



The Influence of Conventional and Islamic Monetary Instruments on Gross Domestic Product: An Empirical Investigation on Indonesia

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Abstract: This study aims to determine that Islamic monetary instruments and conventional monetary instruments both have an effect on the Gross Domestic Product in Indonesia. Indonesia nowadays uses a dual banking system so that in regulating its monetary policy, Indonesia uses a dual system monetary (Islamic monetary policy and conventional one) as well. This research uses the quantitative approach with Vector Auto Regression (VAR) method. This study seeks to fill the gap between theory and empirical evidence of the linkage between monetary instruments and gross domestic products. Such linkages, especially on Islamic monetary instruments that encourage the growth of the real economy should have more influence on the development of the real economy than conventional economic instruments. This research is held from January 2012 until December 2016 in Indonesia. There are 5 variables in this research, they are “Sertifikat Bank Indonesia” (SBI) and Reverse Repo “*Surat Utang Negara*” (SUN) to represent conventional monetary instrument, and the representative of Islamic monetary instrument is “*Surat Bank Indonesia Syariah*” (SBIS) and Reverse Repo “*Surat Berharga Syariah Negara*” (SBSN) and the last variable is Gross Domestic Product (GDP). The results of the study suggest that SBI has a significant positive effect on GDP in Indonesia. While Reverse Repo SUN, SBIS, and Reverse Repo SBSN have no significant effect on GDP. The results of this study can be used by the central bank to determine the portion of monetary policy in both Islamic and conventional banks to achieve the optimal goal of monetary policy

Keywords: SBI, SBIS, Reverse Repo SUN, Reverse Repo SBSN, Monetary

JEL Classification: E44

1. Introduction

Real sector is a representation of the public welfare because it is an overview of the amount of production of goods and services within a region. When the level of a country's productivity increased, it will affect the increase in Gross Domestic Product (GDP). This is in line with what Samuelson and Nordhaus (2005) have found that GDP is a gauge to assess the overall performance of the economy.



Table 1. Indonesia GDP Series 2010 by Expenditure Approach at 2010 Constant Prices
(In Billion Rupiah)

Period	GDP	% (Q to Q)
2014 Q1	2,058,584.90	0.04%
2014 Q2	2,137,385.60	3.83%
2014 Q3	2,207,343.60	3.27%
2014 Q4	2,161,552.50	-2.07%
2015 Q1	2,157,848.00	-0.17%
2015 Q2	2,238,761.70	3.75%
2015 Q3	2,312,640.00	3.30%
2015 Q4	2,273,261.60	-1.70%
2016 Q1	2,264,089.70	-0.40%
2016 Q2	2,354,797.70	4.01%
2016 Q3	2,428,569.90	3.13%
2016 Q4	2,385,577.10	-1.77%

Source: Statistic Indonesia (2017)

If the real sector is considered to be a representation of the public welfare, it means that the welfare of the Indonesian people had decreased indirectly in that several quarters. however, Indonesia's GDP (Y to Y) is increased in every quarter, indicating that the Indonesian public welfare has increased in every quarter if it's compared to the same quarter in a year before.

Monetary policy can not be separated from the economic growth. This is in line with what was stated by Warjiyo and Solikin in Rachman (2017) that the monetary authority policy conducted by the central bank in monetary control is for the effort in controlling the monetary value in achieving the desired economic conditions of a country.

Indonesian applies dual monetary system there are conventional monetary system and monetary system of Islamic. Therefore it is necessary to study which monetary policy gives more positive impact on the economy. This is because there are differences between these two The conventional monetary system uses the interest while the monetary system of Islamic uses the element of ju'alah. Islamic monetary system does not use an interest as in conventional one Because interest in Islam is prohibited Because of its usury. This is in line with what is written in QS: Ar-Rum verse 39 as follows:

وَمَا آتَيْتُم مِّن رَّبًّا لِّيَرْبُوًّا فِي أَمْوَالٍ لِّلنَّاسِ فَلَا يَرْبُوًّا عِنْدَ اللَّهِ وَمَا آتَيْتُم مِّن زَكَاةٍ تُرِيدُونَ وَجْهَ اللَّهِ فَأُولَٰئِكَ هُم
لُضْعَفُونَ (٣٩)

Wa mā 'ātaytum min ribā liyarbuwa fi amwāli n-nāsi falā yarbū 'inda l-Lāhi was mā 'ātaytum min zakātin turīdūna wajha l-Lāhi fa'ulā'ika humu l-lmuḍ'ifūna (39)

“And whatever you give for interest to increase the wealth of people will not increase with Allah. But what you give in zakah, desiring the countenance of Allah - those are the multipliers.”



A conventional monetary system is different from the monetary system of Islamic in the context that monetary system of Islamic follows rules of Islamic law and its practical application through the development of Islamic economics. Islamic strongly prohibits the payments and acceptance of interest, gambling or Gharar, as well as such activities that are contrary to Islamic rules and principles (Javaria, 2016)

Chowdury (1997) reveals the Endogenous Money theory which states that monetary policy is only a representative of the real sector, so there should be no dichotomy between a monetary sector and a real sector because these two sectors are must be inter-related. This means that the financial sector should not be developed faster than the real sector. The character of Islamic finance shows a direct link between the monetary sector and the real sector (Beik, 2010).

Monetary policy is very important because it can stabilize a condition of economic. The monetary policy is felt by the banking sector first and then transferred to the real sector. Monetary policy seeks to achieve sustainable high economic growth by maintaining price stability by regulating the balance of money supply or regulating the amount of money circulation with inventories of goods in order to avoid inflation.

So through the phenomenon, how the influence of conventional and Islamic monetary instruments to GDP becomes interesting to study. then, research objectives of this study are:

1. To examine the effect of conventional monetary instrument on gross domestic product in Indonesia
2. To examine the influence of Islamic monetary instruments on gross domestic product in Indonesia
3. To compare between conventional monetary instruments and Islamic monetary instruments that have the most influence on the gross domestic product in Indonesia.

The motivation behind this research is to determine which is Conventional monetary instruments or Islamic monetary ones that more effective in influencing the economic growth. Monetary policy is very important because it can stabilize economic conditions. The monetary policy is felt by the banking sector first which is then transferred to the real sector. Javaria (2016) "Banking sector is important in the context of motivating people to save, provide risk-free income for depositors, generate employment and attain economic welfare. It is important to note that these services are very important for our daily life. Because of such importance and trust banks work as an intermediary between depositors and borrowers. Banks accept savings from the general public and advance loans to entrepreneurs which play an important role in economic growth." Monetary policy seeks to achieve sustainable high economic growth by maintaining price stability by regulating the balance of money supply or regulating the amount of money circulation with an inventory of goods in order to control the inflation.

