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The Effect of Selected Macroeconomic Variables on Sharia Mutual Funds in Indonesia: A Multidimensional Analysis with VECM Approach

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study determined the short-term and long-term effects of Inflation, Indonesia crude price, and Indonesia sharia stock index on sharia mutual funds in Indonesia. This research utilized secondary data from January 2014 - December 2023 sourced from the Financial Services Authority (OJK), Central Agency on Statistics (BPS), Ministry of Energy and Mineral Sources of the Republic of Indonesia (KESDM). This study uses long run and short run VECM tests. The results show that the long-run VECM estimates indicate that the Inflation variable and the Indonesian sharia stock index have a long-term significant positive effect on Islamic mutual funds in Indonesia. While the Indonesian crude price has a long-term significant negative effect on Islamic mutual funds in Indonesia. The short run VECM estimation results show that there are no variables that affect Islamic mutual funds in Indonesia. Granger causality test reveals the causal relationship between various variables on Islamic mutual funds. The conclusions obtained can be used as a reference for potential investors in making investment decisions for the short and long term.

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Keywords: Inflation; Indonesia sharia stock index; Indonesia crude price; NAV sharia mutual funds; VECM.

1. INTRODUCTION

Islamic mutual funds are a type of financial instrument in the capital market, as defined in fatwa no. 20/DSN-MUI/IV/2001. These funds adhere to Islamic sharia principles and are governed by contracts between investment managers and investment users, with the shahib al-mal acting as the owner of the assets. The popularity of Islamic mutual funds in Indonesia as an investment option is evident from the substantial growth in net asset value, which has reached IDR 42.78 trillion, and the significant increase in the number of Islamic mutual funds, which now stands at 273 as of 2023 [1]. Good investment conditions are supported by many factors, such as political conditions, regulations, law enforcement, land issues for business land, infrastructure, and macroeconomic factors. One of the factors that create a conducive investment climate is macroeconomic factors. Macroeconomic conditions are very important for investment, because changes in the macroeconomy will affect the amount of return earned by investors (Karim et al., 2016), [2]. Therefore, understanding the relationship between macroeconomic variables and the NAV of Islamic mutual funds is important (El-Masry et al., 2016).

Hence, this study examined the impact of macroeconomic variables, specifically inflation, Indonesia crude price, and the Indonesia Sharia stock index, on Islamic mutual funds, as shown by their net asset value [3-5].

Inflation is the persistent rise in the costs of goods and services resulting in a decline in people's ability to buy things. In Indonesia, inflation exerts a substantial influence on the rate of investment expansion. Continued inflationary trends have a detrimental impact on investors, since it leads to a persistent increase in the cost of investing. On the other hand, as inflation drops, the expense of investment also decreases. Hence, the stability of the inflation rate is of utmost importance in fostering investment growth in Indonesia. The research results of Ardhani et al. [2], Setiawan and Wati [6], Sholeha and Fadhlillah [7], Setyani and Gunarsih [8], Mutiara et al. [9], Julianty et al. (2023) found that Inflation has a significant positive effect on Islamic mutual funds, supported by findings from Sumantyo and Savitri [10] in both Indonesia and Malaysia that inflation positively affects the NAV of sharia mutual funds. Research by Budhijana [11], Nafisah and Supriyono [12], Cheng and Dewi [13] concluded that inflation has a significant negative effect on the NAV of Islamic mutual funds. Pratama [14] found that inflation has a significant negative effect on the performance of equity mutual funds and fixed income mutual funds. In contrast to the research of Zulkarnain et al. [15] that inflation has a negative and insignificant effect on the NAV of Islamic mutual funds. Several studies, including Miha and Laila [16], Ariyanti [17], Hazami and Endri [18] found that inflation has no effect on the NAV of Islamic mutual funds.

The objective of exploring Indonesia's crude oil prices and their impact on mutual funds was driven by the need to comprehend the effects of commodity price fluctuations on financial markets. Rising oil prices lead investors to choose the capital market, thereby increasing equity mutual fund returns. External events like global oil tariff increases and movements in global stock indices, as well as events like the Subprime Mortgage crisis, influence investor behavior and returns (Hasibuan et al., 2019). Devi and Prasetyo [19] found that crude price oil affects Islamic stock prices. Miha and Laila [16] found that Indonesia's crude oil price affects the NAV of Sharia Mutual Funds in the long term, Chang et al. [20] that variable oil prices that affect Islamic stock returns in the short term in Malaysia, this also affects Islamic stock mutual funds and impacts NAV.

