



The Stability of Islamic Banking in Response to Macroeconomic Shocks: An Empirical Study of the Indonesian Islamic Financial Market

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Abstract

This study aims to examine the influence of macroeconomic variables on the stability of Islamic banking in Indonesia, with Non-Performing Financing (NPF) serving as the primary indicator of banking resilience. A Vector Autoregression (VAR) approach is employed to capture the dynamic interrelationships among variables, including inflation, the exchange rate, the BI Rate, economic growth, and the money supply. Monthly time series data from 2010–2024 were obtained from Bank Indonesia, the Financial Services Authority (OJK), and Statistics Indonesia (BPS). The findings reveal that money supply, exchange rate, and economic growth are the primary macroeconomic determinants of Islamic banking stability in Indonesia. Rapid liquidity expansion and economic growth that are not accompanied by prudent oversight of financing tend to elevate financing risk, while a stable exchange rate plays a critical role in protecting the real sector's repayment capacity. Notably, inflation and the BI Rate do not exert a meaningful short-term influence on NPF, suggesting that Islamic banking operates through a transmission mechanism distinct from its conventional counterpart – one that is less sensitive to interest rate policy. The novelty of this study lies in its use of a comprehensive, long-horizon dataset covering multiple economic cycles, including the 2008 global crisis and the COVID-19 pandemic, which enables a more robust assessment of Islamic banking resilience across varying macroeconomic conditions. The study is limited to macroeconomic variables at the aggregate level and does not account for bank-specific microeconomic factors or regional variations within Indonesia's Islamic banking sector, which may be addressed in future research.

Keywords : Islamic Banking Stability; Inflation; Exchange Rate; BI Rate; Economic Growth; Money Supply

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INTRODUCTION

The stability of Islamic banking plays a central role in maintaining the resilience of the national financial system and supporting sustainable economic growth (Abduh & Azmi Omar, 2012; Benavides-Franco et al., 2023). As a financial intermediary that collects public funds and channels them back to the real sector in accordance with the principles of fairness and profit-sharing, Islamic banking is a driving force for an inclusive and socially just economy (Nor & Masih, 2017; Peykani et al., 2025). The stability of this system ensures that intermediation functions optimally, maintains public confidence in financial institutions, and guarantees the effectiveness of monetary policy and macroprudential policy transmission (Chang & Shi, 2024; Usman et al., 2022). When banking stability is disrupted, the impact can be systemic: the flow of funds to the real sector is hampered, financing risks increase, and the potential for default spreads to various economic sectors. These disruptions have the potential to reduce asset quality, disrupt liquidity, and increase the Non-Performing Financing (NPF) ratio, thereby threatening the sustainability of financial performance and public confidence (Widarjono, 2020). Indonesia's empirical experience demonstrates this, as seen during the 2008 global crisis and the COVID-19 pandemic shock in 2020, when the NPF ratio of Islamic banks increased to 3.29% due to the slowdown in economic activity and increased risk of default.

The stability of Islamic banking can be disrupted by fluctuations in macroeconomic variables that directly or indirectly affect the performance of financial institutions. Inflation is a major factor that can reduce the quality of financing and increase the risk of default. When inflation rises, people's purchasing power declines, business operating costs increase, and debtors' ability to meet their financing obligations weakens, thereby driving up the NPF ratio. Alqahtani and Mayes (2018) and Ghosh (2015) found that high inflationary pressure negatively affects the profitability and efficiency of Islamic banks by reducing the real value of assets and the real value of financing cash flows.

Exchange rate volatility is also an important determinant of Islamic banking system stability, especially in developing countries with high exposure to international trade. A weakening domestic exchange rate increases import costs and foreign currency payment obligations, which ultimately increases the risk of high-value financing problems (Mokni &

Rachdi, 2014). A study by Rizqi et al. (2024) found that exchange rate fluctuations have a significant impact on the liquidity and profitability of Islamic banks, while Sukmana and Ibrahim (2017) emphasise that exchange rate depreciation can weaken the stability of the Islamic-based financial system.

The benchmark interest rate policy, or BI Rate, also affects the performance and stability of Islamic banking, even though this system does not operate on the basis of interest. Changes in conventional interest rates continue to influence investor behaviour and public preferences for savings and financing, thereby affecting the liquidity and competitiveness of Islamic banks. Hasan and Dridi (2010) found that the transmission of monetary policy to Islamic banking is delayed (lagged effect), with the impact on asset quality only evident after several periods. Research by Beck et al. (2013) also shows that sharia-based financial systems exhibit different sensitivities to monetary policy due to the characteristics of profit-sharing contracts, which are adaptive to changes in risk.

