

Islamic Banking in Indonesia: Assessing the Impact of Economic Turbulence and Market Dynamics on Credit Portfolios

Faizul Mubarak*

Universitas Terbuka, Indonesia
faizul.mubarak@ecampus.ut.ac.id

Martino Wibowo

Universitas Terbuka, Indonesia
tino@ecampus.ut.ac.id

Kabul Wahyu Utomo

Universitas Terbuka, Indonesia
kabulwahyu@ecampus.ut.ac.id

Saif Ur Rahman

Siam University, Thailand
saif.ur@siam.edu

**Corresponding author*

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Abstract

Indonesia's Islamic banking sector has experienced rapid expansion in recent decades; however, credit growth within this sector remains volatile and insufficiently explored, particularly in relation to broader macroeconomic fluctuations. This study addresses this knowledge gap by investigating the key macroeconomic and financial determinants influencing credit growth in Islamic banks. It is driven by the need to understand how external shocks and policy variables affect Islamic financing behavior. Utilizing monthly data from 2002 to 2023, the study employs a Vector Error Correction Model (VECM), Impulse Response Function (IRF), and Forecast Error Variance Decomposition (FEVD) to analyze both short- and long-term dynamics. The VECM results reveal a long-run equilibrium relationship between Islamic credit growth and macroeconomic indicators, including GDP, inflation, and interest rates. This finding suggests that Islamic credit, characterized by its unique Shariah-compliant principles, adjusts over time to restore equilibrium following disruptions. The IRF analysis further indicates that shocks to inflation and exchange rates tend to temporarily suppress credit growth, reflecting the sector's sensitivity to price volatility and currency fluctuations. In contrast, positive shocks to GDP and stock market performance are associated with sustained increases in credit, underscoring the procyclical nature of Islamic bank lending. FEVD results show that GDP and inflation are the most significant drivers of credit growth variability, followed by interest rates and the exchange rate. These findings underscore that Islamic credit expansion is closely tied to real sector performance and overall macroeconomic stability. For policymakers and financial regulators, the study highlights the importance of maintaining sound macroeconomic fundamentals and fostering a stable investment climate. Such efforts are essential to support sustainable credit growth and enhance the resilience of Indonesia's Islamic banking sector.

Keywords: Industrial Production Index; Islamic Financing; Non-Performing Financing; Vector Error Correction Model

Abstrak

Sektor perbankan Islam Indonesia telah mengalami pertumbuhan pesat dalam beberapa dekade terakhir; namun, pertumbuhan kredit di sektor ini masih fluktuatif dan kurang dieksplorasi, khususnya terkait fluktuasi ekonomi makro yang lebih luas. Studi ini penting karena membahas kesenjangan pengetahuan dengan menyelidiki faktor penentu ekonomi makro dan keuangan utama yang memengaruhi pertumbuhan kredit di bank Islam. Studi ini dimotivasi oleh kebutuhan untuk memahami bagaimana guncangan eksternal dan variabel kebijakan memengaruhi pembiayaan Islam. Dengan menggunakan data bulanan dari tahun 2002 hingga 2023, studi ini menerapkan Model Koreksi Kesalahan Vektor (VECM), Fungsi Respons Impuls (IRF), dan Dekomposisi Varians Kesalahan Prakiraan (FEVD) untuk memeriksa dinamika jangka pendek dan jangka panjang. Hasil VECM menunjukkan hubungan ekuilibrium jangka panjang antara pertumbuhan kredit Islam dan indikator ekonomi makro, termasuk PDB, inflasi, dan suku bunga. Hal ini menunjukkan bahwa kredit Islam, dengan karakteristiknya yang unik, menyesuaikan diri dari waktu ke waktu untuk memulihkan keseimbangan saat terganggu. Analisis IRF lebih lanjut menunjukkan bahwa guncangan terhadap inflasi dan nilai tukar cenderung meredam pertumbuhan kredit untuk sementara, yang mencerminkan sensitivitas pembiayaan Islam terhadap ketidakstabilan harga dan fluktuasi mata uang. Sementara itu, guncangan positif terhadap PDB dan kinerja pasar saham dikaitkan dengan peningkatan berkelanjutan dalam kredit, yang menyoroti sifat prosiklis pinjaman bank Islam. Hasil FEVD mengungkapkan bahwa PDB dan inflasi merupakan salah satu variabel paling berpengaruh yang mendorong variabilitas pertumbuhan kredit, diikuti oleh suku bunga dan nilai tukar. Temuan ini menyiratkan bahwa ekspansi kredit Islam sangat dipengaruhi oleh kinerja sektor riil dan stabilitas ekonomi makro. Bagi para pembuat kebijakan dan regulator keuangan, hal ini menyoroti potensi manfaat dari mempertahankan fundamental ekonomi makro yang baik dan mempromosikan iklim investasi yang stabil. Langkah-langkah tersebut dapat mendukung pertumbuhan kredit yang berkelanjutan di sektor perbankan Islam, yang mengarah pada sistem keuangan yang lebih kuat dan tangguh.