The Indonesia Sharia Stock Index (ISSI) reflects corporate performance and influences the NAV of Sharia Mutual Funds, with increased corporate earnings encouraging higher returns. Research by Diana [21], Malik and Hasan [22], Ramdani et al. [23] concluded that ISSI has a significant positive performance in contrast to Islamic mutual funds. The study of Huda et al. [24] that ISSI has a significant positive effect on shocks to the NAV of Islamic mutual funds. Research by Hazami and Endri [18], Sukma et al. [25] has the result that JCI has no effect on the NAV of Islamic mutual funds.

Given the mixed findings in the literature and the significant role of inflation, crude oil prices, and stock indices in financial markets, it is essential

to conduct a comprehensive study that simultaneously examines these factors. By employing the Vector Error Correction Model (VECM) approach, this study seeks to provide a more nuanced understanding of the dynamic relationships among these variables and their collective impact on Sharia mutual funds in Indonesia. This comprehensive analysis is crucial for investors to make informed after knowing the short-term and long-term effects of variables that affect the NAV of Islamic mutual funds.

2. MATERIALS AND METHODS

This research measured the effect of inflation, Indonesia's crude price, and the Indonesian Islamic stock index on Islamic mutual funds proxied by net asset value. It is possible to compare the long-term and short-term effects using the Vector Error Correction Model (VECM). In addition, this research uses the VECM Granger causality method to see how the variables interact causally. This research relied heavily on secondary sources of information to make it easier to compare past results with current trends by using secondary data from January 2014 to December 2023, with data obtained from the Financial Services Authority [26], the Ministry of Energy and Mineral Resources of the Republic of Indonesia [27], and the Central Bureau of Statistics [28], will give a robust analytical framework. This analysis aims to provide a comprehensive discussion of the short-term and long-term impacts that are useful for investors.

2.1 Model Specification

Simple equation estimation model:

$$NAV = f\ (INF, ICP\ ISSI) \quad (1)$$

The econometric model can be written as follows:

$$NAV_t = \beta_0 + \beta_1 INF_t + \beta_2 ICP_t + \beta_3 ISSI_t + \varepsilon \quad (2)$$

The econometric model is transformed into lags and The general form of this study is as follows

$$LogNAV_t = \beta_0 + \beta_1 INF_t + \beta_2 LogICP_t + \beta_3 LogISSI_t + \varepsilon \quad (3)$$

Where β_0 is a constant, ***β1, β2, β3*** regression coefficient, t represents the *time series* from January 2014 to December 2023 and ε is the error rate. NAV represents the net asset value of Islamic mutual funds, Inf means inflation, ICP (Indonesia crude price) and ISSI is the Indonesian Sharia stock index.

2.2 Variables Description and Their Measures

The dependent variable of this research is Islamic mutual funds proxied by NAV (net asset value). The independent variable consists of Inflation, Indonesia crude price, and Indonesia Sharia stock index.

2.3 Estimation Techniques

The analytical tool used is the VECM test which utilizes Eviews 12. It measures the long-term and short-term impact of several independent variables on the dependent variable with a time series of January 2014 to December 2023.

2.3.1 Unit root test

Stationarity test or unit root test is a necessary thing used in time series data. A data set is considered stationary if the mean and variance of the time series data do not change systematically over time. The technique used to test stationarity is the ADF (Augmented Dickey-Fuller) test. The unit root test result states the existence of data stationarity if prob < 0.05.

2.3.2 Cointegration test

Cointegration theory was first proposed by Granger [29], which addresses the issue of determining long-run economic equilibrium relationships. Cointegration is the statistical implication of the existence of long-run linkages between economic variables. The main objective of the cointegration test is to check whether the residuals of the cointegrated regression are stationary or not. According to Johansen and Juselius [30], "If one is cointegrated, this means that the errors in the regression model are stationary though the dependent and independent variables are non-stationary, hence the inference of a long-run relationship.

2.3.3 Granger causality

This stage involves using the Granger causality test to determine whether an endogenous

variable can be treated as an exogenous variable. This stems from the unknown impact between variables. If there are four variables Y and X, then either NAV affects inflation or inflation affects NAV, NAV affects Indonesia crude price or Indonesia crude price affects NAV, NAV affects Indonesia sharia stock index or Indonesia sharia stock index affects NAV, or both have an effect or neither.