Economic growth also contributes to the stability of Islamic banking. In conditions of positive economic growth, people's purchasing power increases, which ultimately has a positive impact on savings and investment rates in the Islamic banking system. Conversely, in conditions of recession or economic slowdown, the potential for non-performing loans in Islamic banks tends to increase, potentially disrupting the sector's stability (Hassan et al., 2019).

On the other hand, the amount of money in circulation also plays an important role in influencing the financial stability of Islamic banking. Rapid liquidity growth without adequate macroprudential supervision can encourage the expansion of high-risk financing. Kaleem and Isa (2003) show that a significant increase in M2 can increase the potential for non-performing financing due to weak risk control and credit supervision.

This study analyses the influence of macroeconomic variables on the stability of Islamic banking in Indonesia using a Vector Autoregression (VAR) approach. The banking stability variable is proxied by Non-Performing Financing, while the macroeconomic variables include inflation, the exchange rate, the BI Rate, economic growth, and the money supply. Through this model, the study aims to explain the dynamic relationship and direction of causality between variables, thereby

providing a more comprehensive understanding of the resilience of the Islamic financial system to macroeconomic shocks in Indonesia.

LITERATUR REVIEW

Islamic Banking Stability

Islamic banking stability is a condition in which the banking system can perform its intermediary function efficiently and is resistant to macroeconomic shocks (M. U. Chapra, 2011). This stability is an important foundation for maintaining public confidence and supporting sustainable economic growth (Mirakhor et al., 2013). In the context of Islamic finance, stability is rooted in the principles of prohibiting *riba* (usury), *gharar* (uncertainty), and *maysir* (gambling), which encourage a real asset-based financial system through contracts such as *murabahah* (cost-plus financing), *mudharabah* (profit-sharing partnership), *musyarakah* (joint venture), and *ijarah* (lease), thereby reducing volatility and speculation (M. M. Hasan & Dridi, 2015). Based on financial stability theory, a healthy banking system is resilient to credit risk, liquidity, and external shocks (Mishkin, 2016), and in Islamic banking, this resilience depends on the effectiveness of risk management, prudential regulation, and public trust (Wahab et al., 2007). One of the main indicators of Islamic banking stability is Non-Performing Financing (NPF), which reflects the quality of the financing portfolio; the higher the NPF, the greater the pressure on system stability (Abduh & Omar, 2012). High NPF often indicates a disruption in the bank's ability to maintain asset quality and liquidity. This condition can be triggered by internal factors, such as weaknesses in risk management, as well as external factors, including macroeconomic dynamics such as inflation, exchange rates, benchmark interest rates (BI Rate), economic growth, and money supply (Hassan et al., 2019).

Inflation

Inflation is a general and sustained increase in the prices of goods and services over a certain period of time, which can be triggered by aggregate demand exceeding production capacity (demand-pull inflation), increases in production costs such as raw material prices and wages (cost-push inflation), or expectations of future inflation. In the context of Islamic finance, inflation has a more complex impact because most Islamic

financing instruments are equity-based, long-term contracts that depend on the real value of assets (Chapra, 2000). High inflation can reduce people's purchasing power and weaken their ability to meet financing obligations (Khan et al., 2006), thereby increasing the risk of non-performing financing (Hasna et al., 2019). In addition, high inflation can erode real profits in profit-sharing contracts such as *mudharabah* (profit-sharing partnership) and *musyarakah* (joint venture), and cause price uncertainty in sales contracts such as *murabahah* (cost-plus financing) and *istisna'* (contract to manufacture), which ultimately has an impact on the profitability and asset quality of Islamic banks. However, several studies have found that moderate inflation can drive economic growth by increasing consumption and investment, which, in turn, positively affects the performance of the Islamic banking sector (Hassan & Aliyu, 2018). This shows that the relationship between inflation and Islamic banking stability is non-linear and can vary across countries, depending on their economic structures, the effectiveness of monetary policy, and Islamic financial institutions' ability to mitigate inflation risk.

Exchange Rate

Foreign exchange rates are an important factor affecting the stability of Islamic banking, especially in an open economy such as Indonesia. As a determinant of international competitiveness, exchange rates affect inflation, investment flows, and economic growth, which in turn affect the liquidity and asset quality of Islamic banks (Čihák & Hesse, 2010). Exchange rate fluctuations, particularly depreciation, can increase import costs and put pressure on debtors who depend on foreign raw materials, thereby increasing the risk of non-performing loans. This risk becomes even more significant when exposure to foreign currencies is high and hedging mechanisms have not been fully optimised in a Sharia-compliant manner (M. Hasan & Dridi, 2012). An unstable exchange rate can affect Sharia-based financing contracts, especially in international transactions such as global *sukuk* (Islamic bonds) or cross-border *murabahah* (cost-plus financing) contracts, where domestic currency depreciation can significantly increase the value of foreign-currency obligations (Mirakhor et al., 2013). This condition has the potential to weaken financial stability and put pressure on Sharia banks' ability to maintain financing margins. Conversely, exchange rate appreciation can strengthen export

competitiveness and drive real-sector growth, thereby indirectly improving customer solvency and reducing pressure on NPF (Ascarya, 2012).