2. Monetary Policy

Nanga (2005) states that monetary policy is the process to regulate the amount of money circulation in society to achieve certain goals. The monetary policy essentially aims to achieve an internal balance such as high economic growth, price stability, development equity and external balance such as the balance of payments and to achieve other macroeconomic goals. Monetary policy is used to maintain economic balance by using its instruments through the monetary transmissions through the financial sector first and then directly or indirectly affect the real sector.

Riadi (2017) classified monetary policy into two, these are:

1. Expansive monetary policy or so-called loose monetary policy that aims to increase the amount of money in circulation to stimulate a sluggish economy by increasing people's purchasing power.
2. Contracting monetary policy or so-called tight monetary policy aimed at reducing the amount of money in circulation to reduce inflation.



Monetary Policy in Islam

Both conventional and Islamic monetary policy have a same monetary goal. But almost all conventional monetary instruments implementing an interest that is prohibited in an Islamic way. Therefore, conventional instruments that containing interest elements (bank rates, discount rate, open market operations with interest securities set before) cannot be used in the Islamic-based monetary policy. But some conventional monetary policy instruments, according to some Islamic economists, can still be used to control money and credit, such as Reserve Requirement, overall and selecting credit ceiling, moral suasion, and change in the monetary base.

In Islamic economics, there is no interest system so the central bank can not apply the discount rate policy. The Central Bank requires an interest-free instrument to control monetary economic policy in Islamic economics. In this case, there are some interest-free instruments that can be used by the central bank to increase or decrease the money supply. The challenge is how the abolition of the interest system, wouldn't hamper to control the money supply in the economy.

Islamic finance system implements the profit/loss-sharing system so that the amount of return or loss in the Islamic financial system depends on the real sector. If investment in the real sector is smooth then the return on the monetary system will increase (Huda et al., 2008).

Chapra (2000) in his *Islamic Monetary System* states that there are three sources of monetary expansion in Islam, there are;

1. A realistic and non-inflationary budgetary policy. A Muslim government must be able to implement a budget policy that is consistent with its objectives
2. Derivative deposits from commercial banks in a proportional reserve system that represent the money created by commercial banks in the process of extending credit and are the main source of monetary expansion
3. balance of payments Surplus. Despite the fact that only a few Islamic countries have a surplus on its balance of payments. If within a country has a surplus, government expenditures are regulated according to the economic capacity to generate real supply, it will not create an internal inflation.

According to Rab (2006), that Islamic monetary system encourages economic growth. Islam advocates the stability of the monetary system. Monetary stability can create exchange rate stability and currency stability. The stability of the value of money will also create a stability of return on investment which in turn will encourage business actors to do business and enterprise grow. In addition, in the field of international trade, a stable exchange rate between countries will increase the trade balance and increase the intensity of trade between countries. The source of the stability of this exchange rate is the Islamic teachings that prohibit interest, gambling and speculation. Activities of such activities potentially disrupt the stability of the monetary system. The instability of the monetary system also has the potential to undermine the real estate profits of businessmen due to fluctuations in real income due to exchange rate fluctuations. Rab (2006) argues that the ignorance of fiat money in classical economics is a source of economic injustice and inefficient production allocations. Chowdury (2012) in his book *Fundamental of Islamic Economics System* states that «the economic philosophy of an Islamic state is based on the concept of social justice. To achieve social justice, Islam takes two major steps: First, it prevents the concentration of wealth in the hands of few people; Second, it ensures the distribution of wealth through the effective rules.

Mechanism of Monetary Transmission

Warjiyo (2014) states that the mechanism of monetary policy transmission basically illustrates how the monetary policy adopted by the central bank to affect various economic and financial activities so that it can achieve the ultimate goal of monetary. More specifically, the mechanism of monetary



policy transmission can be interpreted as a monetary policy process aimed at influencing the real Gross Domestic Product (GDP) and inflation (Taylor, 1995).

Monetary Transmission Channel

Mishkin (1995) describes the five monetary channels as follows;

1. Money Channel

The monetary transmission through the money channel basically illustrates the clear relationship between the growth of money turnover and inflation proposed by Fisher with the following equation;

$$MV = PT$$

The equation above can be explained as the money supply (M) multiplied by the velocity of money (V) equal to the sum of real output (T) multiplied by the price level (P).

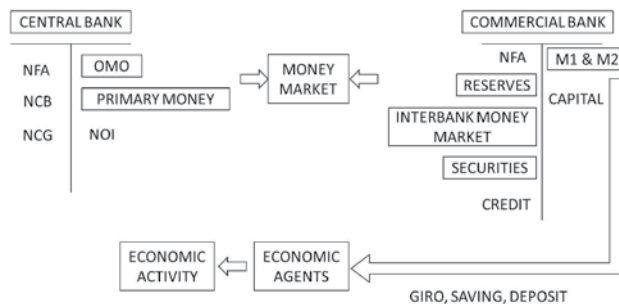


Figure 2.1 Monetary Transmission through Money Channel

Source: Warjiyo (2004)

The monetary transmission mechanism through the money channel begins with the actions of Bank Indonesia to regulate the primary money, which then affects the money supply M1 and M2 with the multiplier process and ultimately the money supply affects economic activity (Warjiyo, 2004). So, if the economic activity becomes more massive than before, then GDP will increase automatically at the end. According to the money view, the first effect of the tight monetary policy is to reduce both bank liabilities (deposits) and bank assets (the sum of loans and securities) (Bernanke, 1993).

2. Credit Channel

Monetary transmission through credit channel assumes that not all forms of public savings in money supply (M1 and M2) are channeled by banks through credit. This means that affect the real economy is a banking credit, not public saving.

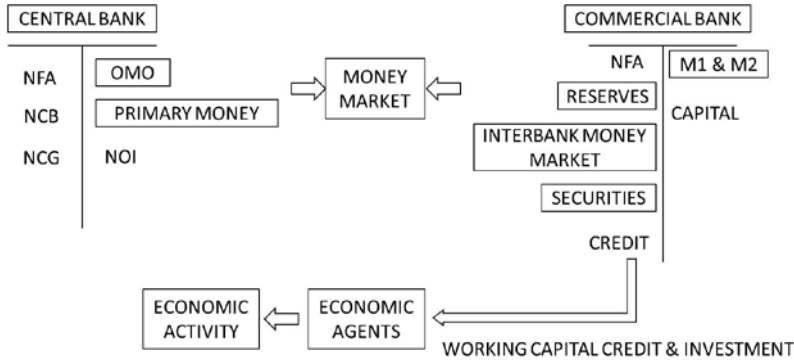


Figure 2.2 Monetary Transmission through Credit Channel

Source: Warjiyo (2004)

The difference in monetary transmission through money channel and credit channel is on lies in the assumption of a dominant credit market role because credit markets are not always in a balanced condition (Warjiyo, 2004). According to the credit, view is similar to money view above, the first effect of the tight monetary policy is to reduce both bank liabilities (deposits) and bank assets (the sum of loans and securities) (Bernanke, 1993).