2.3.4 Vector error correction model

If a long-run relationship is realized, the model can be estimated using a vector error correction model (VECM) which allows for separation of the long-run relationship and also the ECT which shows the speed of adjustment of the variables used to return to the equilibrium position. This study used VECM to estimate the results of the three research variables. The long-run relationship VECM model is used to estimate the results of the first objective. Granger causality is used to determine the direction of causality between variables.

VECM Long Run:

The following is the VECM long-run relationship equation:

$$LogNAV_i = \beta_0 + \beta_1 LogINF_i + \beta_2 LogICP_i + \beta_3 LogISSI_i + \varepsilon$$

VECM Short Run:

The following is the VECM short-run relationship equation:

$$D(Log(NAV_t)) = \beta_0 + \beta_1 D(INF_t) + \beta_2 D(Log(ICP_t)) + \beta_3 D(Log(ISSI_t)) + \varepsilon$$

2.3.5 Impulse response analysis

This stage involves analyzing the response of a variable in the presence of a shock to itself or another variable.

2.3.6 Variance decomposition analysis

This stage involves analyzing the proportion of influence a variable has when it is subjected to shocks or changes in itself over a period.

3. RESULTS AND DISCUSSION

The JarqueBera test statistic fails the null hypothesis of the normal distribution of each variable (P > 0.05), which confirms that the data is normally distributed. The heteroscedasticity and autocorrelation tests have passed the HAC Newey-Test which corrects the standard errors and results in valid estimates and reliable regression coefficients. It also passed the multicollinearity VIF < 10 and linearity (P > 0.05) tests.

3.1 Unit Root Test

The ADF test is performed by comparing the calculated t statistic and the Mackinnon critical value at the 5% significance level. With trend and intercept, the results in Table 1 show that all series are non-stationary in level form and become stationary at the first difference level.

3.2 Cointegration Test

The Cointegration Test shows whether the study can use the VECM test or not. Determination of the presence or absence of cointegration if prob < 0.05. From Table 2 cointegration based on the trace test prob 0.0000 <0.05 means rejecting H0. Rejection of H0 means that there is a long-term relationship between Inflation, Indonesia crude price, the Islamic stock index, and Islamic mutual fund NAV.

The max eigen statistic cointegration test results in Table 3 have a prob of 0.0000 <0.05, which means rejecting H0 and accepting H1 cointegration. Rejection of H0 means that there is a long-term relationship between Inflation, Indonesia crude price, the Islamic stock index, and Islamic mutual fund NAV. This means that VECM testing can be done.

Table 1. Stationarity test

Variables	Prob at level	Result	Variables	Prob at 1st difference	Result
NAV	0.8229	Non-stationary	D(NAV)	0.0000	Stationary
INF	0.3477	Non-stationary	D(INF)	0.0000	Stationary
ICP	0.0174	Stationary	D(ICP)	0.0000	Stationary
ISSI	0.5309	Non-stationary	D(ISSI)	0.0000	Stationary

Source: Data processed by Eviews 12 (2024)

Table 2. Cointegration test (trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None*	0.461670	206.0251	47.85613	0.0000
At most 1*	0.347222	133.5690	29.79707	0.0000
At most 2*	0.327685	83.66643	15.49471	0.0000
At most 3*	0.272447	37.21408	3.841465	0.0000

Source: Data processed by Eviews 12 (2024)

Table 3. Cointegration test (max-eigen statistic)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None*	0.510470	83.55916	27.58434	0.0000
At most 1*	0.360944	52.38829	21.13162	0.0000
At most 2*	0.301437	41.97145	14.26460	0.0000
At most 3*	0.296268	41.10884	3.841465	0.0000

Source: Data processed by Eviews 12 (2024)

Table 4. Granger causality test

	Observation	F-Statistic	Prob. Value
INF does not Granger Cause NAV	119	0.52195	0.4715
NAV does not Granger Cause INF		1.60507	0.2077
ICP does not Granger Cause NAV	119	0.49266	0.4841
NAV does not Granger Cause ICP		0.30389	0.5825
ISSI does not Granger Cause NAV	119	2.28222	0.1336
NAV does not Granger Cause ISSI		0.18153	0.6708