BI Rate

The BI Rate, or the benchmark interest rate set by Bank Indonesia, is a monetary policy instrument that affects borrowing costs and investment returns. Although Islamic banking does not use interest rates in its operations, the BI Rate still affects its stability through the monetary policy transmission mechanism (Ascarya, 2012). An increase in the BI Rate can raise capital costs for Islamic banks, thereby reducing customer interest in financing. This can negatively impact the profitability of Islamic banks and increase the risk of non-performing financing (NPF). Conversely, a decrease in the BI Rate can encourage economic growth and increase demand for financing, thereby enhancing the stability of Islamic banking (Hassan & Aliyu, 2018).

Economic Growth

Economic growth is a macroeconomic indicator that reflects an economy's health. High economic growth is usually followed by an increase in public income, which can improve customers' ability to meet their financing obligations (Khan & Ssnhadji, 2001). In the context of Islamic banking, stable economic growth can reduce the risk of non-performing financing and improve Islamic financial stability. However, excessively high and uncontrolled economic growth can also pose the risk of overheating, triggering inflation and economic instability (Ascarya, 2012). Therefore, moderate and sustainable economic growth is considered ideal for supporting Islamic banking stability.

Money Supply

The money supply reflects liquidity in the economy and can affect the stability of Islamic banking through various mechanisms. An increase in the money supply can drive economic growth and boost demand for financing, thereby increasing the profitability of Islamic banks (Hassan & Aliyu, 2018). However, an excessive money supply can also trigger inflation, reducing people's purchasing power and increasing the risk of

non-performing financing. Therefore, proper management of the money supply by monetary authorities is crucial to ensuring the stability of Islamic banking (Ascarya, 2012).

Empirical Review

The research conducted by the researcher is a continuation of similar research by other researchers, but with different objects and subjects. **This** includes both additions and reductions in objects and subjects. Research by various scholars' shows that several macroeconomic variables have a significant effect on the stability of Islamic banking, while others do not. The following is a summary of several related studies:

Research by Ascarya (2012) and Wahab et al. (2007) shows that inflation significantly affects the stability of Islamic banking. High inflation erodes people's purchasing power, ultimately increasing credit risk. As a result, customers experience difficulties paying their financing obligations, leading to an increase in the Non-Performing Financing ratio. Research by Tho'yibah et al. (2024) shows that inflation has a significant positive effect on NPF in both the short and long term in Islamic banks in Indonesia. Similar results were reported by Fadila and Pangestuti (2022), who stated that inflation has the greatest impact on NPF compared to other macroeconomic variables.

Krugman et al. (2018) found that exchange rates significantly affect the stability of Islamic banking. Exchange rate depreciation increases the payment burden for customers who have loans in foreign currencies, which ultimately increases the risk of bad credit. In addition, exchange rate depreciation can increase import prices, affecting business liquidity and their ability to repay loans to Islamic banks. Fadila and Pangestuti (2022) found that exchange rate shocks significantly increase the NPF ratio in the short term. These results were also reported by Mubarok et al. (2024), who found that exchange rate depreciation and rising inflation are associated with declining efficiency and financial performance in Indonesian Islamic banking.

Although the BI Rate is a monetary policy instrument that strongly influences conventional banks, research by Hasan and Dridi (2012) shows that it does not significantly affect the stability of Islamic banking. This is because the Islamic banks' operating systems are not interest-based, so

changes in the BI Rate do not directly affect their funding costs. In addition, Islamic banks rely more on third-party profit-sharing funds, which are not affected by interest rate fluctuations set by monetary authorities.

A study by Hassan and Aliyu (2018) also found that the BI Rate has no significant correlation with NPF in Islamic banking, especially in countries with established Islamic financial systems. Mubarok et al. (2024) stated that an increase in the benchmark interest rate negatively affects the efficiency of Islamic financial intermediation by suppressing demand for real-sector financing. Furthermore, Ali (2021) confirmed that conventional interest rates and Islamic financing have a long-term dynamic relationship, whereby an increase in the benchmark interest rate can raise funding costs and slow financing expansion.

