

ISSN: 2460-1896

e-ISSN: 2541-5573

Volume 5, Nomor 1, Juni 2019

> Islamic Economics Journal

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Analysis of The Effect of Amount of Money Supply (JUB), Exchange Rate, Profit Sharing And Interest Rate on The Inflation 2011-2017: Islamic and Conventional MI Comparative Study

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Abstract

Inflation is one of the effects of a prolonged economic crisis that hit any country. Inflation is a situation where there is an increase in general prices which continues over the long term. The objective of this research is to analyse the effect of Amount of Money Supply and Exchange Rate, Interest Rate, Return Sharia against Inflation Rate in Indonesia. Type of this research is a quantitative study, a research to explain the influence of independent variables to dependent variables. Dependent Variable used is Inflation Rate (percentages), Independent Variables are Money Supply, Exchange Rate (Indonesian Rupiah to US Dollar), Interest Rate, Return Sharia. The models will be calculated with VECM (Vector Error Correction Model) as it easy to calculate and interpret. In this case a correlation between dependent variables and independent variables. To determine the inflation rate effect from 2011-2017.

The result of this research determine that in long term Independent variables has significant influence to Dependent variable (Inflation). Even in Islam and Conventional side. One of variable such as M1 in Islam has result 5.34041, its indicating that the result has significant value again inflation in long term. While in Conventional side M1 value is 4.70475, that's mean the result has significant too against inflation, cause the value both of them bigger than T Table. Other variable such as exchange rate for long term has negative influence to the inflation around -18.28331 that mean exchange rate has significant influence to the inflation. Both of last variables are interest and return sharia' has significant

too again inflation, the value around 0.443061 for interest rate, and 2.389915 for return sharia. It mean both of these variables has significant values again inflation, cause of T Statistic bigger than T Table.

Keywords : Inflation, Amount of Money Supply, Exchange Rate, Interest Rate, Return Sharia

Abstrak

Inflasi adalah salah satu efek dari krisis ekonomi berkepanjangan yang melanda negara mana pun, di mana ada kenaikan harga umum yang berlanjut dalam jangka panjang. Tujuan dari penelitian ini adalah untuk menganalisis pengaruh Jumlah Uang Beredar dan Nilai Tukar, Tingkat Bunga, dan Return Syariah terhadap Tingkat Inflasi di Indonesia. Jenis penelitian ini merupakan penelitian kuantitatif, penelitian yang menjelaskan pengaruh variabel independen terhadap variabel dependen. Variabel dependen yang digunakan adalah Tingkat Inflasi (persentase), Variabel Independen adalah Jumlah Uang Beredar, Nilai Tukar (Rupiah Indonesia ke Dolar AS), Suku Bunga, dan Return Syariah. Model untuk menghitung menggunakan VECM (Vector Error Correction Model). Dalam hal ini korelasi antara variabel dependen dan variabel independen. Untuk menentukan efek tingkat inflasi 2011-2017.

Hasil penelitian ini menentukan bahwa dalam jangka panjang variabel independen memiliki pengaruh yang signifikan terhadap variabel dependen (inflasi). Bahkan di sisi Islam dan Konvensional. Salah satu variabel seperti M1 dalam Islam memiliki hasil 5,34041, ini menunjukkan bahwa hasilnya memiliki nilai signifikan lagi inflasi dalam jangka panjang. Sedangkan di sisi Konvensional nilai M1 adalah 4,70475, itu berarti hasilnya memiliki signifikan juga terhadap inflasi, menyebabkan nilai keduanya lebih besar dari T Table. Variabel lain seperti nilai tukar untuk jangka panjang memiliki pengaruh negatif terhadap inflasi sekitar -18.28331 yang berarti nilai tukar berpengaruh signifikan terhadap inflasi. Kedua variabel terakhir adalah bunga dan return syariah memiliki inflasi terlalu signifikan, nilai sekitar 0,443061 untuk suku bunga, dan 2,389915 untuk return syariah. Itu berarti kedua variabel ini memiliki nilai signifikan bagi inflasi, menyebabkan T Statistik lebih besar dari T Tabel.

Kata Kunci: Inflasi, Jumlah Uang Beredar, Nilai Tukar, Suku Bunga, Return Syariah

Introduction.

The instability the value of money that crisis has changed by world economic order. The global crisis that began in the United States in 2007, has increase the impact through out the world, including developing countries in 2008.¹ Indonesia's

1 Bank Indonesia. "Inflation." source of: <https://www.bi.go.id/en/moneter/>

financial performance declined due to the global financial crisis. The global financial crisis also has an impact on the Indonesian economic condition, it become unstable either in economic and non-economic. The economic factors included inflation, interest rates, amount of money supply, national income, and international payment positions while non-economic factors include national, political, socio-cultural and security resilience.²

In other hand Indonesian monetary crisis began with a sharp depreciation of the rupiah against foreign currencies (especially the US dollar), due to the domino effect of the depreciation of the Thai currency (bath), one of which had resulted in a surge in prices of goods imported from abroad. The surge in the prices of imported goods has caused the prices of almost all goods sold domestically to increase, especially imported goods.³ The impact of the crisis began to be felt, especially towards the end of 2008. After recording economic growth above 6% up to quarter III-2008, the Indonesian economic condition began to face heavy pressure in quarter IV-2008. This was reflected in a significant economic slowdown mainly due to a drop in export performance.⁴

A financial crisis accured in the late summer of 2008, as mortgage-related securities that had spread through the U.S. and global financial system suddenly collapsed. This crisis has undermined many of the largest financial institutions in the United States, as well as severely damaging a large part of the world's financial system. Which based on US Dollar this condition followed by the increased recession in the non-financial sector not just the US but globally. David in his paper argued that the current financial and real sector crisis should be seen as a systemic crisis.⁵

Coordinating Minister for Economic Affairs Darmin Nasution said the depreciation of the rupiah, which has was reached a new

inflasi/data/Default.aspx, accessed on Saturday 20 of April 2019, 20.53 pm

2 Adwin Surja Atmadja, "Analisa Pergerakan Nilai Tukar Rupiah terhadap Dollar Amerika Setelah Diterapkannya Kebijakan Sistem Nilai Tukar Mengambang Bebas di Indonesia," *Jurnal Ekonomi Akuntansi dan Keuangan*, Vol. 4 No. 1 (May, 2002), pp. 69-78.

