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MONETARY POLICY'S ROLE IN SHAPING THE FUTURE OF ISLAMIC BANKING PERFORMANCE

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Abstract. The study's goal is to define the role of monetary policy directed at achieving sustained Islamic banking and finance development within the global financial system. The system observed the input of inflation, interest rates, and the money supply with its fruitful contribution as a feasible monetary structure in both implementing and shaping the next steps directed toward crisis prevention and crisis resolution in Indonesia. The adopted approach is using Vector Error Correction Model (VECM). Monetary policy is thought to be the main determining factor for transforming Islamic banking performance. Money supply has a considerable impact on the return on assets both in the short and long term. In contrast, inflation and interest rates do not significantly affect the return on assets of the Islamic Banks in Indonesia. The IRF results stated that Return on Asset positively responded to Inflation and gave a harmful exposure to the Interest Rate and Money Supply (MS). Based on the results of the VDC, the money supply has the most significant contribution to the return on assets, followed by the interest rates and inflation. So Islamic banks must consider all the factors that can affect them.

Key words: VECM, Inflation, interest rates, money supply, return on assets.

Introduction

Banking concerns banks, including institutions, business activities, and ways and processes of business activities (UU/7/1992). Economic activity cannot be separated from banking; almost no economic activities do not make the bank the financial institution that guarantees the passage of business activities. Therefore, the bank was crucial in the development of the economy in Indonesia (Senduk, Ilat, & Tirayoh, 2017). The stability of banks, on the other hand, is crucial to the budgetary framework because they are the only sources of assets (Sultan, 2020). This is clear considering that banks are the mainstay sector for the public to make transactions in the financial industry, both to invest money and to request credit or financing (Juhro, Sharifuddin, & Sakti, 2020).

People from every aspect of life trust banks because they are a pillar of society as a whole and are the best institutions for safeguarding money. The primary role of banking in Indonesia is to collect and distribute public funds. (UU/10/1998). So, people can directly get loans from banks. From the explanation above, it can be understood that banks have two roles: financial institutions that collect funds from the public and distribute them to the public. Therefore, As a result, banks play a crucial role in a nation's trade and economic development (UU/10/1998).

The banking industry, which is at the center of the economy, likewise experienced ups and downs, as evidenced by the 1997 financial crisis' impact on the banking sector's falling conditions. Resulting in the Indonesian economy, which was Indonesia is a developing country still pursuing economic development (Trenca, Petria, & Corovei, 2021), suddenly becoming shocked. The economic and social situations have significantly suffered from the financial crisis (Trenca, Petria, & Corovei, 2021). Government regulations requiring banks to employ high-interest rate practices during the crisis have hindered conventional banks from meeting their obligations to clients (Pramisti).

Islamic banks are not experiencing a negative impact because it does not apply the interest system. It's because Islamic banks have no obligation to give their customers interest on deposits. Nevertheless, they are required to pay profit sharing to their customers according to the profits obtained from investing in customer funds. Islamic banks' main sources of income are the earnings made from the collection of cash and investments in the real market. Through explanation in advance, Islamic banks have the potential to invite the Indonesian people, the majority of whom still rely on conventional banks, to switch to depending on Islamic banks. That's, Islamic banks must show exemplary performance to the community (Hidayati, 2014).

The high level of bank profits is one of the indicators used to measure the quality of a reputable bank. Profitability is the appropriate indicator for measuring a bank's health level (Syakhrun, Amin, & Anwar, 2019). In other words, the higher the profit the bank earns, the better the bank performs. To reach the bank goal, the bank must be operated properly. The operation of a new bank can be run as appropriate if customers receive funds. The more funds the bank raises, the more excellent the opportunity to carry out activities to achieve its goals. It means that the bank's development cannot be separated from customer trust, which can be known from the high level of its operations. And then, profit or profitability is the leading cause that will increase the growth of the banking sector (Maski, 2010).

Many factors can affect a bank's Return on Assets, including size, Capital Adequacy Ratio, Non-Performing Loans, Net Interest Margin, and Loan To Deposit Ratio. A bank's return on assets is affected by both factors that management can influence and uncontrollable causes. Factors that management can control describe the policies and decisions of the bank's management, such as depository funds, capital management, liquidity management, and cost management. Meanwhile, factors beyond management's control include environmental factors and bank characteristics, including market structure, regulations, inflation, interest rates, and Gross Domestic Product (Hidayati, 2014).

The authors selected inflation, interest rates, and money supply as variables that affect the Return On Assets of Islamic banks in this study. One of the main variables that have an impact on bank profitability is inflation, which results from a sustained rise in the cost of products or services over an extended period of time. In the world of Islamic banking, inflation could speed up money moves from Islamic to conventional banks. If inflation increases, interest rates will increase, so customers prefer to invest in conventional banks. With the depletion of customer interest in investing in Islamic banks, this will be an effort by Islamic banks to make a profit. In the end, the profit to be generated by Islamic banks is low and is more likely to bring Islamic banks to poor performance (Sukirno, 2006).