A study by Khan and Senhadji (2001) shows that high economic growth can enhance the stability of Islamic banking by raising customer incomes and reducing non-performing financing risk. Research conducted by Hosen and Rahmawati (2016) shows that economic growth has no significant effect on Islamic banking stability. Mubarok et al. (2024) also found a long-term relationship between real GDP and Islamic bank stability, where economic expansion improves profitability ratios and reduces financing risk. Meanwhile, Aliyu et al. (2017), in the context of GCC countries, emphasise that sustainable economic growth contributes to increased intermediation efficiency and the resilience of Islamic banking to macroeconomic shocks.

A study by Čihák and Hesse (2010) shows that an increase in the money supply does not automatically increase the stability of Islamic banking. This is because an increase in the money supply that is not accompanied by balanced economic growth can trigger inflation, thereby reducing the stability of Islamic banking. Qiftiyah and Yustini (2023) found that rapid M2 growth during the COVID-19 pandemic increased the volume of Islamic banking financing but also increased the potential for non-performing financing. Lesmana et al. (2025) added that an increase in the money supply that is not matched by the real sector's absorption capacity can put pressure on financial stability by increasing liquidity risk. Furthermore, Fadila and Pangestuti (2022) confirm that monetary variables, including M2, collectively have a significant impact on NPF, particularly in an expanding financial system.

Conceptual Framework

Based on the theoretical review above, a theoretical framework can be developed to describe the relationships between independent variables (inflation, exchange rate, BI Rate, economic growth, and money supply) and the dependent variable (Islamic banking stability, proxied by NPF). This framework assumes that independent variables affect Islamic banking stability through the mechanisms of monetary policy transmission, credit risk, and macroeconomic conditions.

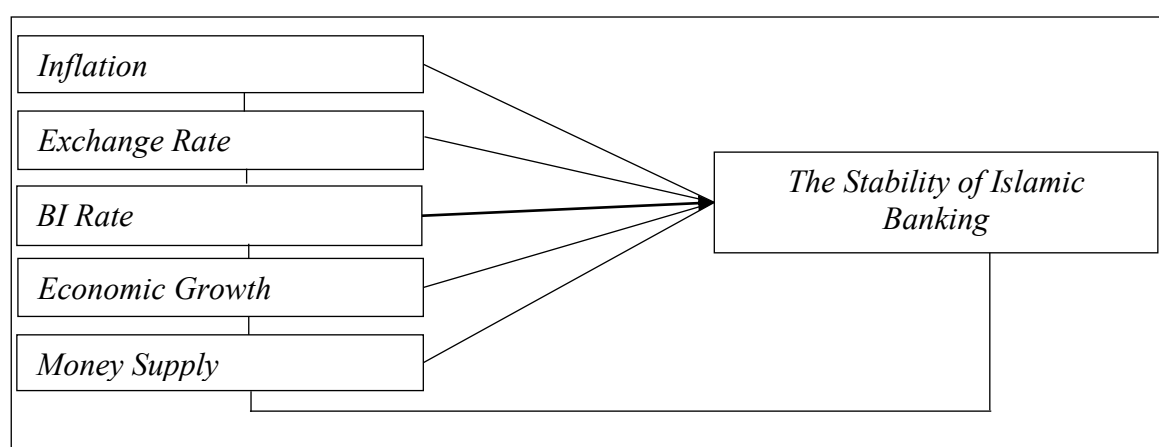


Figure 1. Conceptual Framework

Based on the conceptual framework above, the following hypotheses can be proposed:

- H₁ : Inflation has a significant effect on Islamic Banking in Indonesia
- H₂ : Exchange rate has a significant effect on Islamic banking in Indonesia
- H₃ : BI rates have a significant effect on Islamic banking in Indonesia
- H₄ : Economic growth has a significant effect on Islamic banking in Indonesia
- H₅ : Money supply has a significant effect on Islamic banking in Indonesia

RESEARCH METHOD

This research adopts a quantitative approach with a descriptive-explanatory design, aimed at analysing the dynamic relationships between macroeconomic variables, namely inflation, exchange rate, BI

Rate, economic growth, and money supply and the stability of Islamic banking in Indonesia. The study utilises monthly secondary data from 2010 to 2024, sourced from Bank Indonesia, the Financial Services Authority (OJK), and the BPS. The quantitative approach is employed within the positivist research paradigm, which prioritises objectivity and empirical verifiability in explaining economic phenomena (Creswell, 2014). The Vector Autoregression (VAR) method is selected as the analytical framework for this study, grounded in the foundational work of Sims (1980), who introduced VAR as an atheoretical approach that treats all variables in the system symmetrically without imposing prior restrictions on the direction of causality. This characteristic makes VAR especially appropriate for analysing macroeconomic systems in which the interdependencies among variables are complex and not fully specified by a single theoretical model. Furthermore, Hamilton (2020) underscores that the VAR framework is particularly suited to time-series data exhibiting dynamic feedback mechanisms, as it captures both contemporaneous and lagged interactions among variables within a unified system.