3. Interest Rate Channel

Monetary transmission through the interest rate channel emphasizes the importance of interest rates in the real sector. The central bank’s monetary policy will affect interest rates that then affect economic activity.

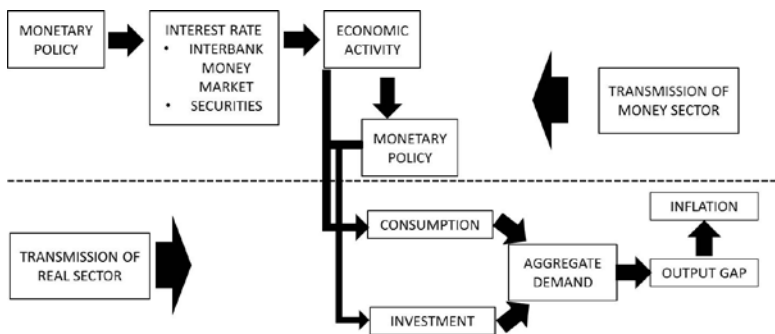


Figure 2.3 Monetary Transmission through Interest Rate Channel

Source: Warjiyo (2004)

Monetary Transmission through the channel of Interest Rate through two stages like the one in the picture above, the first stage is the transmission phase in the monetary sector and the second one is in the real sector. At the monetary sector stage, central bank policy will affect lending rates that will affect transmission in the real sector with the final result are output gap and inflation (Warjiyo, 2004). 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 (Romer and Romer, 1990).

4. Asset Price Channel

Monetary policy also affects the development of asset prices, both financial asset prices such as bond yields and stock prices, as well as prices of physical assets, particularly property and gold prices. This transmission occurs because investment in the investment portfolio is not only in the form of bank deposits but also in other forms, such as bonds, Shares and physical assets (Warjiyo, 2004). In this channel, both prices of a financial asset and physical asset will affect the decision of economic actor either to consume or to invest in things. This term will create an aggregate demand that will affect the GDP. According to Meltzer (1995), asset price movements beyond those reflected in interest rates alone also play a central role in the monetarist description of the transmission mechanism.

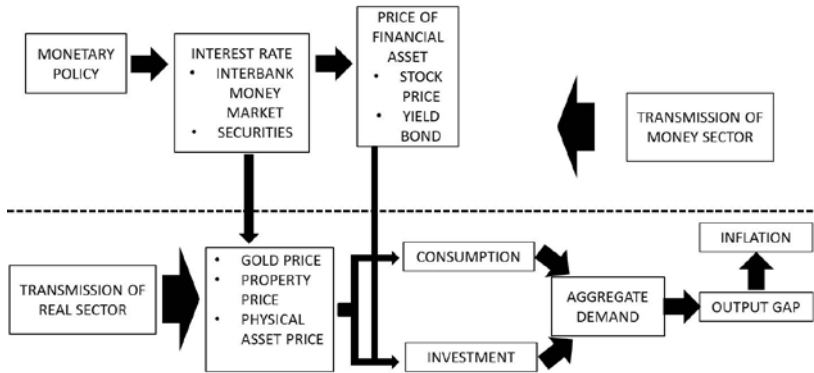


Figure 2.4 Monetary Transmission Through Asset Price Channel

Source: Warjiyo (2004)

5. Expectation Channel

The uncertain economic conditions make economic actors consider the economic and the financial prospects. They will formalize some perception of economic and financial developments. In the end, inflation expectations will be formed and also will influence the actions of economic actors to take decisions (Warjiyo, 2004).

The mechanism of monetary transmission through expectations channel can be explained by the following figure:

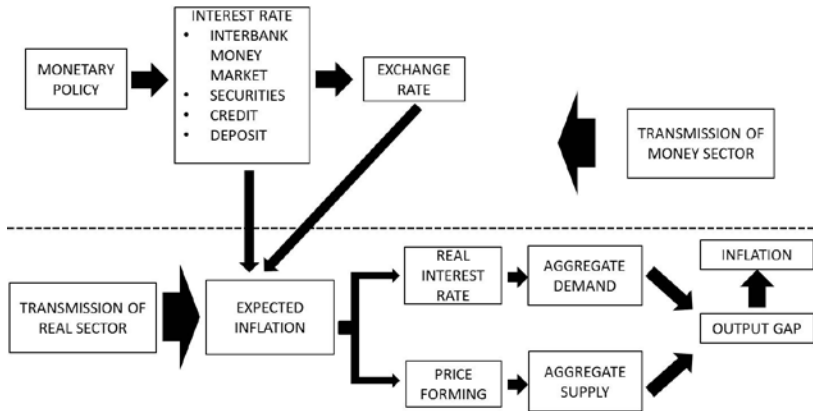


Figure 2.5 Mechanism of Monetary Transmission through Expectations Channel

Source: Warjiyo (2004)

Monetary Operation

Bank Indonesia is authorized to provide the independence of conducting monetary policy through the instruments as Open Market Operations (OMO) and Standing Facilities (SF) (BI, 2017). Open Market Operations (OMO) is an activity of securities transactions in financial markets by the central bank. OMO is done by issuing securities to reduce the liquid instruments of banks in order to minimize the ability of banks to provide credit so that money circulation in the community can be suppressed or by attracting issued securities to increase the ability of banks in providing credit so that increase the amount of money. OMOs with conventional monetary systems use interest rates as incentives while in Islamic OMOs do not use interest rates because it is prohibited in the Islamic religion. This is in accordance with the Word of God in QS: An-Nisa verse 29 below:

يٰۤاَيُّهَا الَّذِيْنَ ءَامَنُوْا لَا تَأْكُلُوْا اَمْوَالِكُمْ بَيْنَكُمْ بِالْبَاطِلِ اِلَّا اَنْ تَكُوْنَ جِزَءًا عَنْ تَرَاضٍ مِّنْكُمْ وَلَا تَقْتُلُوْا اَنْفُسَكُمْ اِنَّ اللّٰهَ كَانَ بِكُمْ رَحِيْمًا (٢٩)

Y ayyuh 'l-la na 'man l ta'kul amwalakum baynakum bilbali ill an takna tijratan 'an tarain minkum was l taqtul anfusakum inna 'l-Lha kna bikum rahman (29)

“O you who have believed, do not consume one another’s wealth unjustly but only [in lawful] business by mutual consent. And do not kill yourselves [or one another]. Indeed, Allah is to you ever Merciful.”