Another indicator that affects bank profitability is the interest rate; consequently, it impacts the slow pace of economic growth. Therefore, Bank Indonesia needs the policy to set an appropriate interest rate as a benchmark for other banks, both conventional and Sharia. Islamic banking is grounded on the principle of avoiding interest. However, paradoxically the argument of Islamic banking being wholly free and independent of interest rate is dubious at best. In reality, the interest rates have deep roots in the present edifice, where Islamic financial institutions do not have independent mechanisms for pricing. By far, Islamic banks operate in a dual banking system worldwide (excluding Iran and Sudan, where the whole financial system has been Islamized). Thus, to cope with the severe competition, the Islamic banks operating within the dual banking system are consistently mimicking and matching their prices with their interest-based conventional counterparts. Ultimately, to bring Islamic banks to good performance, they must match their price-based interest rate (Nouman, Hashim, Trifan, & Spinu, 2022).

So, the next factor is the money supply; if the money supply is increased will cause a rise in interest rate, and then Bank Indonesia will issue a policy to raise the interest rate, eventually attracting customers to entrust or invest their funds in banks. Then, it will increase lending rates and deposit rates. As described before, interest rates have deep roots in the present edifice, where Islamic financial institutions do not have independent pricing mechanisms and will match their prices with their interest-based conventional counterparts. Ultimately, to bring Islamic banks to good performance, they must match their price-based interest rate (Nouman, Hashim, Trifan, & Spinu, 2022). Overall, this study aims to investigate the impact of money supply, interest rates, and inflation on the return on assets of the Islamic bank in Indonesia from 2016-2021.

Literature review

A bank's financial performance is a measure that describes a bank's financial condition. The action can be analyzed by looking at how much a company has used company regulations in the financial sector properly and correctly. The company's performance will be described as financial condition, which is analyzed through financial analysis tools; it is aware of its good and terrible work performance. (Sahara, 2013). Certain assets and share capital use the profitability or profit ratios to measure the company's ability to profit at the selling level. The three ratios that are often used are; Profit Margin, Return on Asset (ROA), and Return on Equity (ROE) (Mufidah & Adriyanto, 2017).

Inflation means the increase in the general price level of goods and services during a certain period of an economy. Another term for inflation is 'symp-

toms of a general and continuous increase in goods.' The price of goods and services increases because demand increases more than supply in the market. In other words, too much money is in circulation, which consumes too few goods (Afif, 2020). Inflation also defined as continuous price increases, which reduces people's purchasing power because, in real terms, the income level also decreases, assuming that people's income levels are constant (Nurjannah & Hendrarno, 2018).

In the Islamic economic system, inflation is not a significant financial problem in the aggregate, as the currency is stable using dinars and dirhams. Decreasing in value is still possible, that is, when the value of gold that supports the face value of the dinar reduces, including due to the discovery of large amounts of gold, but this situation is improbable (Parakkasi, 2016).

Interest rate is the price that will be used at which loanable funds. The interest rate is one indicator in determining whether someone will invest or save (Boediono, 2014). In another sense, the interest rate is the price of borrowing. Interest rate is a percentage expressed as an interesting measure of the price of resources the debtor uses that must be paid to the creditor. According to Hubbard's theory, interest is the fee a borrower must pay on a loan received and a reward for the lender on his investment (Sunariyah, 2013). Monetary policy is a policy determined and implemented by Bank Indonesia to achieve and maintain rupiah stability which is carried out, among others, through controlling the money supply and interest rate. Based on the description above, it can be concluded that the interest rate is the price of users of investment funds issued by the central bank to control the circulation of money in the community.

Islamic economics does not use interest as one of the monetary instruments because interest, according to the Islamic view, is equivalent to riba, which Allah Almighty has forbidden. Riba linguistically is increasing. Meanwhile, riba is a contract of exchange accompanied by conditions to exceed the rate of substitute goods from one of the contracting parties. The view of riba among Muslims today is not limited to the substance of riba that existed at the time of the Prophet (peace be upon him). Throughout Islamic history, what is said to be riba is to stipulate more payments on the principal of the loan, so based on this, bank interest is usury. Abu Umar Faruq Ahmad stated (Afif, 2020) (Ahmad & Hassan, 2008), "Riba is not restricted to usury but encompasses interest as well."

Money can be used for transactions. Money is currency and checkable deposits at banks (Indonesia I. B., 2014). In practice, different countries use money supply of various types. The types of money supply are officially defined based on their components (Blanchard, 2021). These components are generally the three types of money well-known in the previous section: currency, demand deposit, and quasi-money. Thus, according to the diverse scope of the money supply. It follows Boediono's definition of money supply that money supply is an obligation of the monetary system to the domestic private sector. In Indonesia, there are only two types of money in circulation, namely (Solikin & Suseno, 2002); Money supply, in the narrow sense, often given the symbol M1, is defined as the obligation of the monetary system to the domestic private sector consisting of currency and demand deposit. Money supply in a broad sense, often referred to as financial liquidity and given the symbol M2, is defined as the obligation of the monetary system to the domestic private sector consisting of currency, demand deposit, and quasi-money. In other words, M2 is M1 plus quasi-money.