Research Design

The VAR model in this study is constructed by placing Non-Performing Financing (NPF) as the dependent variable representing Islamic banking stability, while inflation, exchange rate, BI Rate, economic growth, and money supply serve as the independent macroeconomic variables. The model captures the dynamic behaviour of each variable as a function of its own past values and those of all other variables in the system, up to a selected optimal lag. This simultaneous structure allows the study to trace how shocks originating from any one macroeconomic variable propagate through the system and affect Islamic banking stability over time.

The stages of analysis using VAR include:

Stationarity Test

The stationarity of each variable is examined using the Augmented Dickey-Fuller (ADF) test, complemented by the Levin, Lin & Chu (LLC), Im-Pesaran-Shin (IPS), and PP-Fisher tests to ensure robustness across different unit root assumptions. A variable is considered stationary when its mean and variance remain

constant over time. If a variable is found to be non-stationary at the level, it is differenced and re-tested until stationarity is achieved. All variables in this study are expected to attain stationarity at the first-difference level, satisfying the prerequisite for VAR estimation.

Lag Optimal Selection

The Optimal Lag Test in the VAR model is a method for determining the optimal number of lags. This method uses statistics to determine the lag length that will provide the most accurate model. Testing the number of lags includes the Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC) and Hannan-Quinn Information Criterion (HQC) criteria.

Granger Causality Test

The Granger Causality Test is employed to determine whether past values of one variable contain statistically significant information for predicting another variable. The Causality Test measures the relationship between two variables using historical data. Specifically, the test evaluates whether lagged values of one variable significantly improve the prediction of another variable within the VAR framework.

VAR Model Estimation

Estimation is carried out by entering independent variables (inflation, exchange rate, BI Rate, economic growth, and money supply) and dependent variables (NPF) into the VAR system.

Impulse Response Function (IRF)

The Impulse Response Function (IRF) is used to trace the reaction of Islamic banking stability as proxied by NPF to a one-standard-deviation shock in each macroeconomic variable over a defined forecasting horizon. The IRF illustrates not only the direction of the response (positive or negative) but also its magnitude and duration, thereby revealing whether the effect of a given shock is temporary or persistent within the system.

Variance Decomposition (VD)

Variance Decomposition (VD) complements the IRF analysis by quantifying the relative contribution of each macroeconomic variable to the forecast error variance of NPF over multiple periods ahead. Rather than examining directional responses, VD provides a proportional breakdown of how much of the fluctuation in Islamic banking stability can be attributed to shocks from each variable in the system, including NPF itself, thereby indicating which macroeconomic factors are most structurally influential in the long run.

RESULTS AND DISCUSSION

Results

Stationarity Test

Table 1. Result of Unit Root Test at Level and First Difference

Group unit root test: Summary

Level				First Difference				
		Cross-				Cross-		
Method	Statistic	Prob.**	sections	Obs	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)								
Levin, Lin & Chu t*	1.14657	0.8742	6	1068	-35.0667	0.0000	6	1067
Null: Unit root (assumes individual unit root process)								
Im, Pesaran and Shin W-stat	0.53010	0.7020	6	1068	-33.4463	0.0000	6	1067
ADF - Fisher Chi-square	11.7482	0.4661	6	1068	535.348	0.0000	6	1067
PP - Fisher Chi-square	11.5334	0.4838	6	1074	445.865	0.0000	6	1068

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Source: Data processing results, 2025

The results of the stationarity test conducted using the Levin, Lin & Chu (LLC), Im, Pesaran and Shin (IPS), ADF-Fisher, and PP-Fisher methods show that all variables in this study, namely BI Rate, inflation, exchange rate, economic growth, money supply (M2), and Non-Performing Financing (NPF), are not stationary at the level. This is indicated by probability values greater than 0.05 for all methods. Therefore, the variables exhibit non-constant means and variances over time, violating the stationarity assumption. However, after transformation at the first difference level, the probability values for all methods become less than 0.05, which means that the data are stationary at the first



difference level. These results indicate that all variables are included in the first order of integration, or I (1).