Conventional OMOs Variables

Bank Indonesia uses the instruments of *Sertifikat Bank Indonesia* (SBI) and Reverse Repo *Surat Utang Negara* (SUN) for conventional open market operations. *Surat Utang Negara* is issued by the government to finance the state budget.

1. Sertifikat Bank Indonesia (SBI)

SBI is issued by Bank Indonesia, it is a security as a recognition of short-term debt. SBI rate is set by the fixed rate method and the various one. The SBI rate at a fixed one is determined by Bank Indonesia (BI) and refers to the BI rate. SBI interest rate at various one is calculated using the weighted average. (BI, 2017)



2. Reverse Repo Surat Utang Negara (SUN)

Surat Utang Negara is a security in the form of debt securities that its interest payments and its principal are guaranteed by the government. SUN is used to finance the State budget and cover its short-term cash deficit. Reverse Repo SUN is a transaction of SUN sale by Bank Indonesia to commercial banks with repurchased agreements by BI (BI, 2017)

Islamic OMOs Variables

Bank Indonesia uses the instruments of *Sertifikat Bank Indonesia Islamic* (SBIS) and Reverse Repo of *Surat Berharga Syariah Negara* (SBSN). *Surat Berharga Syariah Negara* (SBSN) has the same function as a SUN that issued by the government but it used Islamic approach.

1. *Sertifikat Bank Indonesia Syariah* (SBIS)

Sertifikat Bank Indonesia Islamic is an instrument that prepared specially to serve the sale and the purchase of securities by applying the principles of Islamic. The SBIS monetary instrument is regulated in Article 6 PBI 10/36 / PBI / 2008 (BI, 2017).

2. *Reverse Repo Surat Berharga Syariah Negara* (SBSN)

Surat Berharga Syariah Negara (SBSN) commonly called *Sukuk Negara* are bonds that issued by the government of the Republic of Indonesia based on Islamic principles. Reverse Repo SBSN is SBSN selling activity by BI to Islamic banks with repurchased agreement by BI later. Akad that used by Bank Indonesia for Reverse Repo SBSN is *ba's ma'a l-wa'ad* (BI, 2017).

Gross Domestic Product

Gross Domestic Product (GDP) is the total product produced by a country. Samuelson and Nordhaus (2005) suggest that the most comprehensive measure for measuring total output in an economy is Gross Domestic Product (GDP). GDP is a measurement of the market value of the final product of goods and services. There are two ways to measure GDP, the first one is by using the prevailing prices for each calculation period and the second one is by using constant prices for all periods that typically use the base year that the economy assesses in its optimal state. The result of measuring GDP in a second way will produce a real GDP by eliminating the inflation variable.

Mankiw et. al in Sayed, M, and El-Seoud, A (2016) in catching up effect theory argued that if government policies stimulate the national saving rate, people will tend to save more and consume less, and this will create more resources available to make capital goods. Therefore, the capital stock will rise, causing growth in productivity and GDP.

3. Research Methods

Research Approach

This research uses descriptive quantitative approach using Vector Auto Regression (VAR) method with E-views application to see whether conventional monetary instruments and Islamic monetary instruments have long-term and short-term effects on Gross Domestic Product (GDP).

Types and Data Sources

The type of data used in this study is the secondary data in the form of time series in monthly periodization from January 2012 until December 2016

The data sources in this study are from *Statistik Ekonomi dan Keuangan Indonesia* (SEKI) on the official website of Bank Indonesia including variables of SBI, SBIS, Reverse Repo SUN and Reverse Repo SBSN. While the variable of GDP, data is taken from the official website of *Badan Pusat Statistik*.



Analysis Techniques

1. Stationary Test

The stationary test in this study used Augmented Dickey-Fuller (ADF) test with 5 percent of significance level.

2. Optimum Lag Determination

determinating optimum lag is used to remove autocorrelation in VAR system. The right optimum lag determination can be done by looking at the information criteria recommended by Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), and Hannan-Quinn (HQ), some of the above criteria using the residual sum of square (RSS) weighted. If there is an asterisk in the recommended lag by the above criteria, then it shows the optimal lag. Criteria with FPE or the smallest number of AIC, SIC, and HQ is the optimum lag.

3. Cointegration Test (Johansen's Cointegration Test)

Cointegration test is used to see the long-term balance among the observed variables. In this study, it uses Johansen's Multivariate Cointegration Test method.

4. Vector Error Correction Model (VECM) and Vector Auto Regression (VAR)

The VAR model is used if at least one variable is stationary at the level or if there is no cointegration between variables that are all stationary at the same difference. The VECM model is used if all variables are stationary in the same difference and there is cointegration between variables.

5. Impulse Response Function

Impulse response in this research focused on knowing the response of variable of SBI, Reverse Repo SUN, SBIS and Reverse Repo SBSN to GDP. The impulse response function describes the rate of shock from one variable to another variable over a certain time, so it can be known how long the effect of the shock of a variable on the other variable until the effect is lost or return to the equilibrium point.

6. Variance Decomposition

Variance Decomposition or also called forecast error variance Decomposition is a device in the VECM and VAR models that will separate variations from a number of variables that are estimated to be shocking components or to be innovation variables, assuming that the innovation variables are not mutually correlated. Then the decomposition variance will provide information on the proportion of movement of the effect of shock on a variable to the shock of another variable in the current period and in the future.

4. Data And Empirical Research

Data

The data employed in this study are monthly time series data, which is limited to the period 2012-2016. The collected data are Gross Domestic Product took from *Badan Pusat Statistik Indonesia* and *Sertifikat Bank Indonesia*, *Sertifikat Bank Indonesia Syariah*, *Reverse Repo Surat Utang Negara* and *Reverse Repo Surat Berharga Syariah Negara* which are taken from Bank of Indonesia as a Central Bank in Indonesia.