Methodology

The explanatory quantitative method was employed in this study. The quantitative approach is research that emphasizes its analysis of numerical data (numbers) processed by statistical analysis. Judging from the research that will be researched, which uses numbers in analyzing a problem. The model used is the Vector Error Correction Model (VECM). The data used is a Time series that can use the VAR (Vector Autoregressive) model. This study is using secondary data from financial statements published by Bank Indonesia and OJK obtained through their websites from 2016 to 2021. The data in this study was obtained from the annual report from Islamic commercial banking, which has been published on the website of the Financial Services Authority (www.ojk.go.id) and the annual report from Bank Indonesia (www.bi.go.id). The statistical analysis aims to analyze the effect of variable inflation, interest rate, and money supply as variables X1, X2, and X3 and using Return on Assets (ROA) as variable Y.

In terms of model specification, this study proposed model specification into the model as follows:

$$lnROA_t = \beta_0 + \beta_1 Inf_t + \beta_2 Rate + \beta_3 LnJUB + \mu_t$$

where:

$lnROA_t$ = monthly amount of return on asset, where *ln* denotes the natural logarithm and *t* denotes time of monthly period.
Inf_t = Inflation Rate
$Rate_t$ = Interest Rate
$LnJUB_t$ = Money Supply
μ_t = error term

Mathematically the VECM model can be written as follows:

$$\begin{bmatrix} lnROA_t \\ Inf_t \\ Rate_t \\ LnJUB_t \end{bmatrix} = \begin{bmatrix} \beta_{10} \\ \beta_{20} \\ \beta_{30} \\ \beta_{40} \end{bmatrix} + \begin{bmatrix} \beta_{11} & \beta_{12} & \beta_{13} & \beta_{14} \\ \beta_{21} & \beta_{22} & \beta_{23} & \beta_{24} \\ \beta_{31} & \beta_{32} & \beta_{33} & \beta_{34} \\ \beta_{41} & \beta_{42} & \beta_{43} & \beta_{44} \end{bmatrix} \begin{bmatrix} lnROA_{t-1} \\ Inf_{t-1} \\ Rate_{t-1} \\ LnJUB_{t-1} \end{bmatrix} - \lambda \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \\ \mu_{4t} \end{bmatrix}$$

Results

Using the VECM model estimate, the first step in data estimating is to examine the stationary of the data. The unit root test is used to test the stationary of time series variables (Fixed investment and GDP in rural China); ADF (Augmented Dickey-Fuller) test is the standard unit root test method for avoiding the problem of spurious regression. The ADF stationary tests on each variable in the study are shown in Table 2 as follows:

Table 1 – ADF Test Results Using Intercept at Level

Variable	ADF	Mc Kinnon Critical Value 5 Percent	P-Value	Information
Inflation	-1.131183	-2.904848	0.6989	Non-Stationer
Rate	-1.055849	-2.905519	0.7283	Non-Stationer
Log (JUB)	-8.245265	-2.904848	0.0000	Stationer
ROA	-1.790666	-2.904848	0.3821	Non-Stationer

Source: Data Processed

From the results of the stationary test as shown in Table 2, only one stationary variable at the level, namely the Money Supply (MS) variable. In contrast, the other three variables are inflation, rate, and ROA variables, not stationary at the level. At the probability level, ADF t-statistical variable money supply is smaller than the Mc Kinnon Critical Value of 5 percent (this study used α = 0.05), which is -8.245265 < -2.904848. The null hypothesis is rejected, and H1 is accepted, so the data is already stationary.

At the same level, the inflation variable does not meet the requirements of data stationaries. It is known that the probability of ADF t-statistical inflation variable is greater than the Mc Kinnon Critical Value of 5 percent (this study uses α = 0.05), which is -1.131183 > -2.904848 which indicates that H0 is accepted and H1 is rejected, or that the data is not stationary.

Similar estimations arise in the variable rate just like they happen in the inflation variable. Because H0 is accepted and H1 is rejected, or in other words, the data is not stationary, it is known that the probability of the ADF t-statistical variable rate is more than the Mc Kinnon Critical Value of 5 percent, which is expressed as -1.055849 > -2.905519.

In addition, for the last variable, it is known that the probability of ADF t-statistical variable Return on Assets (ROA) is greater than the value of Mc Kinnon Critical Value 5 percent, which is -1.790666 > -2.904848, which indicates that H0 is accepted and H1 is rejected, or that the data is not stationary.

Based on the results of stationary testing at the level, because the three variables, namely inflation, rate, and Return on Assets (ROA), are not stationary in the ADF test of the level intercept model, the solution is to differentiate the data at the first difference level. The results of the first difference-level ADF test can be shown in Table 3 as follows:

Table 2 – ADF Test Results Using Intercept at the First Difference Level

Variable	ADF	Mc Kinnon Critical Value 5 Percent	P-Value	Information
Inflation	-7.837817	-2.905519	0.0000	Stationer
Rate	-5.186770	-2.905519	0.0000	Stationer
Log (JUB)	-9.721127	-2.906210	0.0000	Stationer
ROA	-10.42827	-2.905519	0.0000	Stationer

Source: Data Processed

According to Table 2 above, all of the variables utilized in this study are stationary at the first difference level. Also based on this finding, the meaningful technique for estimation is Johansen multivariate co-integration method, which is adopted in the estimation section. The hypothesis is rejected if the ADF statistic exceeds the associated critical value at 5 percent (0.05). Stationer test results at the first difference level are as follows:

α. The inflation variable in the ADF test of the intercept model at the first difference level showed that the t-statistical ADF value was smaller than the Mc Kinnon of the 5 percent Critical Value (in this study used $\alpha = 0.05$), which is -7.837817 < -2.905519 which means that H0 is rejected and H1 is accepted in other words, the data has been stationary.