3 Fadli Ferdiansyah, "Analisis Pengaruh Jumlah Uang Beredar M1, Suku Bunga SBI, Nilai Tukar Suku Bunga Deposito Terhadap Tingkat Inflasi," *Jurnal Media Ekonomi*, Vol. 19, No. 3, (December, 2011), pp. 43-68.

4 Bank Indonesia. "Inflation." source of: <https://www.bi.go.id/en/moneter/inflasi/data/Default.aspx>

5 David M. Kotz. "The Financial And Economic Crisis Of 2008: A Systemic Crisis Of Neoliberal Capitalism." *Review of Radical Political Economics*, Vol. 41, No. 3 (Summer, 2009), pp. 305-317.

psychological number, which is above Rp. 15,000 per US dollar, can certainly have an impact on inflation. But, he has so far not made a detailed calculation of the impact on the increase in value. *“There is an increase, but not much. I can’t say yet because it must be calculated first in core inflation, actually what percentage is imported,”* Darmin said when he met with the Ministry of Finance.⁶

In principle, various policies carried out by the government, directed at maintaining macroeconomic stability, the financial system and the resilience of the Indonesian economy. In stabilizing the economy, various policies are carried out to control an economy. Government policies are monetary policy and fiscal policy. Monetary policy is a policy goal achieved through regulating the money supply. Fiscal policy is an economic policy that involves regulation of government spending and taxation.⁷

In the view of the monetary economists, the money supply is the main factor that is blamed for causing inflation in every country, not least in Indonesia. In Indonesia, the money supply is mostly translated in the concept of narrow money (M1). This happens because there is still an assumption that quasi money is only part of banking liquidity. Since 1976 the percentage of currency in circulation (48.7%) is smaller than the percentage of total outstanding money (51.3%). Thus, indicating that there has been a modernization process in the Indonesian monetary sector. Also, indicates that the increasingly difficult process of controlling the amount of money circulating in Indonesia, and the increasingly widespread monetization in subsistence economic activities, as a result gives an increasing trend of inflation.⁸

In fiqh muamalah, money is seen as a fair balance that used as a medium of exchange and also a measure of the value of a commodity, in the presence of the money can be known the price of an item. Imam al-Ghazali said that money is like a mirror that is colorless, meaning that money is not a commodity that can be given a price but the money that gives a price to a commodity.⁹

6 Ahmad Fikri Noor (Red.), “Rupiah Melemah, Inflasi Diwaspadai,” source of: <https://www.republika.co.id/berita/nasional/news-analysis/18/10/06/pg5q51440-rupiah-melemah-inflasi-diwaspadai>, accessed 31 Oct. 2018, 10.10 a.m

7 Nopirin, *Ekonomi Moneter Buku Dua*, (Yogyakarta: BPFE Yogyakarta, 1987), p. 35.

8 Adwin Surja Atmadja, “Analisa Pergerakan Nilai Tukar Rupiah...,” p. 75.

9 Ahmad Hasan, *Mata Uang Islami* (Jakarta: PT. Raja Grafindo Persada, 2005), p. 57.

The influence of the inflation rate on foreign exchange rates can be explained by Purchasing Power Parity Theory (PPP). There are various versions of the PPP theory. The first is the absolute version, which is also called the Law of One Price (LOP), which states that the price of the same item or product in two different countries will be the same in the same currency. If there is a price difference in the same currency, then there will be a change in demand so that the price of the goods also changes. Consequently the price changes that occur will result in adjustments in the exchange rate.¹⁰

This research is to analyze the effect of Islamic and conventional M1 money demand in Indonesia, using time series which provide information from 2011-2017. Basically the demand for M1 money is very influential on the inflation rate. Anyhow Hario Aji Hartomo, added several other variables in his research analysis such as the effect of exchange rates and interest rates (SBI) on the level inflation. Therefore the researcher wants to do an analysis related to a similar research and the place of the object of the research being addressed is Indonesia as Indonesia a developing country.

Furthermore the researcher wants to do research based on the Islamic point of view by adding the Return Shari'ah variable, and researcher want to compare from those variables which one more influence against inflation rate so that have more develop the structure of national economy, therefore the researcher takes the title "Analysis Of The Effect Of Amount Of Money Supply (JUB), Exchange Rate, Profit Sharing And Interest Rate On The Inflation 2011-2017" (Islamic And Conventional M1 Comparative Study).

Inflation.

- **The Concept of Inflation in Conventional Economics.**

Inflation is an increase in prices of goods and services in general and continuously. According to Friedman, inflation is always a monetary phenomenon. The source of inflation is the high growth of the money supply. In short, by reducing the growth rate of money supply at a low level, inflation can be prevented. In the view of the monetarist, money supply is seen as the only source of shift in the aggregate demand curve. So that the monetarist analysis indicates that inflation is certain caused by the high growth of the

¹⁰ Hario Aji Hartomo, "Pengaruh Jumlah Uang Beredar Dan Kurs Terhadap Tingkat Inflasi Di Indonesia Sebelum Dan Sesudah Krisis Global 2008," *Jurnal Media Ekonomi* Vol. 18, No. 3, (December, 2010), pp. 1-22.

money supply.¹¹

- **The Concept of Inflation in Islamic Economics.**

Inflation implies that money cannot function as a fair and correct unit of account. Inflation causes people to be unfair to others, by undermining the purchasing power of unknown monetary asset assets. This undermines the efficiency of the monetary system and raises the costs of welfare to the community. Inflation exacerbates the climate of uncertainty where economic decisions are taken, raises concerns about capital formation and causes misallocation of resources. Inflation tends to damage values, reward speculation efforts by inflicting losses on productive activities and exacerbating income inequality. Thus inflation is a symptom of disequilibrium that is not in accordance with Islamic emphasis on equilibrium.¹²

Amount of Money Supply (JUB).