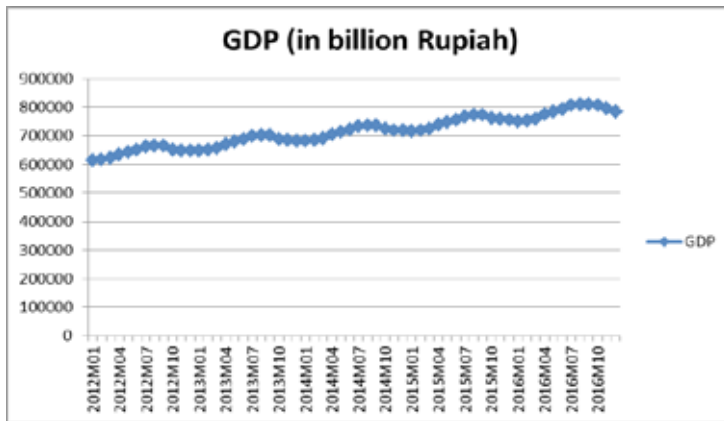


Figure 4.1 Graphic of Indonesia GDP 2012-2016
 Source: Badan Pusat Statistik (2017)

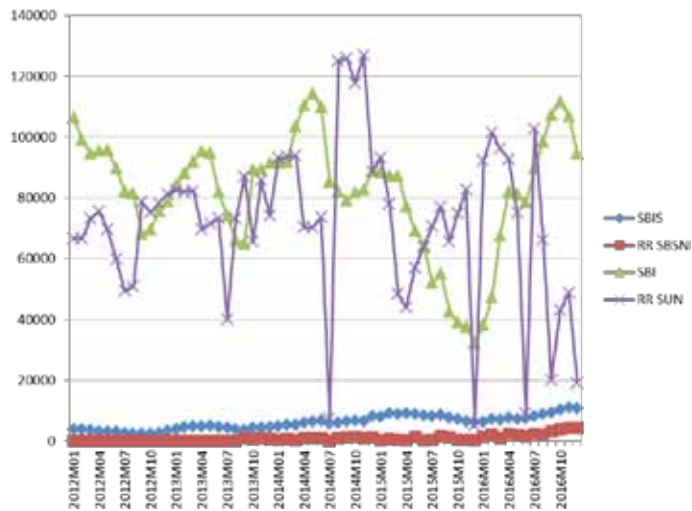


Figure 4.2 Graphic of SBI, SBIS, Reverse Repo SUN and Reverse Repo SBSN 2012-2016 period
 Source: Bank Indonesia (2017)

During the study period, GDP shows positive trends while SBI and Reverse Repo SUN (Both are conventional monetary instruments) show a fluctuating trend. On the other side, SBIS and Reverse Repo SBSN (both are Islamic monetary instruments) show positive trends, these are in line with the growth of Islamic financial sector in Indonesia.



Empirical Results

The table below shows the results of ADF unit root test for each variable in level.

Table 4.1 Result of Unit Root Test at Level

Model	Variable	ADF T-Stat	Probability	Mac Kinnon Critical Value			Note
				1%	5%	10%	
Conventional	GDP	-0.428352	0.8960	-3.67017	-2.96307	-2.62101	Non-Stationary
	SBI	-2.621717	0.0945	-3.67017	-2.96307	-2.62101	Non-Stationary
	RR SUN	-5.588232	0.0000	-3.67017	-2.96307	-2.62101	Stationary
Islamic	GDP	-0.428352	0.8960	-3.67017	-2.96307	-2.62101	Non-Stationary
	SBIS	0.165422	0.9681	-3.67017	-2.96307	-2.62101	Non-Stationary
	RR SBSN	1.657052	0.9995	-3.67017	-2.96307	-2.62101	Non-Stationary

Source: Researcher's estimation using E-views 8.0

Based on the stationarity test results above, it is found that all variables in this study were non-stationary at the level except variable of RR SUN that was stationary at level. Gujarati (2003) states that "stationarity of variables can be seen by comparing the value of ADF t-statistics with Mac Kinnon Critical Value". So, it is decided that in the conventional model, VAR approach will be applied in its analysis because one of those variables is stationary at the level and there will be not cointegration test for the conventional model, while for Islamic model, it will be held a stationarity test at first difference. Here is the result of the stationary test for Islamic model at first difference:

Table 4.2 Unit Root Test Result at First Difference for Islamic Model

Variable	ADF T-Stat	Probability	Mac Kinnon Critical Value			Note
			1%	5%	10%	
D(GDP)	-4.721840	0.0003	-3.67017	-2.96307	-2.62101	Stationary
D(SBIS)	-3.554593	0.0099	-3.67017	-2.96307	-2.62101	Stationary
D(RR SBSN)	-10.46658	0.0000	-3.67017	-2.96307	-2.62101	Stationary

Source: Researcher's estimation using E-views 8.0

Stationarity test for Islamic model at the first difference level shows that all variables are stationary at the same level so that these variables can be used for the next regression test.

The results of the Optimum Lag Length Test in this study for a conventional model and Islamic one are as follows:



4.3 Optimum Lag Length Test Result

Model	Lag	LogL	LR	FPE	AIC	SC	HQ
Conventional	0	-1930.2	NA	6.80e+26	70.29812	70.40761	70.34046
	1	-1771.31	294.6659	2.92e+24	64.84763	65.28560	65.01700
	2	-1744.58	46.65577*	1.54e+24	64.20291	64.96935*	64.49930*
	3	-1734.45	16.58154	1.49e+24*	64.16170*	65.25661	64.58511
	4	-1726.62	11.95236	1.58e+24	64.20440	65.62778	64.75483
	5	-1718.25	11.86874	1.65e+24	64.22734	65.97920	64.90480
Islamic	0	-1574.35	NA	1.63e+21	57.35806	57.46755	57.40040
	1	-1394.92	332.7600	3.32e+18	51.16062	51.59859	51.32999
	2	-1375.6	33.72627	2.29e+18	50.78526	51.55170*	51.08165*
	3	-1364.57	18.04427*	2.15e+18*	50.71155*	51.80646	51.13496
	4	-1359.4	7.888768	2.50e+18	50.85100	52.27438	51.40143
	5	-1351.42	11.31949	2.66e+18	50.88803	52.63988	51.56548

Source: Researcher’s estimation using E-views 8.0

From Table above, it is concluded that the optimal lag length in this study for the conventional model is two (2) because it has the much more (3) stars (*) than the other lag. While the length of the lag for the Islamic model in this study is three (3) which have the much more star than the others too.

Table 4.4 Result of Cointegration Test

	Hypothesized No. of CE(s)	Eigenvalue	Trace/Max-eigenvalue Statistic	5 Percent Critical Value	1 Percent Critical Value
Trace Test	None	0.192934	17.26663	29.68	35.65
	At most 1	0.079966	4.834320	15.41	20.04
	At most 2	6.13E-06	0.000355	3.76	6.65
Max-Eigenvalue Test	None	0.192934	12.43231	20.97	25.52
	At most 1	0.079966	4.833965	14.07	18.63
	At most 2	6.13E-06	0.000355	3.76	6.65

Source: Researcher’s estimation using E-views 8.0

From the table above, it can be concluded that there is no cointegration for the Islamic model because both Trace Statistic value and Max-Eigenvalue Statistics value are not any bigger than Critical Value neither at 5% nor 1%. So the analysis on the Islamic model will proceed with VAR approach. Because one of the variables in the conventional model in this study is stationary at the level (SUN RR), so the analysis for the conventional model will proceed with VAR approach and no cointegration test is required.