β. The variable rate on the ADF test of the intercept model at the first difference level shows that the t-statistical ADF value is smaller than the Mc Kinnon Critical Value of 5 percent, -5.186770 < -2.905519 which means that H0 is rejected and H1 is accepted in other words, the data has been stationary.

χ. The Money Supply (JUB) variable in the ADF test of the intercept model at the first difference level showed that the t-statistical ADF value was smaller than the 5 percent Mc Kinnon Critical Value, which is -9.721127 < -2.905519 which means that H0 is rejected and H1 is accepted in other words, the data has been stationary.

δ. The Return on Assets (ROA) variable in the ADF test of the intercept model at the first difference level showed that the t-statistical ADF value was smaller than the Mc Kinnon of the 5 percent Critical Value, -10.42827 < -2.905519, which means that H0 was rejected and H1 was accepted or in other words, the data had been stationary.

Based on the result presented, it is explicit that all the variables are stationary at the first difference, and the stationer requirements of the ADF test data, the t-statistical ADF value is smaller than the Mc Kinnon Critical Value of 5 percent at the first difference level. Because all data are stationary at the first difference level, the optimal lag length can be determined.

The optimal lag test aims to analyze how long a variable reacts to other variables and eliminate the problem of autocorrelation in VAR models. The lag length test in this study was based on the smallest Akaike Information Criterion (AIC) criteria. This study tested the VAR model with different lag levels and compared it with the AIC value. They are using the smallest AIC value for optimal lag value reference. The results of the optimum lag test in Table 4, suggest that the estimation model is optimum at lag 1.

Table 3 – Optimal Lag Test Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-411.1285	ON	2.830340	12.39190	12.52352*	12.44398*
1	-389.6491	39.75293*	2.405928*	12.22833*	12.88645	12.48875

Source: Data Processed

After the optimum lag test is conducted, the VAR stability test is carried out. The VAR stability test serves to analyze the stability of the model. The Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) are both invalid if the outcome of fusing the VAR estimate with the er-

ror correction model is unstable. Testing whether a VAR estimation is stable or not is based on examining the polynomial root properties that represent the VAR's stability requirements. A VAR system was said to be stable if all roots have a modulus of less than one and are in a unit circle. VAR stability test results are shown in Table 5. The VAR system is stable because the modulus ranges less than one from 0.330830-0.629089. So, the VAR model can be inferred to be optimally stable lag.

Table 4 – VAR Stability Test Result

Root	Modulus
0.629089	**0.629089**
-0.390286 – 0.493032i	0.628811
-0.390286 + 0.493032i	0.628811
0.005105 – 0.420834i	0.420865
0.005105 + 0.420834i	0.420865
-0.353772	0.353772
0.200110 – 0.263446i	0.330830
0.200110 + 0.263446i	**0.330830**

Source: Data Processed

The Granger causality test is used test suggests a cause-and-effect relationship between return on assets and inflation, rate, and money supply. The results of the causality analysis determined the causality between the variables and the direction of the systems. Test causality can be seen if the probability is smaller than the alpha value (0.05). As a result, the null hypothesis is accepted, which means there is a significant relationship, and vice versa: if the probability is greater than the alpha value (0.05), then the null hypothesis is rejected, or there is no relationship between variables.

Table 5 – Granger Causality Test Results

Null Hypothesis:	Obs	F-Statistic	Prob.
D(RATE) does not Granger Cause D(INFLASI)	67	0.46172	0.4993
D(INFLASI) does not Granger Cause D(RATE)		1.77170	0.1879
D(JUB) does not Granger Cause D(INFLASI)	67	4.12201	0.0465
D(INFLASI) does not Granger Cause D(JUB)		0.25923	0.6124
D(ROA) does not Granger Cause D(INFLASI)	67	0.35986	0.5507
D(INFLASI) does not Granger Cause D(ROA)		0.50580	0.4795
D(JUB) does not Granger Cause D(RATE)	67	6.8E-10	1.0000
D(RATE) does not Granger Cause D(JUB)		1.0E-09	1.0000
D(ROA) does not Granger Cause D(RATE)	67	0.58898	0.4456
D(RATE) does not Granger Cause D(ROA)		0.73525	0.3944
D(ROA) does not Granger Cause D(JUB)	67	1.41933	0.2379
D(JUB) does not Granger Cause D(ROA)		0.31587	0.5761

Source: Data Processed

As indicated by Table 6's results, there was inflation in general, an increasing rate of interest, and a fluctuating money supply during the study period. It can be proven through a probability value more significant than the alpha value (0.05). Vice versa, the variables of inflation, rate, and money supply (JUB) did not have a significant effect on the variable Return on Assets (ROA) during the study period because the probability value was more significant than the alpha value (0.05).