Optimal Lag Selection

Table 2. Result Lag Optimum Test

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-4276.890	NA	9.66e+13	49.22863	49.33756*	49.27282
1	-4209.364	129.6204	6.72e+13*	48.86625*	49.62878	49.17558*
2	-4177.902	58.22289*	7.09e+13	48.91841	50.33454	49.49288
3	-4163.856	25.02448	9.16e+13	49.17075	51.24048	50.01036
4	-4150.331	23.16272	1.19e+14	49.42909	52.15242	50.53384
5	-4134.700	25.69165	1.53e+14	49.66322	53.04014	51.03311

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Source: Data processing results, 2025

Based on the test results, the Final Prediction Error (FPE), Akaike Information Criterion (AIC), and Hannan-Quinn (HQ) values show a minimum value at lag 1, while the Sequential Modified LR Test (LR) selects lag 2 and the Schwarz Criterion (SC) selects lag 0. Considering that most information criteria (FPE, AIC, and HQ) select lag 1, this lag is adopted as the optimal lag length for the VAR model. The selection of this lag is considered capable of minimising prediction errors without causing overparameterisation in the model. Thus, the VAR model in this study uses lag 1 to analyse the relationship between variables.

Granger Causality Test

Table 3. Result of Granger Causality

Pairwise Granger Causality Tests			
Null Hypothesis:	Obs	F-Statistic	Prob.
INFLASI does not Granger Cause BI_RATE	179	2.11778	0.1474
BI_RATE does not Granger Cause INFLASI		0.10147	0.7505
M2 does not Granger Cause BI_RATE	179	0.42879	0.5134
BI_RATE does not Granger Cause M2		0.90071	0.3439
NPF does not Granger Cause BI_RATE	179	6.15139	0.0141

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BI_RATE does not Granger Cause NPF		2.13827	0.1454
NT does not Granger Cause BI_RATE	179	5.1E-05	0.9943
BI_RATE does not Granger Cause NT		0.09160	0.7625
PE does not Granger Cause BI_RATE	179	0.63081	0.4281
BI_RATE does not Granger Cause PE		1.63020	0.2034
M2 does not Granger Cause INFLASI	179	4.89569	0.0282
INFLASI does not Granger Cause M2		0.27427	0.6011
NPF does not Granger Cause INFLASI	179	0.72635	0.3952
INFLASI does not Granger Cause NPF		0.31421	0.5758
NT does not Granger Cause INFLASI	179	5.83658	0.0167
INFLASI does not Granger Cause NT		0.02907	0.8648
PE does not Granger Cause INFLASI	179	4.19629	0.0420
INFLASI does not Granger Cause PE		2.98970	0.0855
NPF does not Granger Cause M2	179	0.45788	0.4995
M2 does not Granger Cause NPF		5.17208	0.0242
NT does not Granger Cause M2	179	0.04773	0.8273
M2 does not Granger Cause NT		3.17733	0.0764
PE does not Granger Cause M2	179	0.24561	0.6208
M2 does not Granger Cause PE		32.8439	4.E-08
NT does not Granger Cause NPF	179	1.95635	0.1637
NPF does not Granger Cause NT		0.25330	0.6154
PE does not Granger Cause NPF	179	4.19235	0.0421
NPF does not Granger Cause PE		1.53369	0.2172
PE does not Granger Cause NT	179	5.78932	0.0172
NT does not Granger Cause PE		28.9145	2.E-07

Source: Data processing results, 2025

The results of the Granger causality test show that there are several significant causal relationships between macroeconomic variables and Islamic banking stability. Based on the estimation results, it was found that inflation has a significant effect on the BI Rate with a probability value of 0.0147, which means that changes in the inflation rate drive adjustments to the benchmark interest rate by Bank Indonesia. In addition, economic growth affects inflation ($p = 0.0420$), indicating that increased economic activity can trigger domestic inflationary pressures. A significant relationship is also seen between the exchange rate and inflation ($p = 0.0167$), indicating that exchange rate depreciation has an impact on increasing general prices through the pass-through mechanism. On the other hand, the amount of money in circulation (M2) is found to significantly influence Non-Performing Financing ($p = 0.0242$), which

means that an increase in liquidity in the economy can increase the risk of problematic financing if it is not balanced with productive fund distribution. Meanwhile, the reverse causal relationship, such as between the BI Rate and inflation or NPF and macroeconomic variables, did not show a significant effect.

Impulse Response Function Analysis

The Impulse Response Function (IRF) test results illustrate the dynamics of inter-variable responses to one standard deviation shocks of each macroeconomic variable in the Vector Autoregression (VAR) system. Based on the estimation results, the NPF response to various shocks shows a fluctuating pattern at the beginning of the period but gradually returns to equilibrium in the following period, indicating that the Islamic banking system in Indonesia is relatively stable in the face of macroeconomic shocks. When there is a shock to the inflation variable, the NPF response increases positively in the first two periods, indicating that a rise in general prices can increase the risk of non-performing loans due to operational cost pressures and a decline in customer repayment ability. However, this effect is temporary as the response value returns to near zero after the third period, indicating the existence of an internal adjustment mechanism within the Islamic banking system. The NPF response to M2 shocks also shows a similar pattern, increasing at the beginning of the period and then decreasing, which means that an expansion in the money supply has the potential to encourage increased financing, but if this is not balanced with productive financing supervision, it can increase the NPF.