Technically, the money supply is the overall value of money in the hands of the public. In a narrow sense, the amount of money in circulation consists of demand deposits. The relationship between JUB and inflation can be presented with the quantity theory (Irving Fisher's theory) which says that inflation can only occur if there is an increase in the volume of money in circulation, because JUB's relationship to inflation is comparable. This theoretical formula is $MV = PT$, M is the money supply, V the velocity of the money circulation, P price, and T is the transaction. If the greater the money supply and the speed of circulation, the greater the level of prices and buying and selling transactions in the community. An increase in the price level is constantly mentioned as a kind of inflation. If the amount of money circulation continues to increase, it will have an effect on the continuous increase in the price level. Therefore, the amount of money circulating with inflation is proportionally correlated.¹³

Influence of the Amount of Currency in Inflation.

Ideally, aggregate demand must be equal to aggregate supply.

11 Frederic S. Mishkin, *The Economics of Money, Banking, and Financial Markets*. (Boston: Pearson, 2001), p. 518.

12 Muhammad Umer Chapra, *Towards a Just Monetary System* (London: The Islamic Foundation, 1985), p. 215.

13 Rohaya dan Nazaruddin A. Wahid, "Pengaruh Stabilitas Uang Kertas Terhadap Inflasi ditinjau Menurut Fiqh Muamalah," *SHARE: Jurnal Ekonomi dan Keuangan Islam*, Vol. 3 No. 1 (January – June, 2014), p. 58.

If aggregate demand is not the same as aggregate supply, it is necessary to adjust economic activity so that a balance occurs, which in turn can lead to changes in prices of goods and services. In this case, an increase in aggregate demand that exceeds aggregate supply will encourage an increase in the prices of goods and services. Thus, given the change in the money supply it can affect the development of aggregate demand, it can be concluded that changes in the money supply can affect price development. One implication of the Classical Quantity theory is that in the short term the general price level (inflation) changes proportionally with changes in money circulated by the government. In other words, the tendency of a continuous increase in general prices (inflation) can occur if the addition of the money supply exceeds the actual needs. So, if "the money supply increases, the price of goods increases."¹⁴ Inflation is known as a monetary phenomenon. Written as follows:

$$M.V = P.T$$

Where:

- M** : The amount of banknotes, metals and demand deposits circulating in the economy.
- V** : The velocity of money in a period.
- P** : Price of goods.
- T** : The volume of goods traded.

The left side of the quantity equation states the money used for the transaction. **M** is the quantity of money or the amount of money in circulation. **V** is referred to as the velocity of money or velocity of money in a period in the economy. The right side of the quantity equation states the transaction. **P** shows the price level of a particular transaction or the amount of Rupiah exchanged. **T** states the total number of goods and services traded in the economy in a given period. From the above equation it can be seen that the amount of money received by the seller is equal to the amount of money paid by the buyer and if one variable **M**, **V**, **P** or **T** changes then the other variable will change. For example if the quantity of money (**M**) increases, the number of transactions (**T**) must increase.¹⁵

¹⁴ Veithzal Rivai, et.al., *Bank and Institution Management* (Jakarta: PT Raja Grafindo Persada, 2007), p. 43.

¹⁵ Veithzal Rivai, et.al., *Bank and Institution Management...*, p. 43.

Exchange Rates.

The exchange rate is the price in exchange and in the exchange between two different currencies, there will be a comparison of the value or price between the two currencies. This comparison of values is called the exchange rate.¹⁶ The real exchange rate is the nominal exchange rate that has been corrected at the relative price of domestic prices compared to prices abroad.

The exchange rate is the price of the local currency against foreign currency.¹⁷ So, the exchange rate is the value of one currency of the rupiah which is translated into the currency of another country. For example the rupiah exchange rate against the US Dollar, the rupiah exchange rate. The decline in the rupiah exchange rate against foreign currencies, especially the US Dollar has a negative influence on the economy and capital markets.¹⁸

Interest Rates.

Interest Rate is the cost of a loan or the price paid for the loan fund is usually expressed in percentage.¹⁹ Therefore, interest can also be interpreted as money obtained on loans granted. Interest rates basically have two meanings in accordance with the review, namely for banks and for entrepreneurs. For banks, interest is an income or an advantage on borrowing money by an entrepreneur or customer. And for entrepreneurs the interest is considered as the cost of production or the cost of capital.

According to Marshall, interest as the price to be paid for the use of capital in all markets tends to balance, so that the entire capital in the market according to the interest rate equals the inventory that appears at that level. The interest rate is set at the point where the savings re-presenting the new capital offer are the same as the demand.²⁰

16 Nopirin, *Ekonomi Moneter...*, p. 56.

17 Rudiger Dornbusch, Stanley Fischer, *Makro Ekonomi*, terj. Roy Indra M., (Jakarta: PT Media Global Edukasi), p. 257.

18 Elyzabeth Lucky Maretha Sitingak, Widuri Kurniasari, "Indikator-indikator Pasar Saham dan Pasar Uang yang Saling Berkaitan Ditinjau Dari Pasar Saham Sedang Bullish dan Bearish," *Jurnal Riset Ekonomi dan Manajemen*, Vol. 3, No. 3 (September, 2003), pp. 157-177.

19 Frederic S. Mishkin, *The Economics of Money, Banking...*, p. 517-519.

20 Alfred Marshall, *Principles of Economics, unabridged 8th edition*, (New York: Cosimo, 2009), p. 432.

Return Sharia.

The most widely used profit sharing in Islamic banking is *al-musyārahah* and *al-mudārabah*. *Al-musyārahah* is a cooperation agreement between two or more parties for a particular business where each party contributes funds with an agreement that the benefits and risks will be borne jointly in accordance with the agreement. *Al-mudārabah* comes from the word *darab*, which means walking or hitting. Technically, *al-mudārabah* is a business collaboration between two people where the first party (*ṣāhibu-l-māl*) provides all capital, while the other party becomes the manager. Business profits are divided according to agreements in the contract, where as if the loss is borne by the owner of the capital as long as the loss is not due to the manager's negligence. If the loss was caused by fraud or negligence of the manager, the manager must be responsible for the loss.²¹

Some important aspects of *al-mudārabah* are the sharing of profits between two parties must be proportional and cannot give *ṣāhibu-l-māl/ rabbu-l-māl* or the owner of the capital at the same or definite advantage. *Rabbu-l-māl* is not responsible for losses beyond the capital that has been given. In transactions with the *mudārabah* principle must be fulfilled the pillars of *mudārabah*, namely: *ṣāhibu-l-māl*; *mudārib*; charity (business/ work), and *qabul* permission. The legal foundation of Al-qur'an: and if from people who walk on the earth look for some of the gifts of Allah SWT.²²

Differences in the Concept of Interest Rates and the Concept of Profit Sharing.