Source: Data processed by Eviews 12 (2024)

Table 5. Vector error correction method long run

Description	Coefficient	Std.Error	T-Statistics
INF(-1)	1.819809	(0.41749)	[4.35893]
LOG(ICP(-1))	-6.423954	(1.45410)	[-4.41781]
LOG(ISSI(-1))	15.80050	(5.85101)	[2.70047]

Source: Data processed by Eviews 12 (2024)

3.3 Granger Causality Test

From the Granger causality test results in Table 4 presented below, none of the variables show a causal relationship, either unidirectional or bidirectional, between inflation to NAV, NAV to inflation, ICP to NAV, NAV to ICP, ISSI to NAV, NAV to ISSI. This is indicated by all p-value results > 0.05.

3.4 Vector Error Correction Method

3.4.1 Vector error correction method long run

After examining the long-run relationship in Table 5 between the variables. Then the long-run VECM model is used to estimate the model of this study because the variables in this study are cointegrated. This test observes the existence of a long-run relationship between Inflation, Indonesia crude price, and Indonesia Islamic stock index with the NAV of Islamic mutual funds.

The effect of long-term inflation on islamic mutual funds: The results of the analysis are in line with the hypothesis that the t statistic value of the lag 1 Inflation variable is 4.35893 or greater than the t table value of 1.981 which means accepts H1 and rejects H0 so that the Inflation variable has a positive effect on long-term Islamic mutual fund NAV *($p < 0.05$)*, this is related to signaling theory where controlled inflation and followed by mutual funds that can provide returns that exceed the inflation rate can send positive signals to investors about good investment performance and prospects. This can attract investors to invest in these mutual funds. However, high inflation can cause a decrease in the real value of mutual fund investment returns, thus sending a negative signal to investors about

the prospects of the mutual fund [31]. Inflation is harmless if it is predictable, as people will take into account the potential for future price increases when making decisions. Most economists agree that the economy will grow efficiently if inflation is low. In Islamic economics, controlling inflation is important to maintain economic stability and realize justice in financial transactions. High inflation can encourage people to seek investments that are more profitable and safe from falling currency values. This is to Islamic principles that recommend investing wealth in a halal and productive way. In Islam, investment is recommended to be done fairly, does not involve usury (interest), and is not speculative. Since inflation affects the value of money circulating in society, inflation has a positive impact on Islamic mutual funds in the long run. When inflation increases, the value of money circulating in society becomes less valuable, so people prefer to preserve the value of their money by investing their funds in Islamic mutual funds. As a result, inflation has a positive impact on Islamic mutual funds in the long run. Research conducted by Ardhani et al. [2], Setiawan and Wati [6], Sholeha and Fadhlillah [7], Setyani and Gunarsih [8], Mutiara et al. [9], Julianty et al. (2023). supported by findings from Sumantyo and Savitri [10] in both Indonesia and Malaysia that inflation positively affects the NAV of sharia mutual funds. Research by Budhijana [11], Nafisah and Supriyono [12], Cheng and Dewi [13] concluded that inflation has a significant negative effect on the NAV of Islamic mutual funds. Pratama [14] found that inflation has a significant negative effect on the performance of equity mutual funds and fixed income mutual funds. In contrast to the research of Zulkarnain et al. [15] that inflation has a negative and insignificant effect on the NAV of Islamic mutual funds. Several studies, including Miha and Laila [16], Ariyanti [17], Hazami and Endri [18] found that inflation has no effect on the NAV of Islamic mutual funds.