The co-integration test is used to adjust the economic model using non-stationary time series data of return on assets and inflation, rate, and money supply. No matter how much the variable varies over time, long-run relationship co-integration test can be used to determine the long-term relationships between return on assets, inflation, rate, and money supply. There will consequently be a common link between them. The co-integration tests are used to confirm the presence of potential long-run equilibrium relationships between variables. We adopted the Johansen methodology to conduct the co-integration test in this study. The co-integration test shows that the system equation undergoes error correction, which describes short-term dynamics consistent with the long-term equation. Long-term information is obtained by determining the co-integration rating to determine how many systems of equations can explain the overall system.

The co-integration test uses Johansen's co-integration approach by comparing trace statistics with a critical value of 5%. Co-integration occurs in the equation system if the statistical trace result exceeds the critical value. The results of Johansen's co-integration test in Table 7 show that the trace statistical value and maximum eigenvalue at r = 0 are more significant than the critical value with a significance level of 5 percent. It can be explained that in the 5 percent test level (0.05), four variable ranks have a co-integration relationship to continue the research. Since the variables are co-integrated, we use the Restricted VAR Model (VECM) and not the Unrestricted VAR model in the selected variables.

Table 6 – Co-integration Test Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.622469	135.8656	40.17493	0.0000
At most, 1 *	0.408388	71.57486	24.27596	0.0000
At most 2 *	0.316601	36.93118	12.32090	0.0000
At most 3 *	0.163800	11.80654	4.129906	0.0007

Source: Data Processed

After performing a series of pre-stages, that is, stationary data, long determination of the estimation test lag, Granger test, and the stability of the VECM, and the fact there are four rank Granger in 0.05 test level (5 percent) in this study, then the model used, VECM (vector error correction model). Using the estimation of VECM by the outline of the problem in this study is to identify short-term relationships and long-term influence of independent variables against the dependent variables. The result of VECM estimation can be shown in Table 7 as follows:

Table 7 – Results Estimated VECM (Vector Error Correction Model) Short Term

Variable	coefficient	t-statistic partial
CointEq1	-0.043349	[-2.56705]
D(ROA(-1))	-0.128014	[-1.16088]
D(INFLASI(-1))	-0.033519	[-0.41055]
D(RATE(-1))	0.122800	[0.98566]
D(JUB((-1)	0.000231	[2.16307]
C	0.025131	[1.26926]

Source: Data Processed

Table 7, described in the short term, shows that one variable can be significant at 5 percent plus one variable error correction. The real variable is the amount of money supply. If there is an increase in the amount of

money supply RP. 1.00 in the previous year will raise the value of the return on assets in the current year to 0.00023. The analysis followed the hypothesis, the value of the partial statistics variable amount of money supply to lag 1 for 2,16307 or greater than 1,995469, which means h0 denied and h1 received in other words variable the amount of money supply influential positive and significantly to return on assets short-term. The higher money supply resulted in a higher return on assets, so Islamic Bank profitability took up.

In addition, in the short term (a six-year research period), based on Table 8, it can be known that the variable of the amount of money supplies influential significantly returns on assets. In contrast, inflation and rate do not indicate a significant influence in the long run against the return on assets. Following the empirical facts in this study, short-term and long-term inflation and rate do not affect the return on assets. ECM over the long term is shown in tables as follows:

Table 8 – Results Estimated Error Correction Model Long Term

Dependent Variable: D(INFLASI)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 02/28/23 Time: 09:15
Sample (adjusted): 2016M06 2021M12
Included observations: 67 after adjustments
D(INFLASI) = C(7)*(ROA(-1) - 0.0807294317302*INFLASI(-1) + 0.288403390093*RATE(-1) + 0.00898595066684*JUB(-1) - 2.78500472117) + C(8)*D(ROA(-1)) + C(9)*D(INFLASI(-1)) + C(10) *D(RATE(-1)) + C(11)*D(JUB(-1)) + C(12)

	Coefficient	Std. Error	t-Statistic	Prob.
C(7)	-0.002964	0.026853	-0.110373	0.9125
C(8)	0.071427	0.175355	0.407328	0.6852
C(9)	0.080996	0.129831	0.623858	0.5350
C(10)	0.146974	0.198115	0.741864	0.4610
C(11)	0.000242	0.000170	1.423418	0.1597
C(12)	-0.016082	0.031486	-0.510776	0.6114

R-squared	0.072208	Mean dependent var	-0.021791
Adjusted R-squared	-0.003840	S.D. dependent var	0.249393
S.E. of regression	0.249871	Akaike info criterion	0.149543
Sum squared resid	3.808571	Schwarz criterion	0.346978
Log-likelihood	0.990314	Hannan-Quinn criter.	0.227668
F-statistic	0.949505	Durbin-Watson stat	1.989971
Prob (F-statistic)	0.455842		

Dependent Variable: D(RATE)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 02/28/23 Time: 09:19
Sample (adjusted): 2016M06 2021M12
Included observations: 67 after adjustments
D(RATE) = C(13)*(ROA(-1) - 0.0807294317302*INFLASI(-1) + 0.288403390093*RATE(-1) + 0.00898595066684*JUB(-1) - 2.78500472117) + C(14)*D(ROA(-1)) + C(15)*D(INFLASI(-1)) + C(16)*D(RATE(-1)) + C(17)*D(JUB(-1)) + C(18)