As an alternative interest system in conventional economics, economics Islam offers a profit and loss sharing system, when the owner capital (surplus spending unit) working with entrepreneurs (deficit spending unit) to conduct business activities. When generating profits divided both, if they suffer losses they are also borne together. Profit-sharing system guaranteeing justice and no exploited parties (*ẓulm*). The profit sharing system can be in the form of *musyarakah* or *mudaraba* with various types the variation.²³

21 Erni Susana dan Annisa Prasetyanti, "Pelaksanaan dan Bagi Hasil Pembiayaan Al-Mudharabah Pada Bank Syari'ah," *Jurnal Keuangan dan Perbankan*, Vol. 15, No.3, (September, 2010), pp. 466-478.

22 QS. Al-Muzzamil (73): 20.

23 Umami Kalsum, "Fiat Money Dalam Perspektif Ekonomi dan Hukum Islam," *AL'ADALAH*, Vol. 12, No. 2 (December, 2014), pp. 427-436.

The relationship between problem formulation and research objectives can be seen from the research framework, as presented in Figure Macroeconomic variables namely JUB The money supply or M1 and Interest rates, exchange rates and profit sharing affect inflation in both the conventional system and the Islamic system. As a balance in looking at the dependent variable (inflation) the conventional money demand is included in the interest rate variable. Whereas in the demand for Islamic money, the variable interest rate is replaced by the rate of return on the Islamic scheme.

$$\text{Islamic, INF} = \alpha_1 \text{M1Isl} + \alpha_2 \text{ER} + \alpha_3 \text{Rs} + \epsilon_t$$

$$\text{Conventional, INF} = \alpha_1 \text{M1Conv} + \alpha_2 \text{ER} + \alpha_3 \text{I} + \epsilon_t$$

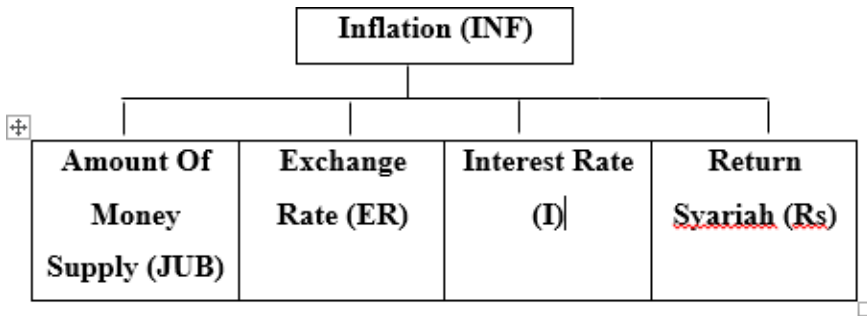
INF : Inflation rate is denoted as dependent variable. (Y)

M1 (Islam and conv.): Amount of money supply (**JUB**) is represented as an independent variable. (X1)

ER : Exchange Rate of Rp./ US. \$ is represented as an independent variable. (X2)

I : SBI Rate (SBI Rate) is represented as an independent variable. (X3)

Rs : Return of sharia Rs (Equivalent *mudārabah*) is denoted as an (independent variable). (X4)



Research Methods.

Place of research is a place or object where research this will be examined. The location of the study is a place or region where research is this will be done. The research conducted by the author is take location in Indonesia. Time that used in this study during January 2019 began at the time first data retrieval is through the official website of Central Bank of Indonesia (Bank Indonesia) by

taking data on inflation rates from 2011-2017.²⁴

Research design is all that is needed in the analysis. Information obtained from the analysis will have a real relationship with research problems.²⁵ The way the researcher used in this analysis is a quantitative method and uses a comparative approach. In this study, researchers used quantitative methods because they used numerical data.²⁶ The comparative approach is a research method to identify similarities and differences between social entities. Comparative research seeks to compare and differentiate countries, cultures, communities and institutions.²⁷ This study is determined to compare influencing exchange rate instability to money demand.

This is the number of times it is used using descriptive analysis method to analyze the effect of the amount of the Money Supply in the narrow sense (M1), the SBI interest rate, Deposit Interest Rate, and Rupiah exchange rate against the dollar against the inflation rate. The analytical tool used on this research is a parametric approach how to reduce the number of people in the world Does it still not available or not concerning the influence of money circulating in the sense narrow (M1), SBI interest rates, Interest Rates Deposits, and the rupiah exchange rate against dollar against the inflation rate. Data collection techniques are ways that researchers do to capture or capture quantitative information from respondents according to the scope of the study.²⁸

Method of Data Analysis.

Analysis of the effect of independent variables on the dependent variable, namely the inflation rate in this study will be analyzed using Vector Auto-regression (VAR). Then if the data used is stationary in the first difference, the VAR model will be combined with the error correction model to become the Vector Error Correction Model (VECM). All data in this study are transformed into natural logarithms (ln) except interest rates, rate of return, and inflation to get more valid and consistent analysis results. The software used in this study is Microsoft Excel 2003 and Eviews 10 programs.

24 Bank Indonesia. "Inflation," source of: <https://www.bi.go.id/en/moneter/inflasi/data/Default.aspx>, accessed on Saturday 20 of April 2019, 20.53 pm

25 Moh. Nazir, *Metode Penelitian* (Bogor: Ghalia Indonesia, 2014), p.62.

26 Jill Hussey, *et.al., Business Research: A Practical Guide for Undergraduate and Postgraduates Students* (Great Britain: Palgrave, 1997), p.140.