The effect of long-term indonesia crude price on sharia mutual funds: The analysis results are by the test criteria where the t statistic value of -4.41781 is greater than the t table value of 1.981 which means accepting H1 and rejecting H0 so that the Indonesia crude price lag 1 variable has a negative effect on the NAV of Islamic mutual funds. This is inversely proportional to signaling theory which states that changes in crude oil prices can be a signal for investors about investment prospects in mutual funds that have exposure to related sectors. For example, if crude oil prices increase, this can be a positive signal for mutual funds that invest in energy companies or other related sectors. Conversely, a decrease in the price of crude oil can be a negative signal for such mutual funds. The two-way relationship means that movements in mutual fund performance also signal movements in oil prices. Mutual funds should provide clear and accurate information about their exposure to sectors related to crude oil prices so that investors can make informed decisions. It is assumed that Indonesia crude price in the long run has less exposure because, in the long run, Islamic mutual fund portfolios are dominated by the money market, fixed income, and mixed Islamic sectors. While oil prices include Islamic stock mutual fund portfolios that have high risk, because also an increase in the price of Indonesian crude oil (ICP) can increase operational costs and production costs, companies can spend more money, reduce company profits, and reduce the net asset value of Islamic mutual funds in the long run. As a result, ICP has a negative impact on Islamic mutual funds in the long run. This is in line with Miha and Laila [16] found that Indonesia's crude oil price affects the NAV of Sharia Mutual Funds in the long term, Devi and Prasetyo [19] found that crude price oil affects Islamic stock prices. However, Chang et al. [20] that variable oil prices that affect Islamic stock returns in the short term in Malaysia, this also affects Islamic stock mutual funds and impacts net asset value.

The effect of long-term indonesia sharia stock index on sharia mutual funds: The results of the analysis are in line with the hypothesis that the t statistic value of the lag 1 sharia stock index variable is 2.70047 or greater than the t table value of 1.981 which means accepting H1 and rejecting imports so that the Indonesian sharia stock index variable has a positive effect on long-term Islamic mutual fund NAV, this is by signaling theory which states that the Indonesian sharia stock index can be a signal for investors about the prospects and potential returns of Islamic mutual funds that invest in stocks incorporated in the index. If the Islamic stock index increases, this can be a positive signal for investors that Islamic mutual funds that have a similar portfolio to the index have the potential to provide good returns. The composition and changes in the constituency of stocks in an Islamic index can also signal to investors about the investment strategy and asset allocation policy implemented by the investment manager of an Islamic mutual fund.

This helps investors in assessing the suitability of Islamic mutual funds to their risk preferences and Shariah compliance [32]. The increase in ISSI reflects an increase in company performance that is getting better so that it has the opportunity to generate more increased profits. Increased company income will lead to increased returns on Islamic mutual funds. Thus, investors will invest their funds through Islamic mutual funds with the expectation of getting more returns. Since ISSI represents the performance of the Islamic stock market listed on the Indonesia Stock Exchange (IDX), the Indonesia Sharia Stock Index (ISSI) has a long-term positive effect on Islamic mutual funds. In the long run, ISSI can show stable and increasing performance, which means that Islamic mutual funds invested in Islamic stocks listed on ISSI can also show stable and increasing performance. Therefore, ISSI has a positive influence on the performance of Islamic mutual funds. This research is in line with Diana [21], Malik and Hasan [22], Ramdani et al. [23] concluded that ISSI has a significant positive performance in contrast to Islamic mutual funds. The study of Huda et al. [24] that ISSI has a significant positive effect on shocks to the NAV of Islamic mutual funds. However, this is different from the research of Hazami and Endri [18], Sukma et al. [25] has the result that JCI has no effect on the NAV of Islamic mutual funds.

3.4.2 Short run vector error correction model

After examining the long-run effect, we look at the short-run effect in Table 6 between Inflation, Indonesia crude price, and Indonesia Islamic stock index on the NAV of Islamic mutual funds. The VECM estimation results show that none of the variables have a short-term effect on the NAV of Islamic mutual funds.

The effect of short-term inflation on islamic mutual funds: The estimation results indicate that there is no effect of the short-term lag 1 inflation variable on the NAV of Islamic mutual funds. This conclusion is based on the t statistic of -0.53044, which is smaller than the critical value of 1.981. Therefore, the null hypothesis (H0) is accepted and the alternative hypothesis (H1) is rejected, suggesting that there is no short-term influence of the lag 1 inflation variable on the NAV of Islamic mutual funds. The reason for this is that there is a weak association between short-term inflation movements and Islamic mutual fund investment instruments. Furthermore, in the immediate term, the performance of Islamic mutual funds is mostly affected by issues associated with business and the tangible economy, rather than short-term inflation. Islamic mutual funds achieve performance protection against inflation swings through diversification, since they allocate investors' cash into a range of investments. While inflation can influence the performance of Islamic mutual funds through many factors, it does not have any immediate impact on their performance. In the immediate term, inflation can lead to a rise in operational and production expenses, resulting in increased expenditure for corporations. Consequently, the company's earnings may decline, leading to a reduction in the net asset value of Islamic mutual funds. Furthermore, volatile inflation can generate considerable ambiguity for economic participants, therefore impacting investor enthusiasm for allocating assets to Islamic mutual funds. This aligns with the findings of Miha and Laila [16], Ariyanti [17], Hazami and Endri [18], found that inflation has no effect on the NAV of Islamic mutual funds. Contrary to the findings of Ardhani et al. [2], Setiawan and Wati [6], Sholeha and Fadhlillah [7], Setyani and Gunarsih [8], Mutiara et al. [9] Julianty et al. (2023). supported by findings from Sumantyo and Savitri [10] in both Indonesia and Malaysia that inflation positively affects the NAV of sharia mutual funds. Research by Budhijana [11], Nafisah and Supriyono [12], Cheng and Dewi [13] concluded that inflation has a significant negative effect on the NAV of Islamic mutual funds. Pratama [14] found that inflation has a significant negative effect on the performance of equity mutual funds and fixed income mutual funds. In contrast to the research of Zulkarnain et al. [15] that inflation has a negative and insignificant effect on the net asset value of Islamic mutual funds.