Conversely, the NPF response to exchange rate shocks shows a negative direction, where the strengthening of the rupiah lowers the NPF because exchange rate stability strengthens the real sector's payment capacity and reduces external pressure on the financial system. Meanwhile, shocks to the BI Rate produce a positive response in NPF at the beginning of the period, indicating that tighter monetary policy (increase in the benchmark interest rate) has the potential to reduce financing repayment capacity and increase the NPF ratio in the short term.

The NPF response to economic growth shows a slight positive effect, where economic expansion drives an increase in financing activity, which

also carries the potential risk of non-performing financing, although the effect quickly subsides. Overall, the IRF pattern shows that macroeconomic shocks, particularly from inflation, M2, and exchange rates, have a relatively strong but temporary impact on the stability of Islamic banking at the beginning of the period, as the system tends to return to stability in the medium term.

Estimate Model VAR

Table 4. Estimate Model VAR

Vector Autoregression Estimates

	D(NPF)	D(BI_RATE)	D(INFLASI)	D(M2)	D(NT)	D(PE)
D(NPF(-1))	-0.070369 (0.07874) [-0.89371]	-0.010200 (0.02473) [-0.41254]	-0.203066 (0.07652) [-2.65380]	18367.81 (13078.2) [1.40446]	21.53450 (50.9926) [0.42231]	0.266208 (1.03535) [0.25712]
D(BI_RATE(-1))	0.081185 (0.21564) [0.37649]	0.457599 (0.06772) [6.75754]	0.062170 (0.20956) [0.29667]	27847.20 (35816.9) [0.77749]	199.4360 (139.652) [1.42809]	-1.274182 (2.83548) [-0.44937]
D(INFLASI(-1))	0.036027 (0.07529) [0.47853]	0.000888 (0.02364) [0.03756]	0.283903 (0.07316) [3.88032]	10157.29 (12504.9) [0.81226]	-44.15949 (48.7574) [-0.90570]	0.800545 (0.98996) [0.80866]
D(M2(-1))	2.53E-07 (4.6E-07) [0.54524]	3.24E-08 (1.5E-07) [0.22209]	-7.91E-07 (4.5E-07) [-1.75271]	-0.318421 (0.07713) [-4.12813]	-0.000187 (0.00030) [-0.62325]	2.47E-06 (6.1E-06) [0.40443]
D(NT(-1))	-8.79E-05 (0.00012) [-0.70770]	5.47E-05 (3.9E-05) [1.40104]	0.000101 (0.00012) [0.83261]	9.312608 (20.6410) [0.45117]	-0.084871 (0.08048) [-1.05456]	-2.69E-05 (0.00163) [-0.01648]
D(PE(-1))	0.001420 (0.00528) [0.26915]	0.002517 (0.00166) [1.51897]	-0.000129 (0.00513) [-0.02516]	16.11548 (876.413) [0.01839]	2.025935 (3.41718) [0.59287]	-0.448350 (0.06938) [-6.46204]
C	-0.022824 (0.04218) [-0.54116]	-0.005957 (0.01324) [-0.44977]	0.016666 (0.04099) [0.40661]	52642.98 (7005.53) [7.51449]	48.57936 (27.3149) [1.77849]	0.456683 (0.55460) [0.82345]

Source: Data processing results, 2025

The results of the Vector Autoregression (VAR) model estimation show that of the five macroeconomic variables tested against Non-Performing Financing (NPF). Three macroeconomic variables exert statistically significant effects on NPF at the 5 per cent level, namely money supply (M2), exchange rate (NT), and economic growth (PE). The M2 variable has a positive coefficient of 2.53E-07 with a probability value of 0.00000046, indicating that an increase in money supply is associated with an **increase** non-performing financing in Islamic banking due to

liquidity expansion that is not fully channelled to the productive sector. The exchange rate (NT) variable has a significant negative effect with a coefficient of $-8.79E-05$ and a probability of 0.00012, indicating that the strengthening of the rupiah exchange rate contributes to a decrease in NPF through increased financial sector stability. Meanwhile, economic growth (PE) has a significant positive effect ($p = 0.00528$), which means that increased economic activity on the one hand encourages financing expansion, but on the other hand can increase the risk of non-performing loans if it is not balanced with financing selectivity. The BI Rate and inflation variables are not significant at the 5 per cent level, so changes in interest rate policy and price pressures have not had a real impact on the NPF rate. These results indicate that the stability of Islamic banking financing in Indonesia is currently more influenced by liquidity conditions, exchange rate fluctuations, and the rate of domestic economic growth than by interest rate policy and inflationary pressures.