27 Sugiyono, *Metode Penelitian Kuantitatif Kualitatif dan R&D* (Bandung: Alfabeta, 2009), p.72.

28 V. Wiratna Sujarweni, *Metode Penelitian Bisnis & Ekonomi* (Yogyakarta: Pustaka Baru Press, 2015), p. 93.

- **Vector Autoregression (VAR) Analysis.**

The first VAR model was developed by Sims in 1980. VAR is a priori model of economic theory. However, this model is very useful in determining the level of exogeneity of an economic variable in an economic system where there is interdependence between variables in the economy. This model also became the basis for the emergence co-integration method which was very good at explaining variable behavior in the economy.²⁹

VAR modeling is a form of modeling used for multivariate time series. The VAR model makes all variables endogenous. The VAR model specifications include the selection of variables and the number of lags used in model. In accordance with the variables used in the VAR equation are selected based on relevant economic theory. According to mathematical it can be representative VAR model like:

$$x_t = \mu_t + \sum_{i=1}^k A_i x_{t-i} + u_t$$

Where x_t is a vector of endogenous variables with dimensions $(n \times 1)$, μ_t vectors of exogenous variables including constants (intercepts) and trends, A_i is dimensionless coefficient matrices $(n \times n)$, and u_t is a vector of residuals that are contemporary correlated but do not correlate with their own lag values and also do not correlate with all the variables in the right side of the equation above.³⁰

- **Analysis of Vector Error Correction Model (VECM).**

When two or more variables involved in an equation on the data level are not stationary then the possibility of co-integration in the equation is possible.³¹ If after the co-integration test is done there is a co-integration equation in the model used so it is recommended to enter the co-integration equation into the model used. Most stationary time series data is at the first difference. So to anticipate

29 Dedi Rosadi, *Ekonometrika dan Analisis Runtun Waktu Terapan Dengan Eviews*, (Jakarta: Andi Publisher, 2011), p. 213.

30 Noer Azam Achsan, et.al., "Econometric and Fuzzy Modelling of Indonesian Money Demand," *Statistical Tools for Finance and Insurance*, (Springer, 2005), p. 253.

31 Ficky Widya Nugraha, "Efek Perubahan (Pass-Through Effect) Kurs terhadap Indeks Harga Konsumen di ASEAN-5, Jepang, dan Korea Selatan," *tesis of Fakultas Ekonomi dan Manajemen*, (Bogor: Institut Pertanian Bogor, 2006).

the loss of long-term information in this study VECM models will be used. Standard VECM is obtained from the VAR model with reduced λ_{t-1} . The VECM equation is mathematically shown by the following equation.

$$\Delta x_{t-1} = \mu + \prod x_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta x_{t-1} + u_t$$

Where Π and Γ_i are functions of A_i The matrix Π can be decomposed into two dimensions ($n \times r$) α and β ; where α is called an adjustment matrix and $\beta = \Pi \alpha \beta^T$ as a co-integration vector and r is co-integration rank. The co-integration framework is only appropriate if the related variable is integrated. This can be tested using the unit root test. When no unit roots are found, traditional econometric methods can be applied.³²

Pre-Estimated Testing.

Before estimating VAR/ VECM, there are several steps that must be done, namely pre-estimation testing. These tests include data stationarity test, optimal lag determination, and co-integration testing.

1. Data Stationarity Test.

Time series economic data are generally stochastic or have a trend that is not stationary, meaning that the data contains unit roots. To be able to estimate a model using that data, the first step is to be sad the problem of data stationarity test is known or known as the unit root test. If the data used contains root units, it will be difficult to estimate a model using that data because the trend of data tends to fluctuate not around the average value. Then it can be concluded that stationary data will have a tendency to approach the average value and fluctuate around the average value.³³ Unit root test will be carried out in this study using Augmented Dickey Fuller (ADF).

2. Determination of Optimal Lags.

In specifying the VAR model it is necessary to select variables and determine the lag number used in the model. Determination of optimal lag in VAR analysis is very important because the

32 Noer Azam Achsani, et.al., "Econometric and Fuzzy Modelling ...", p. 254.

33 Damodar N. Gujarati, *Ekonometri Dasar*, terj. Sumarno Zain (Jakarta: Erlangga, 2003), p. 90.

endogenous variables in the equation system will.

3. Co-integration Test.

Co-integration test aims to determine whether the variables that are not stationary have co-integration or not. The concept of co-integration was put forward by Engle and Granger as a phenomenon in which linear combinations of two or more variables that are not stationary will become stationary.³⁴ This linear combination is known as the co-integration equation and can be interpreted as a long-term balance relationship between variables.

Model VECM Research.

This research will be analyzing by Vector Error Correction Model (VECM). Furthermore, the researcher improved the model by converting interest variable with return sharia and money demand (M1 Conventional to M1 Islam) to consider the relations among variables as Follow:

VECM Model for Conventional Money Demand Model

$$\Delta INF_1_t = \beta_{x0} + \beta_{xx1} \Delta LM1_{t-1}^1 + \beta_{x21} \Delta LER_{t-1}^1 + \beta_{x41} \Delta IDEP_{t-1}^1 + \lambda_x (LM1_{t-1} - \alpha_0 - LER_{t-1} + IDEP_{t-1}) + v_t^1$$

$$\Delta LER_t = \beta_{20} + \beta_{2x1} \Delta LM1_{t-1}^1 + \beta_{221} \Delta LER_{t-1}^1 + \beta_{231} \Delta INF_{t-1}^1 + \beta_{241} \Delta IDEP_{t-1}^1 + \lambda_2 (LM1_{t-1} - \alpha_0 - LER_{t-1} + INF_{t-1} + IDEP_{t-1}) + v_t^1$$

$$\Delta INF_t = \beta_{30} + \beta_{3x1} \Delta LM1_{t-1}^1 + \beta_{321} \Delta LER_{t-1}^1 + \beta_{331} \Delta INF_{t-1}^1 + \beta_{341} \Delta IDEP_{t-1}^1 + \lambda_3 (LM1_{t-1} - \alpha_0 - LER_{t-1} + INF_{t-1} + IDEP_{t-1}) + v_t^1$$

$$\Delta IDEP_t = \beta_{40} + \beta_{4x1} \Delta LM1_{t-1}^1 + \beta_{421} \Delta LER_{t-1}^1 + \beta_{431} \Delta INF_{t-1}^1 + \beta_{441} \Delta IDEP_{t-1}^1 + \lambda_4 (LM1_{t-1} - \alpha_0 - LER_{t-1} + INF_{t-1} + IDEP_{t-1}) + v_t^1$$

34 Robert F. Engle and C. W. J. Granger, "Co-integration and Error Correction: Representation, Estimation, and Testing," *JSTOR*, Vo. 55, No. 2 (March, 1987), pp. 251-276.