Table 6. Short run vector error correction model

Description	Coefficient	Std.Error	T-Statistics
D(LOG(NAV(-1)))	0.012298	(0.09655)	[0.12738]
D(INF(-1))	-0.008472	(0.01597)	[-0.53044]
D(LOG(ICP(-1)))	0.013715	(0.03174)	[0.43206]
D(LOG(ISSI(-1)))	0.040878	(0.24568)	[0.16639]

Source: Data processed by Eviews 12 (2024)

The effect of short-term indonesia crude price on sharia mutual funds: The estimation results of the short-term Indonesia crude price lag 1 variable on the NAV of Islamic mutual funds that there is no influence on the NAV of Islamic mutual funds because the t statistic result of 0.43206 is smaller than the t table of 1.981 so it accepts H0 and rejects H1 which means there is no short-term influence of the Indonesia crude price lag 1 variable on the NAV of Islamic mutual funds. ICP affects the performance of Islamic mutual funds in the long term, ICP does not affect Islamic mutual funds in the short term because ICP affects the company's operating costs and production costs, thus affecting the company's net asset value. In the short term, ICP does not have a impact on Islamic mutual funds because the performance of Islamic mutual funds isinfluenced by other variables, such as the BI rate and inflation. The portfolio of Islamic mutual funds is also dominantly spread across various economic sectors rather than the oil and gas sector, so fluctuations in crude oil prices have no impact on the NAV of Islamic mutual funds. This is in line with the research of Nugraha et al. [33] that world oil prices in the short term have no proven effect on the net asset value of mutual funds, but in contrast to the research of Devi and Prasetyo [19] found that crude price oil affects Islamic stock prices. Miha and Laila [16] found that Indonesia's crude oil price affects the NAV of Sharia Mutual Funds in the long term, Chang et al. [20] that variable oil prices that affect Islamic stock returns in the short term in Malaysia, this also affects Islamic stock mutual funds and impacts net asset value [34].

The effect of short-term islamic stock index on islamic mutual funds: The estimation results indicate that there is no influence of the lag 1 variable of the Indonesian sharia stock index on the net asset value (NAV) of Islamic mutual funds. This is supported by the t statistic result of 0.16639, which is smaller than the critical value of 1.981. Therefore, the null hypothesis (H0) is accepted, and the alternative hypothesis (H1) is rejected. In other words, there is no short-term impact of the lag 1 variable of the Indonesian sharia stock index on the NAV of Islamic mutual funds. Investors in the short term pick Islamic firms based on their return and performance, but the Indonesian Islamic stock index uses DES as a reference instead of directly selecting Islamic stocks. Investors mostly utilise the Indonesian Sharia stock index as a benchmark for selecting investments with consistent performance. However, it does not directly impact Islamic mutual funds as their success is determined by investor purchasing choices. The short-term impact of ISSI on Islamic mutual funds is not considerable due to the influence of other factors, including the BI rate, inflation, and the Rupiah exchange rate, which can affect the fluctuations in Islamic stock prices. This is in line with research by Hazami and Endri [18], Sukma et al. [25] has the result that JCI has no effect on the NAV of Islamic mutual funds. This contradicts the findings of Diana [21], Malik and Hasan [22], Ramdani et al. [23] concluded that ISSI has a significant positive performance in contrast to Islamic mutual funds. The study of Huda et al. (2023) that ISSI has a significant positive effect on shocks to the NAV of Islamic mutual funds.