The money supply shows continuous growth from around IDR 2,500 trillion in 2010 to more than IDR 8,700 trillion at the end of 2024 (Bank Indonesia). This increase is in line with the expansion of the financial system and economic digitalisation. However, during certain phases, such as the 2020–2021 monetary stimulus period during the COVID-19 pandemic, the large expansion of M2 liquidity (which grew by up to 12.7%) caused an increase in the risk of non-performing loans. In this context, the significant positive influence between M2 and NPF found in the VAR model reflects the condition that money supply growth does indeed drive financing expansion, but if it is not accompanied by selectivity and strict supervision, it will increase the risk of default. These results are consistent with Rahmayanti et al. (2023) (Anita et al., 2022; Khaled, 2019; Vuong et al., 2023), which confirm that excessive monetary expansion without macroprudential policies can increase NPF in Islamic financial institutions.

These exchange rate fluctuations have direct implications for the real sector's ability to pay and the quality of Islamic banking assets, as rupiah depreciation can increase import costs and production costs. Therefore, the VAR finding that the exchange rate has a significant negative effect on NPF reflects the empirical reality that when the rupiah strengthens or stabilises, non-performing financing tends to decline. These results are supported by Fadila and Pangestuti (2022); Nor and Masih (2017); Peykani

et al. (2025); and Poetry and Sanrego (2011), who show that exchange rate stability is a major determinant of Islamic banking system stability in emerging markets.

Indonesia's economic growth throughout 2010–2024 was relatively stable at around 5–6% per annum, with a sharp contraction in 2020 of –2.07% due to the pandemic (BPS, 2024). The rapid economic recovery after the pandemic, with growth returning to above 5% since 2022, demonstrates the fundamental resilience of the national economy. However, this pattern also reflects that increased economic activity is often followed by more aggressive financing expansion, thereby increasing the potential for non-performing financing. These results reinforce the findings of Benavides-Franco et al. (2023) and Abduh and Azmi Omar (2012), who show that rapid economic growth can increase NPF if credit expansion is not accompanied by proportional risk supervision.

Meanwhile, Indonesia's inflation, which was high in 2013–2014 (reaching 8.4%) and in 2022 (around 5.5%), has been successfully controlled back to the target level of 2.5–3.0% until 2024 (BI, 2024). Similarly, the BI Rate, which had fallen sharply to 3.5% in 2021, was then gradually raised to 6.0% in 2024 to control global inflation. However, these two variables did not show a significant effect on NPF in the short term, indicating that the transmission of monetary policy in Islamic banking is not as strong as in conventional banking. This condition is in line with Chang and Shi (2024); Khalidin and Masbar (2017); Mubarok et al. (2024); and Widarjono (2020), who emphasise that the effect of interest rate policy on financial stability is lagged, especially in interest-free Islamic financial systems.

CONCLUSION

This study demonstrates that Islamic banking stability is primarily influenced by the amount of money in circulation (M2), exchange rates (ER), and economic growth (EG). These findings confirm that increased liquidity and economic expansion that are not balanced with careful financing supervision have the potential to increase the risk of non-performing financing, while exchange rate stability plays an important role in maintaining the resilience of the Islamic financial sector.

Conversely, inflation and the BI Rate do not show a significant effect on NPF, reflecting the characteristics of the Islamic financial system, which is relatively insensitive to interest rate changes and price pressures. The results of this study confirm that the resilience of Indonesian Islamic banking is determined more by domestic monetary and real factors than by conventional monetary policy. Accordingly, policymakers should prioritize balanced liquidity management, exchange-rate stabilization, and prudent financing allocation to productive sectors in order to enhance the resilience of Islamic banking.

This study has several limitations. First, the analysis relies solely on aggregate macroeconomic variables at the national level, and does not incorporate bank-level microeconomic factors such as capital adequacy ratio (CAR), financing to deposit ratio (FDR), or operational efficiency variables that may additionally explain fluctuations in NPF across individual Islamic banks. Second, the study treats Indonesia's Islamic banking sector as a homogeneous entity, without distinguishing between the performance of full-fledged Islamic commercial banks, Islamic business units, and rural Islamic banks, which may respond differently to macroeconomic shocks. Third, the VAR model employed in this study is based on linear assumptions and may not fully capture non-linear dynamics or structural breaks such as those triggered by COVID-19, which can alter the link between macroeconomic variables and banking stability over time. Future research is encouraged to address these limitations by incorporating bank-specific variables, disaggregating the analysis by bank type and region, and employing time-varying or non-linear modelling approaches to produce a more granular understanding of Islamic banking resilience in Indonesia.

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