VECM Model for Islamic Money Demand Model

$$\begin{aligned} \Delta LM1Isl_t &= \beta_{x0} + \beta_{xx1} \Delta LM1Isl_{t-1}^1 + \beta_{x21} \Delta LER_{t-1}^1 + \\ &\beta_{x31} \Delta INF_{t-1}^1 + \beta_{x41} \Delta RS_{t-1}^1 + \lambda_x (LM1Isl_{t-1} - \alpha_0 - \\ &LER_{t-1} + INF_{t-1} + RS_{t-1}) + v_t^1 \\ \Delta INF_t &= \beta_{30} + \beta_{3x1} \Delta LM1Isl_{t-1}^1 + \beta_{321} \Delta LER_{t-1}^1 + \\ &\beta_{331} \Delta INF_{t-1}^1 + \beta_{341} \Delta RS_{t-1}^1 + \lambda_3 (LM1ISL_{t-1} - \alpha_0 - \\ &LER_{t-1} + INF_{t-1} + RS_{t-1}) + v_t^1 \\ \Delta LRS_t &= \beta_{40} + \beta_{4x1} \Delta LM1Isl_{t-1}^1 + \beta_{221} \Delta LER_{t-1}^1 + \\ &\beta_{431} \Delta INF_{t-1}^1 + \beta_{441} \Delta RS_{t-1}^1 + \lambda_4 (LM1Isl_{t-1} - \alpha_0 - \\ &LER_{t-1} + INF_{t-1} + RS_{t-1}) + v_t^1 \\ \Delta LER_t &= \beta_{20} + \beta_{2x1} \Delta LM1Isl_{t-1}^1 + \beta_{221} \Delta LER_{t-1}^1 + \\ &\beta_{231} \Delta INF_{t-1}^1 + \beta_{241} \Delta RS_{t-1}^1 + \lambda_2 (LM1Isl_{t-1} - \alpha_0 - \\ &LER_{t-1} + INF_{t-1} + RS_{t-1}) + v_t^1 \end{aligned}$$

Discussion And Research Result.

Before we step to analyse phase of the VAR/ VECM model, then we must pre-estimation tests. These tests include unit root test (unit root test), VAR stability testing, and optimal lag testing. These tests are important because in the multivariate time series model most of the data used contains root units so that it will make the estimation result fake and invalid.

Pre Estimation Test.

1. Unit Root Test.

Variables	ADF Test Statistic			Critical Value Mackinnon		
	Level	First Difference	Second Difference	Level	First Difference	Second Difference
LM1	-1.029	-2.096114	-8.5818	-3.51554	-2.902953	-2.588902
LM1ISL	-1.247	-3.876984		-3.52423	-2.902953	
LER	-0.916	-9.396742		-3.51126	-2.902953	
IDEP	-2.329	-2.669691	-10.62416	-3.51443	-2.897678	-2.586351
RS	-4.017	-10.29309		-3.51126	-2.897678	
INF	-2.41	-6.792323		-3.51229	-2.897678	

Notes : Bold indicates the data is stationary at 5% level

After unit root test the first difference in the 5% percentage there are some results of the data was not stationary, the following variables are M1 Conventional, and Interest Rate (IDEP), thus the

next step is the test second difference and as a result the data has been stationary at the second difference level. Therefore, the data level will be used, so the VAR model will be combined with the Variance Error Correction Model or VECM.

2. Lag Optimal Test.

LAG	INF	INF(ISL)
0	2.680645	3.131717
1	-7.697862*	-3.392507*
2	-7.216979	-2.796864
3	-6.971974	-2.272302
4	-6.30451	-1.72693
5	-5.706151	-1.049511

Notes : An asterisk (*) indicates the minimum SC

From the result above we see that the shortest SC value for all models equal. The lag optimal test is indicated first lag as optimal lag.

3. VAR Stability Test.

Variables	Modulus Range
Inf	0.121477-0.998808
InfIsl	0.098681-0.995379

Notes : All modulus are stable (<1) for each model.

4. Co-integration Test.

Model	Trace Statistic				
	H0	r = 0	r <= 1	r <= 2	r <= 3
	H1	r >= 1	r >= 2	r >= 3	r >= 4
Inf		45.4021	19.3015	2.85186	0.84615
InfIsl		54.6443	27.0245	13.898	5.38014
5% Critical Value		40.1749	24.276	12.3209	4.12991

Note : Bold print shows that trace statistics > 5% critical value and co-integration occurs

Table above shows that for each equation there is at least one co-integration rank at the five percent real level, that the value of trace statistic is bigger than critical value of 5% and 1%. In addition, the value of the Max-Eigen is also bigger than critical value 5%, it can be concluded that these data are co-integrated. This shows that there is a long-term relationship between among the variables. Information

on the number of ranks will be used as an error correction model (ECM) which will be included in the VAR model into VECM.

VECM Estimation.

1. VECM Estimation of Conventional Inflation.

Variables	Coefficients	T-Statistic
Long-Term		
LER(-1)	-18.28331	[-4.29069*]
LIDEP(-1)	0.443061	[1.65847*]
LM1(-1)	13.54098	[4.70475*]
Short-Term		
CointEq1	-0.100363	[-1.41694]
D(Inf(-1))	0.327614	[2.64322]
D(LER(-1))	-0.65869	[-0.20234]
D(LIDEP(-1))	-0.127551	[-0.23268]
D(LM1(-1))	0.456012	[0.17831]

Note: an asterisk (*) indicates significant variables at 5% level.