3.5 Impulse Response Analysis

At the beginning of the period, namely the first month, the LOG(NAV) response fluctuates, namely responding positively and negatively (up and down) since the shock or shock to 4 variables, LOG(NAV), INF, LOG(ICP) and LOG(ISSI), but small fluctuations until approaching month 20 and beyond experiencing equilibrium or equilibrium.

At the beginning of the period, namely the first month until approaching month 15, the response of LOG(ICP) to itself decreased and began to reach equilibrium in month 15 onwards. The response of LOG(ICP) to LOG(NAV), LOG(ISSI), and INF increases in the first month until approaching month 15 and beyond.

At the beginning of the period, namely the first month, INF experienced a downward shock to itself and began to reach equilibrium as it approached month 20. INF's response to LOG(ICP) increased from the first month until it approached month 20. It began to reach equilibrium in month 21 and beyond. The INF response to LOG(NAV) and LOG(ISSI) decreased until approaching month 10 and began to reach equilibrium afterward.

At the beginning of the period, namely the first month to month 10, the LOG(ISSI) response fluctuates in the early months and begins to reach equilibrium as it approaches month 15 onwards. The response of LOG(ISSI) to LOG(ICP) fluctuates in increase and decrease and reaches equilibrium in the 15th month onwards. The response of LOG(ISSI) to LOG(NAV) and INF experienced a decline in the first month and began to reach equilibrium

in the period approaching the 15th month onwards.

3.6 Variance Decomposition Analysis

VD LOG(NAV) analysis shows that the variable that is suspected to have the highest influence on LOG(NAV) in the 120 months ahead is LOG(NAV) itself with a contribution of in the first month of 100%, followed by LOG(ISSI) by 0.06% in the second month and followed by INF by 0.02 in the second month. However, the contribution of LOG(NAV) continues to decline every month. It is inversely proportional to the LOG(ICP), LOG(ISSI), and INF variables which continue to increase every month.

The INF VD analysis shows that the largest contributing variable is itself in the first month at 99.96%, followed by LOG(NAV) which contributed 0.04% in the first month, LOG(ISSI) at 0.92% in the second month, and finally LOG(ICP) at 0.1% in the second month. However, the contribution of INF every month continues to decline, best compared to the variables LOG(NAV), LOG(ISSI), and LOG(ICP) which continue to increase every month.

The VD LOG(ICP) analysis shows that the variable that is suspected to have the highest influence on LOG(ICP) in the 120 months ahead is LOG(ICP) itself with a contribution in the first month of 99.84%, followed by INF by 0.14% in the first month and followed by LOG(NAV) by 0.015% in the first month. However, the contribution of LOG(ICP) continues to decline every month. In contrast to the INF, LOG(NAV), and LOG(ISSI) variables which continue to increase every month.

VD LOG(ISSI) analysis shows that the variable that is suspected to have the highest influence on LOG(ISSI) in the next 120-month period is LOG(ISSI) itself with a contribution in the first month of 80.88%, followed by LOG(ICP) of 13.66% in the first month and followed by LOG(NAV) of 3.56% in the first month. However, the contribution of LOG(ISSI) fluctuates every month and continues to decline, this is followed by LOG(NAV) which also experiences a decline every month. This is inversely proportional to the LOG(ICP), and INF variables which continue to increase every month.

4. CONCLUSION

This study aims to examine the impact of inflation, Indonesia crude price, and Indonesia sharia stock index on the net asset value (NAV) of Islamic mutual funds throughout the period of January 2014 to December 2023, both in the short term and long term. The empirical findings from the VECM analysis demonstrate a significant and enduring positive relationship between inflation and both the Indonesian Sharia stock index and the net asset value (NAV) of Islamic mutual funds in Indonesia. There exists a persistent and adverse correlation between the price of Indonesian crude oil and the net asset value (NAV) of Islamic mutual funds in Indonesia. The short-term VECM analysis indicates that there are no variables that have a significant impact on the net asset value (NAV) of Islamic mutual funds. However, Granger causality analysis shows that there is no causal relationship, either unidirectional or bidirectional, between inflation to NAV, NAV to inflation, ICP to NAV, NAV to ICP, ISSI to NAV, NAV to ISSI. This finding is important for potential investors after knowing the short-term and long-term effects of variables that affect the NAV of Islamic mutual funds.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

The authors declare that generative AI technology was utilized during the writing of the manuscript.