Kata Kunci: Indeks Produksi Industri; Pembiayaan Bermasalah; Pembiayaan Syariah; Vector Error Correction Model

INTRODUCTION

Islamic banks adopt a distinctive approach to financing, grounded in the principles of profit-and-loss sharing and adherence to Shariah law. One key method involves profit-and-loss sharing agreements, in which both the bank and the investor share in the financial outcomes—either profits or losses—of the financed project or venture. This structure ensures risk-sharing among all relevant parties and aligns with Islamic ethical and legal principles. Additionally, Islamic banks commonly utilize markup-based financing structures, such as murabaha, wherein the bank purchases an asset and resells it to the client at a predetermined price that includes a profit margin. This approach avoids the conventional use of interest rates, thereby complying with the prohibition of *riba* (usury) under Islamic law.

Leasing contracts, such as *ijarah*, are also widely employed by Islamic banks as a mode of Shariah-compliant financing. In such arrangements, the bank purchases the required asset and leases it to the client for a specified period. Upon completion of the lease term, the lessee may be granted the option to acquire ownership of the asset. This model allows Islamic banks to facilitate asset-based financing while adhering to the prohibition of interest.

It is important to note that Islamic banks face several operational limitations, including restrictions on the use of derivative instruments, short selling, and speculative activities, all of which are considered non-compliant with Islamic law. Despite these constraints, Islamic banking has emerged as a legitimate and legally recognized alternative to conventional finance, offering interest-free financial services to individuals and businesses (Bilgin et al., 2020; Caporale et al., 2020; Lassoued, 2018). In managing financing risks, Islamic banks must prioritize prudent fund management and effective liquidity strategies to maintain financial soundness. Due to Shariah restrictions on certain transaction types, including debt trading and interest-based lending, Islamic banks may experience reduced operational flexibility. Consequently, sound risk management practices are essential to ensure stability and compliance within the framework of Islamic finance (Dibooglu et al., 2022; Grassa et al., 2020). In the face of economic shocks, Islamic banks are exposed to a range of credit and financing risks that must be managed effectively. Economic disruptions typically result in heightened liquidity pressures and short-term financing challenges. During such periods, borrowers may face uncertainty regarding their cash flow and diminished capacity to access or repay short-term financing (Ashraf et al., 2022; Caporale et al., 2020). Consequently, borrowers may struggle to meet their repayment obligations, increasing the risk of default. This underscores the necessity for Islamic banks to implement proactive and adaptive risk mitigation strategies. A further concern arises in profit-sharing financing arrangements—such as *mudarabah* and *musharakah*—where an economic shock can negatively affect a borrower's business performance. In such cases, both profits and associated risks, which are shared between the bank and the borrower, may decline. This introduces volatility into the bank's income stream and complicates financial forecasting. To address these risks, Islamic banks must develop and maintain effective risk management mechanisms. These may include maintaining sufficient liquidity reserves, employing rigorous credit assessments, diversifying financing portfolios, and incorporating flexible contract terms to accommodate fluctuations in economic performance. Such measures are essential to safeguard financial stability while remaining compliant with Shariah principles.

Another critical risk faced by Islamic banks during economic shocks is the decline in borrowers' asset values. Economic downturns can significantly erode asset valuations, thereby increasing the risk of default on financing obligations. To mitigate this, Islamic banks must enhance the monitoring of their financing portfolios and develop comprehensive risk management strategies aimed at minimizing potential asset devaluation. Proactive portfolio supervision is essential to identify exposures that may become problematic under adverse market conditions. Furthermore, the quality of financing tends to deteriorate during economic shocks. Islamic banks must therefore regularly assess and monitor the performance of their financing assets, while identifying borrowers who are at heightened risk of credit distress. This requires the implementation of robust credit risk assessment tools and early warning

systems to detect emerging vulnerabilities in borrower profiles. To effectively navigate these challenges, Islamic banks must adopt resilient policies, strengthen risk management frameworks, and maintain operational flexibility to respond swiftly to changing market conditions. Collaboration with regulatory authorities and coordination with other financial institutions are also crucial to ensuring a harmonized response to economic shocks and maintaining systemic stability in the Islamic financial sector.