	Coefficient	Std. Error	t-Statistic	Prob.
C(13)	-0.001317	0.015645	-0.084185	0.9332
C(14)	0.046789	0.102164	0.457978	0.6486
C(15)	0.089837	0.075642	1.187672	0.2396
C(16)	0.431039	0.115424	3.734387	0.0004
C(17)	2.11E-05	9.89E-05	0.213181	0.8319
C(18)	-0.015104	0.018344	-0.823358	0.4135

R-squared	0.197977	Mean dependent var	-0.029851
Adjusted R-squared	0.132238	S.D. dependent var	0.156278
S.E. of regression	0.145578	Akaike info criterion	-0.930917
Sum squared resid	1.292779	Schwarz criterion	-0.733482
Log likelihood	37.18572	Hannan-Quinn criter.	-0.852791
F-statistic	3.011542	Durbin-Watson stat	1.988493
Prob(F-statistic)	0.017072		

Dependent Variable: D(JUB)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 02/28/23 Time: 09:21
Sample (adjusted): 2016M06 2021M12
Included observations: 67 after adjustments
D(JUB) = C(19)*(ROA(-1) - 0.0807294317302*INFLASI(-1) + 0.288403390093*RATE(-1) + 0.00898595066684*JUB(-1) - 2.78500472117) + C(20)*D(ROA(-1)) + C(21)*D(INFLASI(-1)) + C(22)*D(RATE(-1)) + C(23)*D(JUB(-1)) + C(24)

	Coefficient	Std. Error	t-Statistic	Prob.
C(19)	-123.7278	20.44231	-6.052535	0.0000
C(20)	-171.2093	133.4928	-1.282536	0.2045
C(21)	2.873338	98.83706	0.029071	0.9769
C(22)	38.75424	150.8191	0.256958	0.7981
C(23)	0.068589	0.129239	0.530713	0.5975
C(24)	3.426884	23.96924	0.142970	0.8868

R-squared	0.542029	Mean dependent var	-0.007463
Adjusted R-squared	0.504490	S.D. dependent var	270.2277
S.E. of regression	190.2199	Akaike info criterion	13.41952
Sum squared resid	2207201.	Schwarz criterion	13.61696
Log likelihood	-443.5541	Hannan-Quinn criter.	13.49765
F-statistic	14.43923	Durbin-Watson stat	1.987187
Prob(F-statistic)	0.000000		

Source: Data Processed

The estimation results of long-term regression show that macroeconomic indicators used are not significant at the 5 percent level except the money supply variable. The relationship between each dependent and independent variable used in the model does not fully correspond to the hypothesis. Based on Tables 9, 10, and 11, note that one variable can be significant at 5 percent in the long term. Moreover, the variable is the money supply; from Table 11 estimation in the long run above, it can be explained that the long run coefficient of money supply reaches -123.7278 and the associated t-value 0.0000. The long run between money supply and return on assets caused the negative coefficient value and the associated t-value to be significant at the 5 percent level.

On the contrary, according to table 9 also explains that the long-run coefficient of inflation is -0.002964, and the associated t-value is 0.9125. This means no long run between inflation and returns on assets caused the coefficient value to be negative, but the associated t-value is not significant at the 5 percent level. In addition, table 10, estimating the long run above, explains that the long run coefficient of the rate is -0.001317, and the associated t-value is 0.9332. This means no long run between the rate and returns on assets caused the coefficient value to be negative, but the associated t-value is insignificant at the 5 percent level.

The results of VECM analysis are not only able to see the influence of independent variables against the dependent variables however, but also equipped with IRF features (impulse response function) and VDC (variance decomposition) it can use to see the response and the time for variable back to the point balance as well as see how big the composition of the influence of each variable against the formation of dependent variables.

The impulse response function (IRF) is used to describe the level of shock rate from the variables used in the study. The response of any variable to

the shock of the variable and other endogenous variables allows one to observe the dynamic behavior of the VECM model. One standard deviation in this model represents the response to changes in each variable in the presence of new information. Following the shock, the horizontal axis represents the time of the following day, and the vertical axis represents the response value.

Fundamentally, this analysis will be recognized to be a variable's positive or negative relationship to other variables. The short-term effect is typically extremely large and tends to vary. The answer typically remains constant over time and keeps getting smaller. The impulse response function illustrates how a variable will behave in the future if any disruption on another variable takes place. To make understanding simpler, the graphic below breaks down the analysis results into 10 time periods. Graphs of test results will display a positive or negative response from the factors used. The following examples show how the impulse response function (IRF) is performed:

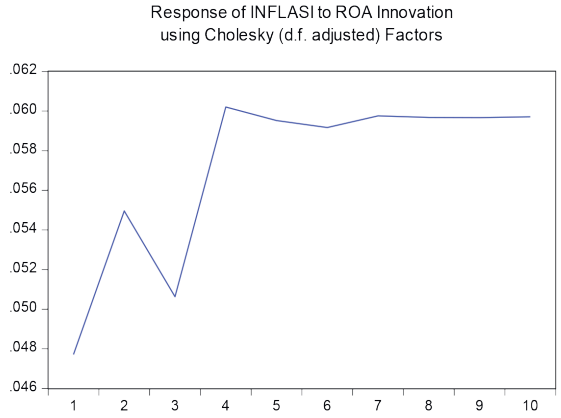

Figure 1 – The Results of IRF Analysis of Inflation concerning ROA

From Figure 1 above, it can be explained in the figure above that the response of inflation against variable shock return on assets is from the first to the second period of experiencing ascension. However, in the second and third periods of response, the Inflation in the third period until the fourth, the response inflation against shock ROA has elevated. The IRF line demonstrates the tendency to vary from the first to the seventh period. Additionally, fluctuations started to decrease after the seventh period, indicating that inflation is no longer as volatile as it was during the preceding time; in other words, the graph demonstrates stability.

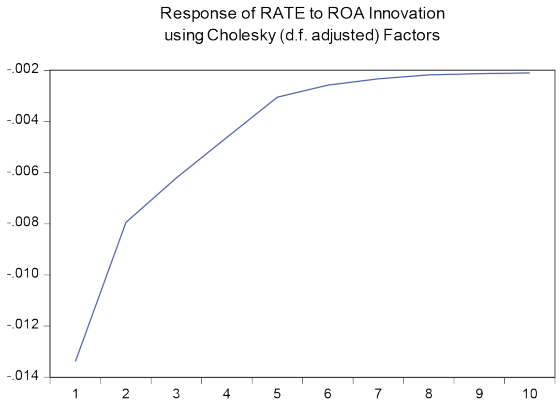

Figure 2 – The Results of IRF Analysis of Rate concerning ROA

Analysis from Figure 2 above indicates that from the first period to the eighth, there is a consistent increase in the response rate to shock variable return on assets. In addition, after a period of 8, the increase began to shrink. It indicates that inflation is no longer as volatile as it was during the preceding time period; the graph thus indicates stability.

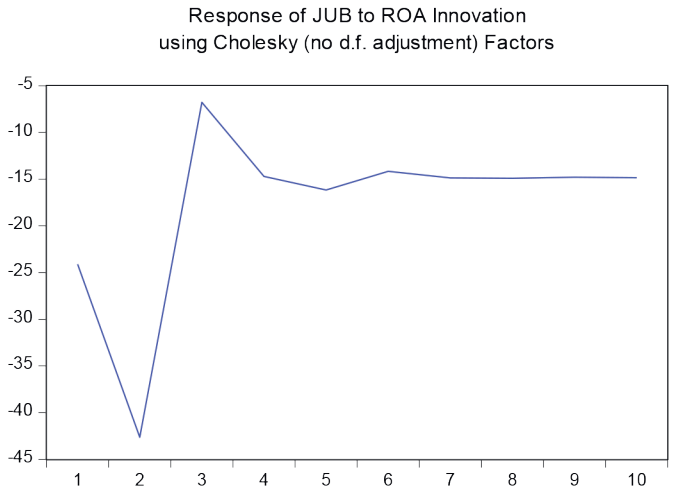

Figure 3 – The Results of IRF Analysis of Money Supply concerning ROA

Analysis Figure 3 above shows how the response of the money supply to a variable shock return on assets fluctuates from the first period. Furthermore, after 6, the growth started to decline, indicating that inflation was less volatile than it had been. The graph, therefore, displays the stability

After analyzing the dynamic behavior from impulse response, the next step is to make a model through variance decomposition. Characteristics variance decomposition is used to compose forecast error variance a variable, showing how big the difference between variance before and after the shock, good shock from other variables, and the influence of relative research variables against other variables. The procedure variance decomposition by measuring the percentage of surprises over each variable. The variance decomposition model explains how to change one variable affected by other variables change. The presence of variance error changes indicates changes in a variable. Variance test results decomposition can be seen in Table 9 as follows:

Table 9 – Analysis Results Variance Decomposition (VCD) ROA

Variance Decomposition of ROA:					
Period	S.E.	ROA	INFLASI	RATE	JUB
1	0.157133	100.0000	0.000000	0.000000	0.000000
2	0.207651	97.24724	0.096201	0.607565	2.048994
3	0.261441	91.08031	0.061896	0.871168	7.986622
4	0.305719	89.72678	0.045547	1.019623	9.208054
5	0.343483	88.72537	0.036466	1.153282	10.08488
6	0.378099	87.94649	0.030111	1.242267	10.78114
7	0.409746	87.45464	0.025678	1.307757	11.21193
8	0.439087	87.07588	0.022391	1.358774	11.54295
9	0.466621	86.77975	0.019846	1.398291	11.80211
10	0.492615	86.54682	0.017826	1.429938	12.00541

Source: Data Processed

The results of VDC analysis in the period to 2 variable rates have contributed to the ROA of 0.60 percent. The contribution rate to the ROA increased in period to-3 with a significant shock of 0.061 percent up to the 10th period of 1.42 percent. The results of VDC analysis in the period to 2 variables amount of money supply have contributed to the ROA of 2.04 percent. The contribution rate against ROA continuously rises to up to 12 percent.