Details of AI usage are given below:

1. Grammarly: This AI is useful for writers to check English writing and grammar.
2. Quillbot: This AI technology is useful for writers in paraphrasing to avoid excessive plagiarism.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

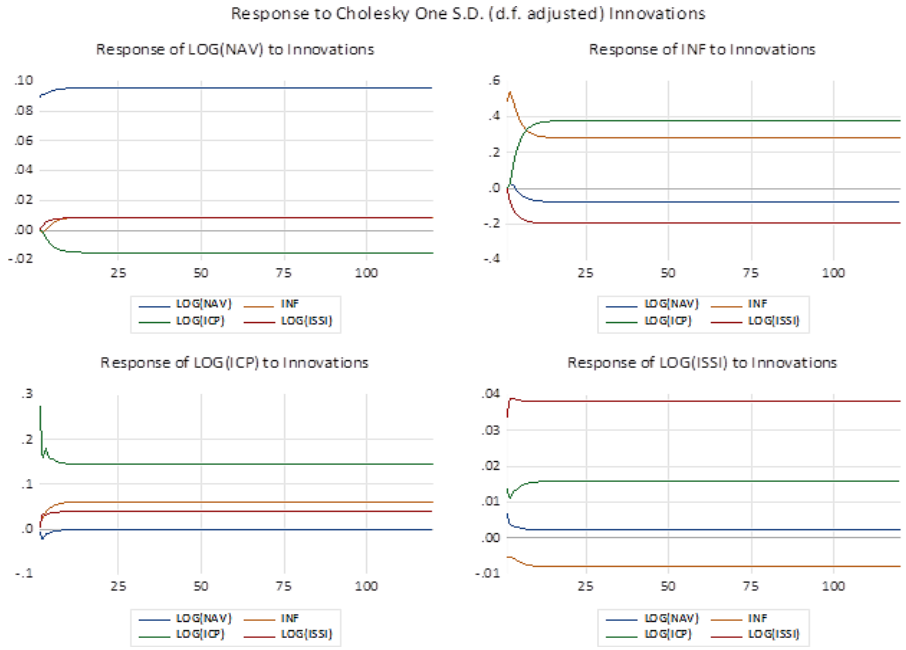

Fig. 1. Impulse response

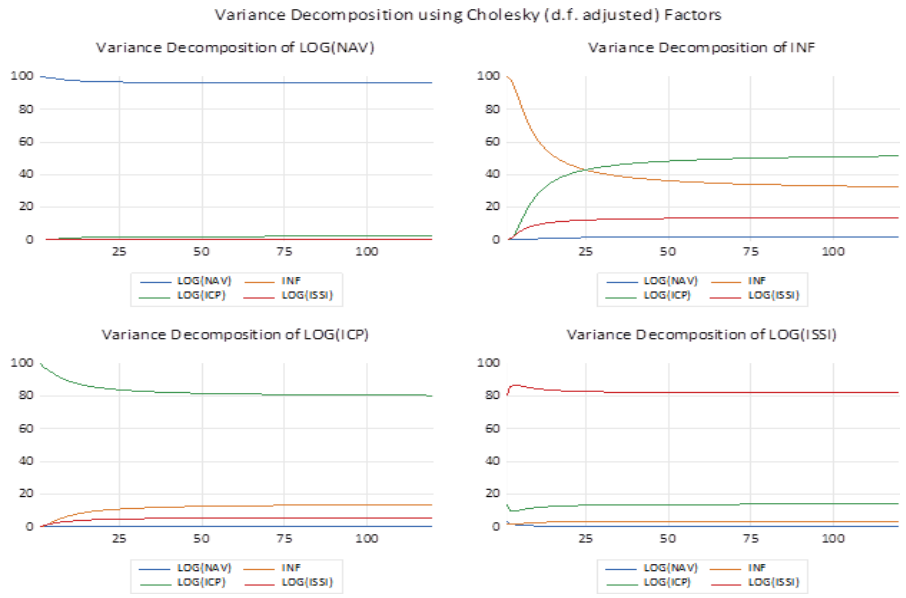

Fig. 2. Variance decomposition

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