VAR analysis in this research used two lag lengths for the conventional model and 3 lag for the Islamic model. There are 60 observations and the alpha (α) is 5% then the value of t-table ($\alpha / 2, n-1$) is equal to 2.00100. Data that used are the data on the first difference for both conventional and Islamic models because all variables in Islamic model are stationary at first difference and some variable in the Conventional model is stationary at the level while the others are stationary at first difference. however, all variables in the conventional model are stationary at first difference. Here are the results of conventional model VAR test estimation:

Table 4.5 Result of VAR for Conventional Model

Variables	Coefisien	T-Stat	Note
C	608.6764	0.73988	Not Significant
D (GDP) (-1)	0.793115	5.62594	Significant
D (GDP) (-2)	-0.107381	-0.74614	Not Significant
D (SBI) (-1)	0.292309	2.86956	Significant
D (SBI) (-2)	-0.104295	-0.94936	Not Significant
D (RR_SUN) (-1)	-0.040211	-1.50577	Not Significant
D (RR_SUN) (-2)	-0.042417	-1.67301	Not Significant

Source: Researcher's estimation using E-views 8.0

Based on the result of VAR estimation above, the equation of conventional model can be written as follows:

$$DPDB = 0.793115 DPDB_{t-1} + 0.292309 DSBI_{t-1}$$

From Table 4.1 above, it is found that only D(GDP) (-1) and D(SBI) (-1) that are significantly associated with the D(GDP) variable (GDP at the first difference) at a significance level 5%. The results obtained by seeing that the t-statistical value of these two variables is greater than the value of its t-table. D(GDP) (-1) and D(SBI) (-1) have positive correlation to D(GDP) with coefficient 0,793115 for D(GDP) (-1) variable and 0,292309 for D(SBI) (-1) variable. This means that any increase of 1 Billion Rupiah in D(GDP) variable in the last month will cause an increase of D(GDP) variable in this month amounted to 0.793115 Billion Rupiah and each increase of 1 Billion Rupiah in D(SBI) variable in the last month will increase the D(SBI) variable in this month amounted to 0.292309 Billion Rupiah.

Here are the VAR estimates for Islamic models:

Table 4.6 Result of VAR for Islamic Model

Variable	Coefisien	T-Stat	Explanation
C	899.1387	0.96865	Not Significant
D(GDP) (-1)	0.662297	4.57116	Significant
D(GDP) (-2)	0.198229	1.17979	Not Significant



D(GDP) (-3)	-0.305724	-1.98156	Not Significant
D(SBIS) (-1)	0.533732	0.27737	Not Significant
D(SBIS) (-2)	1.721833	1.04888	Not Significant
D(SBIS) (-3)	1.721833	0.13768	Not Significant
D(RR_SBSN) (-1)	-3.226251	-1.8073	Not Significant
D(RR_SBSN) (-2)	-0.439194	-0.22247	Not Significant
D(RR_SBSN) (-3)	1.658490	0.93471	Not Significant

Source: Researcher’s estimation using E-views 8.0

From Table 4.6 it can be seen that both the D(SBIS) variables (SBIS at the first difference) and the D(RR_SBSN) variable (Reverse Repo SBSN at the first difference level) do not have a significant relationship to the D(GDP) variable (GDP at the first difference level). It can be inferred from the t-statistic values of both D(SBI) and D(RR_SBSN) in lag 1, 2 or 3 are not greater than its t-table value.

Result of Impulse Response

Impulse Response Function (IRF) helps to analyze the VAR estimation results. Gujarati (2003) states that through IRF it can be seen how long shock affects a variable resulting from other variables and also to know how long the shock will occur until it is gone and then the balance point will be restored. The graph of IRF results for conventional models is as follows:

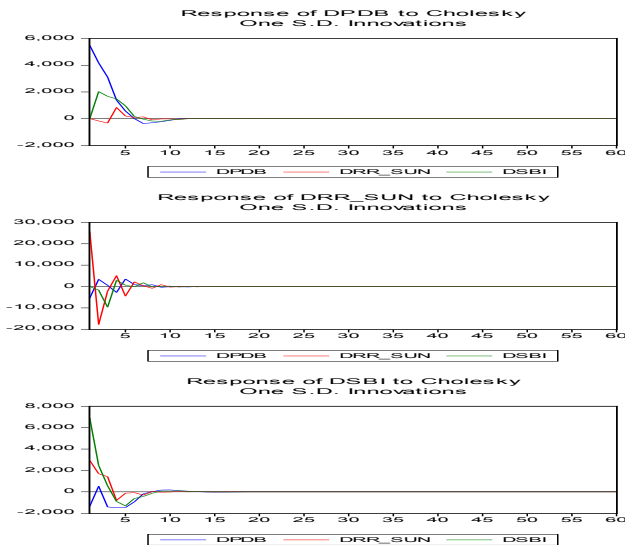


Figure 4.3 Graphics of Impulse Response for Conventional Model

Source: Researcher’s estimation using E-views 8.0



From the Figure 4.1, it is known that D(GDP) Response varies on each variable. The D(SBI) variable itself gives a positive shock to D(GDP) in the second period until the sixth period and in the seventh one to the twelfth one, the D(SBI) variable gives a negative shock. The shock from D(SBI) to D(GDP) is lost in the eighteenth period. The biggest shock from the D(SBI) variable to D(GDP) occurred in the second period that amounted to 2,021,318.

D(RR_SUN) variable gives a shock to D(GDP) smaller than D(SBI) does to D(GDP). The biggest shock from D(RR_SUN) variable to D(GDP) is 835,2680 which occurred in the fourth period. The shock from D(RR_SUN) variable fluctuates from the second period until the fifteenth period and in the next period, the shock is gone. D(RR_SUN) gives negative shock value in the first and second period then give a positive influence in the third period until the seventh one and then again give a negative shock in the eight-period until the eleventh period.

