dependent variables by themselves. This means that IRF describes the behaviour of one variable shock to another variable at a certain time period so that it can be seen the length of influence of the dependent variable on shocks in error term with the standard deviation values in the VAR / VECM system (Gujarati, 2004)

**Variance Decomposition (VD)**

Variance decomposition, called Forecast Error Variable Decomposition (FEVD) is a dynamic structure of the VAR / VECM model that separates variations from various variables. VD is done after IRF testing but in contrast to VD which is more about the proportion of the movement of the effect of shock on variable to other variables in the current and future periods.

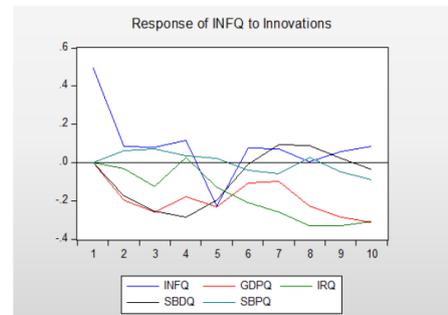
**4. RESULT AND FINDINGS**

Monetary Policy Transmission is part of the process of monetary policy in influencing the economy in general and the price level (Price Stability) in particular. The monetary

transmission mechanism is a process that is said to be a complex "Black Box" which is famous for having a variety of channels that can simultaneously work to achieve the ultimate goal of monetary policy. Therefore, the channels contained in MPKM become important to be able to identify from the perspective on the effectiveness of the instruments and the time frame of policy action. In fact, the success of monetary policy implementation is highly dependent then on the ability of policymakers to track changes in parameters related to Transmission. (Khundrakpam & Jain, R, 2012). In influencing the real sector of monetary policy transmission with several channels, it is not as soon as possible to directly influence it because of the time lag.

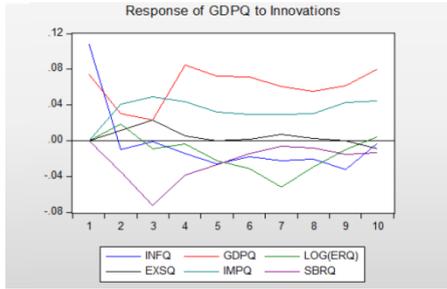
**Indonesia**

In Indonesia, the results of the study show that the interest rate channel has a significant effect on inflation and has a long term relationship to inflation in Indonesia.

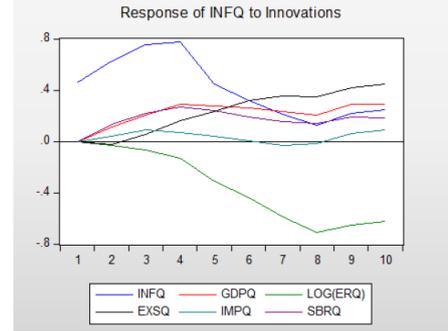


Picture 4.1. The Results of the Impulse Response Function in the Indonesian State Interest Rate

Another thing is proven by the following results. First, the R-Squared value of the interest rate channel is able to explain its effect on inflation by 97%. Second, the variable interest rates can explain the variation in inflation of 30.31% with a time lag of up to 10 quarters. The three real interest rates (SBR) show a positive coefficient related to the movement of the inflation rate in Indonesia both in the long term and short term which occurs in the 4th lag. These three things are in accordance with the research conducted by Natsir (2008) that the interest rate channel is quite effective in achieving the final target rather than inflation in Indonesia. In addition, Funding's research (2014) also mentioned positive relationship between real interest rates and inflation. In the next macroeconomic objective, the most effective channel in influencing economic growth (GDP) is the exchange rate channel.