While in short term, we see there are error correction on model around that statistically insignificant. Beside that, other variables that statistically influence are inflation it self, and M1 Responded positively to inflation in his first lag by coefficient 0.456012, it means the increase in M1 will be increasing to Inflation rate. On contrary, exchange rate and Interest rate has negative influence toward Inflation that record coefficient -0.65869 and -0.127551 furthermore will be decrease when it increases.

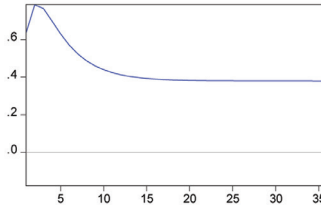
Even the result for the long term independents variables are has significant influence to the inflation, that T Statistic indicates the values bigger than T table.

Impulse Response Function (IRF).

Figure 2 below, is the result of an inflation response impulse due to M1 shocks, expected exchange rates, and long- term interest rates. In the case of M1 variable shocks, inflation responds negatively to the occurrence of increases starting from the second period to the end of the forecasting period. In the second period till thirteenth M1 should be fluctuating around -0.02-1.6 percent. Furthermore the money demand M1 should stable at fourteenth period till the end of forecast around 1.7 percent.

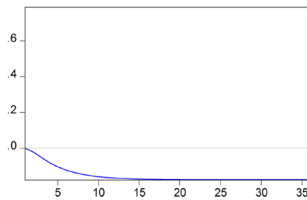
Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of INF to INF



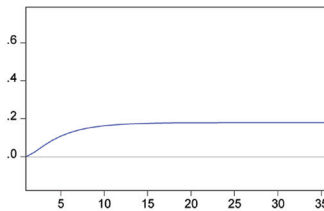
Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of INF to LM1CON



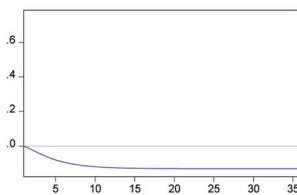
Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of INF to LKURS



Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of INF to IDEP

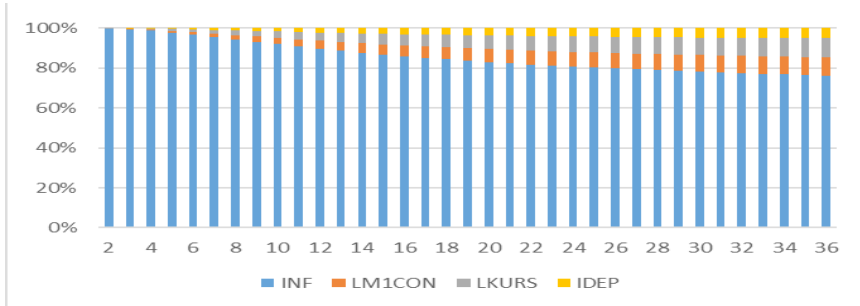


The exchange rate variable in conventional shock in the second period till the end of forecast. And it should fluctuate around 0.2-1.6 percent from second period till eleventh period. Than from twelfth till last period exchange rate should stable around 1.7 percent.

In general, interest rate variable shocks starting from the second period till the end of forecast. In second period till sixteenth period

interest rate should fluctuate around 0.2-1.2, and it should stable around 1.3 percent from seventeenth period till the end of forecast. From the picture and explanation above, it can be concluded that this inflation began to stabilize in response to other variable shocks after the twenty eight periode.

FEVD of Inflation Conventional



In the first period, fluctuations in inflation variables were influenced by inflation shocks themselves by 100 percent, while the effect of other variables was not yet seen. At the forecasting intervals of subsequent periods, the effect of the inflation shock itself decreases affecting fluctuations inflation but still dominant. In the first period to the end of the period the increase in inflation can be explained by variables M1 conventional, exchange rate and interest rates, with a contribution of 0.4-9.1 percent for M1, 0,6-9.5 percent exchange rate and 0,4-5,1 percent for interest rate.

2. VECM Estimation of Islamic Inflation.

Based on Table 6. below, the long-term variable exchange rate, M1 money demand in Islam, and sharia return have a significant effect on the level of five percent on inflation demand. The M1 Islam variable itself has a positive effect on inflation with a coefficient of 22.72929. This means that when Inflation increases by one percent, the demand for Islamic M1 also increases by 22.72929 percent.

Results of VECM Estimation of Inflation in Islam

Variables	Coefficients	T-Statistic
Long-Term		
LER(-1)	-27.4821	[-5.05247*
LRS(-1)	2.389915	[4.61844*
LM1Isl(-1)	22.72929	[5.34041*
Short-Term		
CointEq1	-0.003289	[-0.07752]
D(Inf(-1))	0.268035	[2.24662]
D(LER(-1))	-1.150215	[-0.35053]
D(LRS(-1))	-0.091043	[-0.68789]
D(LM1Isl(-1))	-0.351926	[-0.25164]

Note: an asterisk (*) indicates significant variables at 5% level.

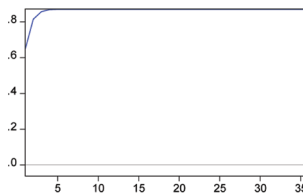
Furthermore the result above the Islamic return variable also has a positive effect on inflation for long term. With a coefficient of 2.389915 percent. It shows that in inflation in Islam, the means that when expected inflation and Islamic returns increase, inflation will increase too. It is difference shock of exchange rate variable has negative influence around -27.4821. That mean when exchange rate increase around -27.48210 the inflation should decrease by 27.48210.

The summary of the result Vector Error Correction Model for Islamic model that independents variables such as exchange rate, return sharia' and M1 in Islam has significant influence to inflation, cause of T Statistic indicates by 5% percent level, and it bigger than T table.

IRF of Inflation Islam.