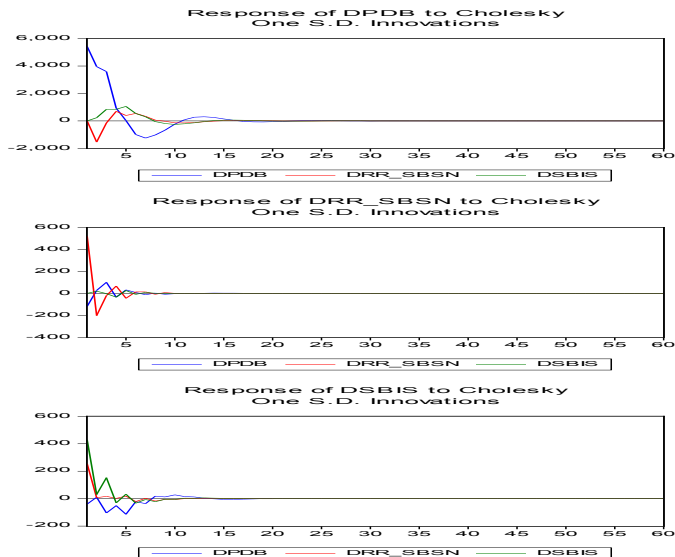


Figure 4.4 *Graphic of Impulse Response for Islamic Model*

Source: Researcher's estimation using E-views 8.0

From the Figure 4.2, it can be known the IRF for Islamic model. The Shocks from D(SBIS) and D(RR_SBSN) fluctuate to D(GDP). The highest positive shock from D(SBIS) variable is in the fifth period that amounted to 1055.108 and the highest negative shock is in the tenth period with the value -261,1955. The shock from D(SBIS) variables begins to disappear in the 25th period.

The D(RR_SBSN) variable provides a negative shock in the second period until the third period which then becomes positive in the fourth till the eighth period and returns to negative in the ninth till the fourteenth period. The shock of D(RR_SBSN) to D(GDP) began to disappear in the 24th period.

Result of Variance Decomposition

Variance decomposition provides information on the proportion of the movement of a variable to the shock of other variables in the current period and the next one. (Rachman, 2017)



Variance decomposition results for conventional models are as follows:

Variance Decomposition of D(GDP):				
Period	S.E.	D(GDP)	D(RR_SUN)	D(SBI)
1	5489.665	100.0000	0.000000	0.000000
2	7189.137	92.03484	0.059909	7.905250
3	8016.855	89.07859	0.218686	10.70273
4	8310.564	85.67798	1.213665	13.10836
5	8387.111	84.57806	1.248877	14.17306
6	8389.082	84.53831	1.257786	14.20390
7	8398.372	84.54390	1.281314	14.17478
8	8406.232	84.51722	1.290246	14.19254
9	8411.673	84.48097	1.289305	14.22972
10	8413.185	84.47185	1.289471	14.23868
11	8413.499	84.46600	1.291586	14.24241
12	8413.519	84.46587	1.291587	14.24254
13	8413.592	84.46576	1.291579	14.24266
14	8413.655	84.46569	1.291560	14.24275
Period	S.E.	D(GDP)	D(RR_SUN)	D(SBI)
15	8413.685	84.46542	1.291616	14.24297
16	8413.693	84.46533	1.291614	14.24305
17	8413.694	84.46532	1.291619	14.24306
18	8413.694	84.46532	1.291620	14.24306
19	8413.695	84.46532	1.291621	14.24306
20	8413.695	84.46532	1.291620	14.24306
21	8413.695	84.46532	1.291621	14.24306
22	8413.695	84.46532	1.291621	14.24306
23	8413.695	84.46532	1.291621	14.24306
24	8413.695	84.46532	1.291621	14.24306
25	8413.695	84.46532	1.291621	14.24306
26	8413.695	84.46532	1.291621	14.24306
27	8413.695	84.46532	1.291621	14.24306
28	8413.695	84.46532	1.291621	14.24306
29	8413.695	84.46532	1.291621	14.24306
30	8413.695	84.46532	1.291621	14.24306
31	8413.695	84.46532	1.291621	14.24306
32	8413.695	84.46532	1.291621	14.24306
33	8413.695	84.46532	1.291621	14.24306
34	8413.695	84.46532	1.291621	14.24306
35	8413.695	84.46532	1.291621	14.24306
36	8413.695	84.46532	1.291621	14.24306
37	8413.695	84.46532	1.291621	14.24306
38	8413.695	84.46532	1.291621	14.24306
39	8413.695	84.46532	1.291621	14.24306
40	8413.695	84.46532	1.291621	14.24306



41	8413.695	84.46532	1.291621	14.24306
42	8413.695	84.46532	1.291621	14.24306
43	8413.695	84.46532	1.291621	14.24306
44	8413.695	84.46532	1.291621	14.24306
45	8413.695	84.46532	1.291621	14.24306
46	8413.695	84.46532	1.291621	14.24306
47	8413.695	84.46532	1.291621	14.24306
48	8413.695	84.46532	1.291621	14.24306
49	8413.695	84.46532	1.291621	14.24306
50	8413.695	84.46532	1.291621	14.24306
51	8413.695	84.46532	1.291621	14.24306
52	8413.695	84.46532	1.291621	14.24306
53	8413.695	84.46532	1.291621	14.24306
Period	S.E.	D(GDP)	D(RR_SUN)	D(SBI)
54	8413.695	84.46532	1.291621	14.24306
55	8413.695	84.46532	1.291621	14.24306
56	8413.695	84.46532	1.291621	14.24306
57	8413.695	84.46532	1.291621	14.24306
58	8413.695	84.46532	1.291621	14.24306
59	8413.695	84.46532	1.291621	14.24306
60	8413.695	84.46532	1.291621	14.24306

Source: Researcher's estimation using E-views 8.0

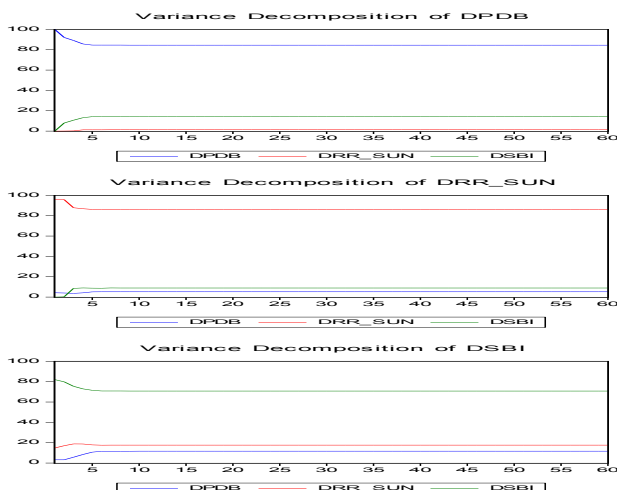


Figure 4.3 *Grafic of Variance Decomposition for Conventional Model*

Source: Researcher's estimation using E-views 8.0

From the Figure 4.3, it can be concluded that the shock from D(SBI) variable is greater than the shock from D(RR_SUN) variable. D(SBI) Shock contributed 14.24% to D(GDP) from the fifteenth period to the last one. While the D(RR_SUN) shock only contributed 1.29% in the same period.