Picture 4.2. The Results of the Impulse Response Function of the Indonesian State Exchange Rate Channels



Picture 4.3. Results of Impulse Response Function in Malaysian State Exchange Rates Channels

This is evidenced by the large R-Square value of the exchange rate channel in influencing credit by 91% and causality granger also strengthens the findings in the study if there is a two-way relationship between the exchange rate with GDP. This is in accordance with research conducted by Korkmaz (2013) who examined the impact of the exchange rate there is economic growth that shows a significant relationship between the exchange rate with economic growth in Turkey using granger causality analysis.

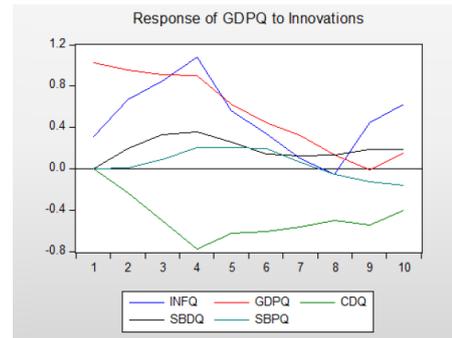
In the short-term estimation of VECM in this study, it can also be shown by the behavior of the exchange rate if there is an appreciation of 1%, it will reduce GDP so that the reverse if there is a derivation, will increase GDP. This is also in line with research conducted by Warrijo and Solikhin (2016) which explains that transmission through the exchange rate explains that a decline in interest rates in accordance with purchasing power parity will result in exchange rate depreciation which will lead to an increase in exports than in accordance with the calculation of Growth economics through the expenditure approach for open economy countries will also be able to increase GDP.

**Malaysia**

In Malaysia, the results show that the exchange rate channel is the most effective channel in achieving the ultimate goal of monetary policy and among several variables in the exchange rate channel have a short-term and long-term coefficient relationship in influencing the movement of inflation in Malaysia which in the long term relationship The relationship created by each variable of the exchange rate channel is a significant negative such as the exchange rate, exports, and real interest rates and significant positive imports.

This is evidenced by the R-Squared value of the exchange rate channel which at least 77% results show in influencing inflation. The results also have similarities with research conducted by (Poon, 2010) where effective channels in Malaysia are exchange rate channels that affect Malaysian international trade and will have an impact on the real sector including inflation.

In the next macroeconomic goal, the most effective channel in influencing economic growth (GDP) is the credit channel.

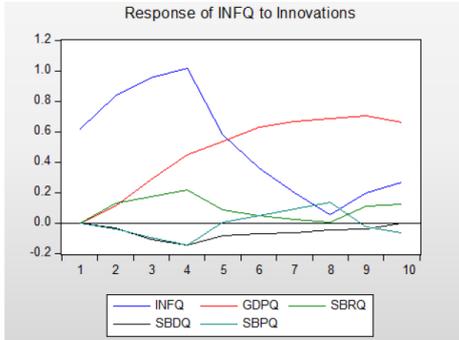


Picture 4.4. Results of Impulse Response Function Malaysian State Credit Line

This is evidenced by the value of R-Square credit channel in influencing GDP output recorded at 78%. Surely this is in accordance with research conducted by Sipahatur, M, A et al (2016) which states that there is a significant causal relationship between credit and economic growth. This is also supported by the results of this study where there is also a causal relationship between GDP and credit growth in Malaysia. In addition, the rules in the new Keynesian model regarding the rules of the Taylor rule are not found in Malaysia through the relationship between real interest rates and inflation through the granger test which states a one-way relationship which means it has a positive relationship.

**Filipina**

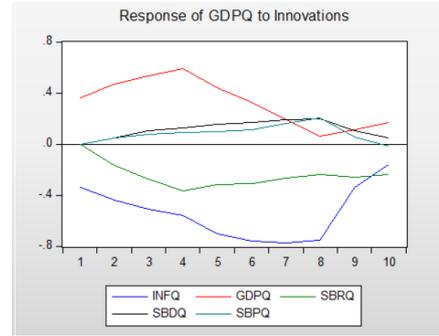
Based on the results of analysis through IRF and VD, the mechanism of monetary policy transmission through the credit channel in the Philippines has a significant effect of 67% in creating price stability.