Over the years, numerous studies have explored various aspects of credit and financing in both Islamic and conventional banking systems. For instance, Hassan et al. (2019) investigated the determinants of liquidity risk, offering insights particularly relevant to Islamic banks due to their unique operational structures. Kabir et al. (2015), through a case study, examined the measurement of credit risk and raised critical questions about risk assessment methodologies. Their study employed innovative and practical indicators, including bank size, portfolio composition, and institutional policies. Similarly, Bilgin et al. (2020) analyzed how macroeconomic developments influence the lending capacity of banks, highlighting the procyclical nature of credit. In addition, Dibooglu et al. (2022) presented a model to assess institutional constraints that limit banks' ability to withstand sudden shocks in financial markets. Collectively, these studies provide a foundational understanding of the risks and dynamics shaping credit behavior in both Islamic and conventional banking systems.

Recent studies have further deepened the understanding of credit expansion patterns and risk dynamics in Islamic and conventional banking. Albaity et al. (2022) explored the differences in credit expansion tendencies between Islamic and conventional banks, offering important insights into their respective risk appetites and growth behaviors. Boubakri et al. (2023) provided updated evidence on shifts in loan growth patterns at the onset of economic recessions, highlighting the importance of cyclical sensitivity in credit supply. Similarly, Mateev et al. (2022), found that while market forces and capital requirements influence the risk levels of financial institutions in the MENA region, these factors do not necessarily produce uniform risk patterns across institutions. Grassa et al. (2020) examined the link between risk disclosure and credit ratings, raising the question of whether higher transparency results in more favorable evaluations by rating agencies. Viverita et al. (2023) focused on liquidity generation during the COVID-19 crisis, identifying variations in liquidity behavior across banks with different ownership structures. Rashid et al. (2020) analyzed the differential impact of monetary policy on credit supply in Islamic and conventional banks in Malaysia, while Sobarsyah et al. (2020) investigated the interplay between credit growth, capitalization, and credit risk within the Islamic banking sector. Collectively, these studies enrich the literature by highlighting the complex interactions between regulatory, macroeconomic, and institutional factors that shape credit behavior in both banking systems.

Several empirical studies have employed diverse methodologies to investigate credit supply and risk in Islamic banking. Ibrahim & Rizvi (2018) utilized panel analysis to estimate the ability of Islamic banks to sustain financing activities over time. Bilgin et al. (2021), analyzed the effects of economic uncertainty on default risk, finding differing impacts on Islamic and conventional banks. Caporale et al. (2020) examined the monetary transmission mechanism through bank loans in Malaysia, providing insights into how policy changes affect lending behavior. In contrast, Lassoued (2018) questioned whether Islamic banks in Malaysia exhibit higher credit risk compared to their conventional counterparts, though the findings were inconclusive. Lastly, Mohammad et al. (2020) conducted an in-depth investigation into the liquidity risks encountered by Islamic banks, offering valuable evidence on their vulnerability under financial stress.

While prior studies have examined the effects of economic shocks on the banking industry, there remains a need for more focused research within the context of Islamic banking in Indonesia. Existing literature has primarily addressed international or regional economic dynamics, often overlooking the unique structural and macroeconomic characteristics of emerging markets like Indonesia. As a result, a more granular investigation is warranted to assess how economic shocks specifically influence credit growth and risk exposure in Indonesian Islamic banks. To address this gap, future research should incorporate comprehensive analyses that consider the distinct features of Islamic banking models, financing portfolio structures, local macroeconomic variables, and the regulatory and policy environment. Additionally, understanding the behavior of market participants—including customers and targeted market segments—will provide critical insight into how Islamic banks respond to economic disturbances. Addressing these dimensions will enhance the formulation of context-sensitive policies and improve risk mitigation strategies, ultimately contributing to the resilience and stability of the Islamic banking sector in Indonesia during periods of economic volatility.

This research is essential for understanding the impact of economic shocks on Islamic bank credit in Indonesia. By focusing on the country's unique economic environment, adherence to Islamic financial principles, and detailed examination of Islamic bank financing portfolios, the study aims to generate meaningful insights. It also considers local macroeconomic variables and the role of government policy, analyzing how these factors influence both the behavior and resilience of Islamic bank customers. The findings from this research have important implications for Islamic bank administrators, who must formulate and implement effective, adaptive policies. Banking practices that are grounded in empirical evidence and capable of responding flexibly to economic disruptions will be critical in ensuring financial stability. Such resilience is particularly important in the Indonesian context, where minimizing the adverse effects of economic shocks is a key national objective.