According to Table 9 above, the shock ROA of 100% had a significant impact on ROA during the first term. Variable rates, money supply, and levels of inflation had no impact on ROA during the first period. As a consequence, ranging from the first to the 10th period, the proportion of shock ROA is still significant. However, shock ROA gives the proportion of influence down little by slight against import itself from period to-1 to period the 10th. Inflation versus ROA fell in the period to 3 with a substantial shock of 0.061 percent, and second-time variable inflation contributes 0.096 to 2 percent of inflation. And soon, up until the 10th period.

Discussion

The effect of inflation against the return on assets Indonesia Islamic Bank

The estimation result shows a negative and insignificant effect, which means H1 was approved, between inflation variables and returns on assets in both the long and short terms. It can be seen from the test results explained that the long run coefficient of inflation is-0.002964 and the t-value 0.9125. Due to no longer running between inflation and return on assets, it caused the coefficient value to be negative. However, the t-value is not significant at the 5 percent level. It can be interpreted that throughout negative effect inflation rate observations and insignificant against the return on assets of sharia bank of Indonesia.

This finding lines up with the idea in the context of Islamic banking, which holds that inflation can speed up the transition from Islamic to conventional banks. Customers prefer to invest in traditional banks since rising interest rates will result in higher inflation. With the depletion of customer interest in investing in Islamic banks, this will be an effort by Islamic banks to make a profit. In the end, Islamic banks are going to generate a small profit, which will probably result in underwhelming performance.

In addition, based on impulse response analysis, it is known that inflation variables positively respond to the shock on a return on assets variable. This shows that the increased development of inflation influences increased return on assets. Besides, variance decomposition analysis shows that inflation has no more substantial influence in explaining the existence of a change in return on assets compared to the return on assets and the amount of money supply.

The effect of Rate against the return on assets Indonesia Islamic Bank

In theory, Islamic banking is grounded on the principle of avoiding interest. However, paradoxically the argument of Islamic banking being wholly free and independent of interest rates is dubious at best. The interest rates have deep roots in the present edifice, where Islamic financial institutions do not have independent mechanisms for pricing. By far, Islamic banks operate in a dual banking system worldwide (excluding Iran and Sudan, where the whole financial system has been Islamized). Thus, to cope with the severe competition, the Islamic banks, operating within a dual banking system, are consistently mimicking, and matching their prices with their interest-based conventional counterparts. Ultimately, to bring Islamic banks to good performance, they must match their price-based interest rate. Research by Wakara Ibrahimu Nyakabora supports this theory, stated that the interest rate variable positively affects asset return.

In contrast, based on the test results, on top known that, they are a negative influence and insignificant among variables interest rates to return on assets both in the long and short term; in other words, H1 declined. It means there is no long run in the release interest rate and returns on assets because the coefficient value is negative. However, the associated t-value is not significant at the 5 percent level. It can be interpreted that throughout the observation, negative interest rates and insignificant returns on assets are influential commercial banks of Sharia Indonesia.

Furthermore, through impulse response analysis, it is known that variable interest rates negatively respond to the shock that occurs on a variable return on assets. The numbers coefficient IRF interest rates indicate it changes return on assets, which is worth damaging from the start to the end of the period. It shows that an increase in interest rates can lower the performance of the Islamic Bank. On the other hand, through the analysis of variance decomposition, the interest rate has no more substantial influence in explaining the existence of a change in return on assets compared to the return on assets and the amount of money supply.

The Effect of Money Supply against the Return on Assets Indonesia Islamic Bank

The relationship between the money supply and interest rates is very close; that is, if interest rates increase, lending and deposit rates will increase as described before the interest rates have deep roots in the present edifice, where Islamic financial institutions do not have independent mechanisms for pricing and will matching their prices with their interest-based conventional counterparts. Ultimately, to bring Islamic banks to good performance, they must match their price-based interest rate. This theory is supported by research. A study conducted by Ibnu Seyna Ryanto and Salamatun Asakdiyah said that the Money Supply (MS) positively affects the Return on Assets (ROA).

Following the test results above, the theory shows a positive and significant influence between the variable money supply and return on assets in the long and short term. In other words, H1 received. Long-run release inflation and return on assets caused the negative coefficient value, but the associated t-value is insignificant at the 5 percent level.

On the other hand, analysis impulse response shows that variable money supply gives a negative response to the shock that took place in return on assets, variable indicated by the number's coefficient IRF money supply to return on assets, which shows a negative number from start to the end of the period. It shows that the increased money supply can decrease Islamic banking performance. In addition, the variance decomposition analysis shows money supply as instrumental in explaining return on assets compared to another macroeconomic variable.

Conclusion

According to the research, which has been carried out about the influence of inflation, interest rates, and the amount of money supply against the return on asset (ROA) Islamic Bank in Indonesia in the period of 2016-2021, it can be concluded that money supply (M2) has a positive and significant impact towards return on asset (ROA) in the short-term. The estimation results support the hypothesis that the money supply (MS) effect is positive toward return on asset (ROA) in the short term. On the other hand, money supply has a considerable long-term impact on return on asset (ROA), whereas inflation and rate have little impact.

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