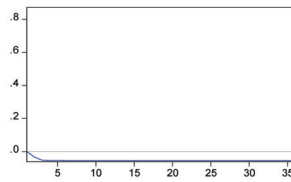
Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of INF to INF



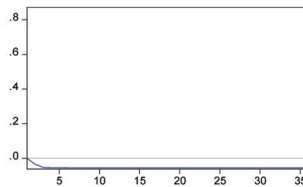
Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of INF to LKURS



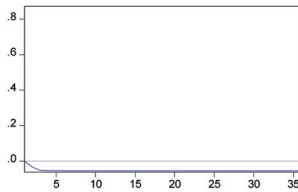
Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of INF to LKURS



Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of INF to RS



Contrary of inflation in conventional, the shock of exchange rate toward Demand for M1 Islamic responded negatively from second period till the end of forecast around 0.3-0.5 percent. And it will stable at thirch period. It means the shock of exchange rate when it increase inflation should be decrease. The response of M1 Islamic record that only need 4 period to go to equilibrium point around 1.7 percent, it is from sixth till the end of forecast.

One last thing, the shock of return sharia toward Demand for M1 Islamic responded negatively for overall forecast. It means the shock of return sharia for one standard deviation led the decrease of inflation. the response of return sharia record that all of forecast for three year coming soon shaould stable till the last of forecast around 0.5 percent.

FEVD of Islamic Inflation

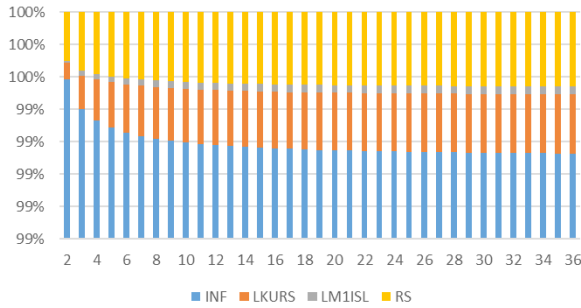


Figure above it can be seen that the variable shocks of money demand M1 to Inflation dominantly affect the first period by 100 percent. In the first period, the M1 shock expected to affect inflation until the end of the period is 0.1-0.4 percent. While the inflation variable shock itself can explain inflation fluctuations of 99.5 percent. For sharia return variables, shocks in this variable predominantly influence fluctuations in Islamic inflation. profit sharing variable has a positive effect on the inflation rate with the stability level in the sixth period until the end of forecast which is at point 4.4 percent.

General Discussion.

The results of the study using the VECM estimation of the two models above prove that the inflation rate which is influenced by money demand M1 conventional or Islam. These variables defined in the M1 Islamic system is influence by 22.72929 for long term model, it mean variable M1 in Islam when it increase by 1 percent, the inflation should increase by 1 percent too, because M1 Islam here has positive influence. While money demand M1 in conventional it same has significant influence to the inflation around 13.54098 percent and it also positive influence to the inflation. Than if inflation increase by 1 percent M1 conventional should increase too. But sadly the result of the Islamic M1 estimation do not have a good effect in this study because there is no adjustment or error correction (ECT) which shows the speed of adjustment from the short term to the long term.

The error correction value M1 Islam model is statistically significant. But there is no imbalance in the short term that will be corrected to the long term. While for the conventional M1 request model, shows that the error correction value is statistically significant. ECT values on conventional M1 requests are bigger than

ECT values on Islamic M1 requests. This means that the adjustment towards the long term is faster on the demand for M1 conventional than the Islam M1 demand.

Summary of response model inflation against the shock of exchange rate

Model	The Shock of variable Exchange Rate
Response of Inflation in Conventional	Positive & getting Stable on 12th period of forecast
Response of Inflation in Islam	Negative & getting Stable on 2nd period of forecast

Summary of response model inflation against the shock of Return Sharia and Interest Rate

Model	The Shock of variable Return Sharia and Interest Rate
Response of Inflation in Conventional	Negative & getting Stable on 17th period of forecast
Response of Inflation in Islam	Negative & getting Stable on 6th period of forecast

Conclusion.

Based on the results that obtained in a research above, it concluded some of the following conclusions, those are: Islamic M1 estimation do not have a good effect in this study because there is no adjustment or error correction (ECT) which shows the speed of adjustment from the short term to the long term. The error correction value M1 Islam model is statistically significant. But there is no imbalance in the short term that will be corrected to the long term. The result (ECT) or Error Correction for Inflation that influenced by M1 Islam around -0.003289 percent, it mean there is no imbalance in the short term that will be corrected to the long term. While the result of ECT for money demand in conventional it same like in Islam, no more influence to the inflation and it was insignificantly around 1 percent. But the result is independents variables are have significant values again dependent variables, even in Islam and Conventional side. One of variable such as M1 in Islam has result 5.34041, its indicating that the result has significant value again

inflation in long term.

While in Conventional side M1 value is 4.70475, that's mean the result has significant too against inflation, cause the value both of them bigger than T Table. Other variable such as exchange rate for long term has negative influence to the inflation around -18.28331 that mean exchange rate has significant influence to the inflation. Both of last variables are interest and return sharia' has significant too again inflation, the value around 0.443061 for interest rate, and 2.389915 for return sharia. It mean both of these variables has significant values again inflation, cause of T Statistic bigger than T Table.

Furthermore, Impulse response result was point out Speed of adjustment of Islamic money demand is faster than conventional money demand to reach equilibrium point. It needs around sixth period of forecast to go to the equilibrium point, and for Return Sharia variable getting stable around sixth period too and one other is exchange rate in Islam is faster than in Conventional the result is around second period. While the result of impulse response for M1 money demand in conventional getting stable at fourteenth period and interest rate around seventeenth period and last for exchange rate in conventional getting stable at twelfth period. According to variance decomposition simulation, it is concluded that fluctuation of Inflation more explained by the shock variable inflation itself than other variables.

Suggestion.

- The research on the influence of conventional and Islamic M1 fluctuations and the Inflation Targeting Framework (ITF) policy on inflation in Indonesia needs to be carried out more deeply to enrich the study of literature on the issue of money supply and the impact of implementing the ITF on inflation.
- Researchers realize there are still many shortcomings this study, both in terms of data that has not been maximally processed, as well as writing procedures study. Hope for the next researches can analyze on the money demand and monetary stability and to add any variables which did not exist in this research to make the study more valid, for every each element of money demand system. Because, maybe every each variable indicating different behavior in order explaining of monetary stability.

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