Based on the result of variance decomposition, it can be concluded that D(SBI) and D(RR_SUN) variables can explain each other in case of the shock to D(GDP) variable in the conventional model. However, the shock to D(GDP) is still dominated by D(GDP) itself in each period. Variance decomposition results for Islamic models are as follows:

Variance Decomposition of D(GDP):				
Period	S.E.	D(GDP)	D(RR_SBSN)	D(SBIS)
1	5429.390	100.0000	0.000000	0.000000
2	6898.263	94.88152	5.008345	0.110135
3	7829.065	94.82343	3.926650	1.249916
4	7959.464	93.09786	4.565636	2.336506
5	8038.683	91.27291	4.713652	4.013437
6	8136.194	90.59696	5.047925	4.355113
7	8244.471	90.54616	5.080461	4.373377
8	8308.897	90.68423	5.006442	4.309330
9	8338.538	90.69627	4.972123	4.331608
10	8347.075	90.58961	4.989718	4.420670
11	8351.421	90.50604	5.016001	4.477958
12	8357.684	90.47458	5.026891	4.498529
13	8363.494	90.47929	5.025778	4.494929
14	8367.226	90.48687	5.021710	4.491417
Period	S.E.	D(GDP)	D(RR_SBSN)	D(SBIS)
15	8368.620	90.48485	5.020633	4.494514
16	8369.020	90.47854	5.021837	4.499621
17	8369.325	90.47377	5.023322	4.502907
18	8369.716	90.47254	5.023832	4.503624
19	8370.066	90.47301	5.023665	4.503329
20	8370.259	90.47336	5.023437	4.503207
21	8370.328	90.47315	5.023406	4.503448
22	8370.349	90.47274	5.023501	4.503762
23	8370.369	90.47249	5.023581	4.503927
24	8370.394	90.47245	5.023601	4.503951
25	8370.414	90.47248	5.023587	4.503930
26	8370.424	90.47250	5.023575	4.503928
27	8370.427	90.47248	5.023575	4.503946
28	8370.428	90.47245	5.023582	4.503964
29	8370.430	90.47244	5.023586	4.503972
30	8370.431	90.47244	5.023586	4.503973
31	8370.432	90.47244	5.023585	4.503972
32	8370.433	90.47244	5.023585	4.503972
33	8370.433	90.47244	5.023585	4.503973
34	8370.433	90.47244	5.023585	4.503974
35	8370.433	90.47244	5.023586	4.503974
36	8370.433	90.47244	5.023586	4.503974
37	8370.433	90.47244	5.023586	4.503974
38	8370.433	90.47244	5.023585	4.503974



39	8370.433	90.47244	5.023585	4.503974
40	8370.433	90.47244	5.023586	4.503975
41	8370.433	90.47244	5.023586	4.503975
42	8370.433	90.47244	5.023586	4.503975
43	8370.433	90.47244	5.023586	4.503975
44	8370.433	90.47244	5.023586	4.503975
45	8370.433	90.47244	5.023586	4.503975
46	8370.433	90.47244	5.023586	4.503975
47	8370.433	90.47244	5.023586	4.503975
48	8370.433	90.47244	5.023586	4.503975
49	8370.433	90.47244	5.023586	4.503975
50	8370.433	90.47244	5.023586	4.503975
51	8370.433	90.47244	5.023586	4.503975
52	8370.433	90.47244	5.023586	4.503975
53	8370.433	90.47244	5.023586	4.503975
Period	S.E.	D(GDP)	D(RR_SBSN)	D(SBIS)
54	8370.433	90.47244	5.023586	4.503975
55	8370.433	90.47244	5.023586	4.503975
56	8370.433	90.47244	5.023586	4.503975
57	8370.433	90.47244	5.023586	4.503975
58	8370.433	90.47244	5.023586	4.503975
59	8370.433	90.47244	5.023586	4.503975
60	8370.433	90.47244	5.023586	4.503975

Source: Researcher's estimation using E-views 8.0

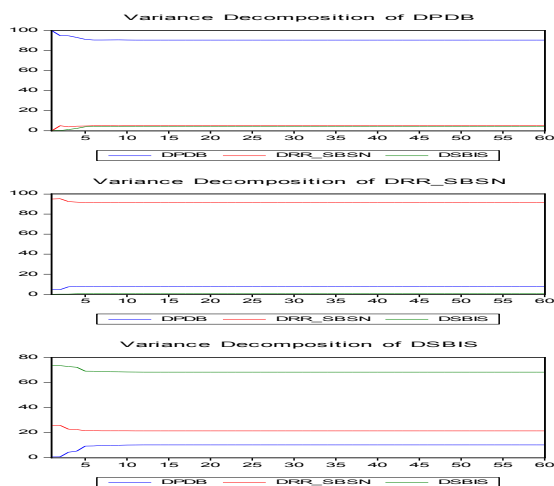


Figure 4.4 Grafik of Variance Decomposition for Islamic Model

Source: Researcher's estimation using E-views 8.0



Generally, from Figure 4.4 it can be known that the contribution of D(SBIS) and D(RR_SBSN) are not much different. The difference is striking just at the beginning of the period where D(RR_SBSN) shock in the second period contributes as much 5% while the D(SBIS) shock only contributes as much 0.1% only. The shock of both variables to D(GDP) looks not much different in the period of twelve to the end where the shock of D(SBIS) is equal to 4, 5% while the shock of D(RR_SBSN) is equal to 5.02%. The contribution of D(RR_SBSN) shock is always greater than the contribution of D(SBIS) shock from the beginning of the period till the end of the period. however, as same as the conventional model, the explanation portion of each variable in the Islamic model is still dominated by the D(GDP) itself in each period.

5. Conclusion

Based on the results of research and discussion that have been done on VAR analysis in the relationship of the conventional monetary instrument and Islamic monetary instrument, where Sertifikat Bank Indonesia and Reverse Repo *Surat Utang Negara* as variables of the conventional monetary instrument and Sertifikat Bank Indonesia Islamic and Reverse Repo *Surat Berharga Syariah Negara* as variables of Islamic monetary instrument, the conclusion is drawn as follows:

1. SBI has a significantly positive influence on GDP and gives the shock to GDP up to 18 months and contributes the amount of 14.24% on Variance Decomposition results. While Reverse Repo *Surat Utang Negara* has no significant effect on GDP.
2. SBIS and Reverse Repo *Surat Berharga Syariah Negara* both have no significant effect on GDP.

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