Picture 4.5. Results of Impulse Response Function Philippine Country Credit Line

This is reinforced by the statement from Guinigundo (2008) in the Philippines that the availability of credit remains closely related because of the dominant role of the banking system in the Philippine financial system. This strengthening was also supported by the influence of significant deposit rates and lending rates in the short term and the long-term relationship between deposit rates and inflation. The same thing was revealed by Chowdhury, E, K (2012) who found a significant relationship between inflation and lending rates (Bank Lending Rate) in Bangladesh, and none other than the exchange rate channel which was also said to have a relatively effective second effect which had an impact on international trade in the Philippines. In addition, the Philippine economic report by the IMF (2018) reports that the growth and stability of bank credit continue to grow and exceeds the rate of economic growth. The bank's relatively high ability and stable problem loans and minimal exposure to external financing have provided some buffer against potential financial stability risks. Although there is no significant relationship between inflation and credit growth based on the results of VECM and similar to Johnson. K, A (2014) also realized that inflation did not have a significant impact on credit growth.

The final goal of the next monetary policy objective is economic growth where the most effective channel in regulating economic growth is the interest rate channel based on the level of influence of the credit variable on economic growth which has a proportion of 12.4 % in the 10th period.



Picture 4.6. Results of the Impulse Response Function in the Philippines Country Interest Rate Channels

The results were also strengthened by the R-Square of the interest rate channel to output (GDP) which contributed 84%. Another support arises from Gylych's research, J (2016) which examines the impact of interest rates on economic growth in Nigeria and the results show that interest rates have an impact on economic growth, although a little, but can be circumvented by lowering interest rates which will increase investment.

Collaboration between interest rates and credit is one of the relatively effective channels in achieving the ultimate goal of monetary policy in the Philippines can be seen from the decision of the Central Bank of the Philippines (BPS) which in 2016, BPS adopted the Interest Rate Corridor (IRC) system for monetary operations, IRC of 100 basis points consisting of deposit and loan interest rates and the repurchase facility / Reserve Repurchase Facility (RRP). This system has sought to improve the transmission of monetary policy by better adjusting the level of the money market with the level of policy, as well as trying to encourage banks to be more careful in managing liquidity more actively by managing credit and balanced savings (IMF Philippines, 2018).

**5. CONCLUSION**

In a general, each a channel in the monetary policy transmission mechanism (MPKM) in ASEAN-3 results shows that there is a long-term and short-term relationship between variables in the study based on the model of each channel (interest rate channel, exchange rate channel, Credit channel and money Channels) based on analysis through VEC M modelling.

Apart from the results per country where not all variables show long-term equilibrium results but there is a short-term equilibrium relationship with a 6 limit.

The effectiveness of monetary policy transmission in ASEANa-3 can be seen from two indicators, namely through the Impulse Responses Factor (IRF) test and the Variance Decomposition (VD) test. The results show that for Indonesia the most effective channel in achieving the ultimate goal of monetary policy price stability (inflation) is

the interest rate channel, while the channel that has a relatively effective set of economic growth (Output) is the exchange rate channel, the State of Malaysia results show that the channel which is relatively effective in achieving the final target of inflation is the exchange rate channel, whereas for the final target of economic growth through the interest rate channel. The Philippines shows that the channel which has a relatively effective approach to achieving the ultimate goal of monetary policy is the channel of credit while the final goal of the policy is in controlling economic growth through the interest rate channel.

From the results of testing the effectiveness of monetary policy transmission in ASEAN-3 in developing countries, namely Indonesia, Malaysia and the Philippines, the most dominant channel in playing its role to achieve the ultimate goal of monetary policy objectives is the interest rate channel and exchange rate copy, the results of the study are in line with which one is quoted from Warrijo (2014) the most influential channel in developing countries / EMEs generally takes place through interest rate channels and exchange rate channels.

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