LITERATURE REVIEW

Research on credit growth in Islamic banking is closely tied to understanding the theory of financial intermediation and the fundamental principles of Islamic finance. The theory of financial intermediation clarifies that banks serve as intermediaries between parties with excess funds and those in need, with the primary function of managing risk and information asymmetry. In Islamic banking, this function is carried out through profit-sharing contracts such as *mudarabah* and *musharakah*, which emphasize sharing risk and profit. This unique approach to risk management in Islamic banking provides a sense of reassurance and confidence. The theory of pro-cyclicality is also relevant, explaining the tendency of bank credit to grow during economic upturns and shrink during downturns. However, the profit-sharing mechanism in Islamic banking can modify this pattern, making it distinct from conventional banks.

Hassan et al. (2019) emphasize that risk tends to follow patterns of liquidity, two concepts that are closely linked. They further demonstrate that conventional banks score higher on both fronts: credit and liquidity risk — although Islamic banks outperform their non-Islamic counterparts in this respect. Kabir et al. (2015) offer a fresh perspective by evaluating credit risk using market-based models. Recognizing the importance of employing the proper evaluation methodology for Islamic Bank credit risk, they re-evaluate all significant risks. Bilgin et al. (2020) discuss the economic impact. The authors note that Islamic banks are more resilient to performance declines than their conventional banking rivals. Dibooglu et al. (2022) ask an important question: Does fishing for Islamic banks make them less vulnerable to financial market volatility? The findings indicate that this approach offers advantages during periods of turmoil, although it renders Islamic banks more vulnerable in normal conditions. Albaity et al. (2022) examined the credit growth cycle of Islamic banks, revealing a tendency for Islamic banks to exhibit procyclical behavior characterized by higher credit growth, particularly with the aid of profit-sharing mechanisms and favorable market sentiment.

Boubakri et al. (2023) investigated the initial impact of the COVID-19 crisis on loan growth, finding that Islamic banks experienced faster growth than conventional banks during the crisis. Mateev et al. (2022) examine the impact of capital requirements and market forces, highlighting that the effects differ between Islamic and conventional banks, particularly in the context of the Middle East and North Africa (MENA). Baldwin & Alhalboni (2023) developed a new measure of market power for Islamic banks, showing that deposit growth contributes to their market power. Grassa et al. (2020) highlight the relationship between risk disclosure and bank credit ratings, noting differences in risk disclosure practices between Islamic and conventional banks. Viverita et al. (2023) describe the creation of liquidity during the COVID-19 pandemic, with Islamic banks tending to create more liquidity, primarily through off-balance sheet activities. Suropto (2023) analyzes company characteristics as determinants of differences between Islamic and conventional banks in ASEAN,

highlighting variations in capital adequacy ratios, profit before tax, and interest rates, as well as company size.

Rashid et al. (2020) examine the impact of monetary policy in Malaysia, showing that Islamic banks are less responsive to policy changes than conventional banks, with a more significant impact on smaller and less liquid banks. Sobarsyah et al. (2020) evaluate the effect of credit growth and capitalization on credit risk in Islamic banking, showing that high credit growth can worsen credit risk, especially in Islamic banks with high capitalization, especially after the 2008 global financial crisis. Ibrahim & Rizvi (2018) examine whether Islamic banks can maintain a financing supply during times of economic pressure while still growing. It can be seen from the graph that while Islamic banks maintain stable financing, conventional bank credit growth exhibits a substantial decline across the board without any excessive risk-taking.

Peran & Sdiri (2024) examine the performance of Islamic and traditional banks in Qatar during the crisis and other significant events. The use of data from seven banks in this research enables comparability across various elements of performance. Offering an insight into how the banks handle four economic challenges and perform comparison by different regions by interpreting episodes from last year. In a different context, Adalessossi (2023) demonstrates how performance is influenced when Islamic banks in North Africa offer banking technologies to Sub-Saharan African clients through electronic channels over time. The results show an increase in total profit, highlighting the significant role bank technology plays in enhancing the financial health of Islamic banks.

The research by Rouetbi et al. (2023) highlights the dangers of Islamic banks managing deposits by forcing profit-sharing investment account arrangements in Bahrain. The study's results demonstrate the negative impact of risk on the bank's performance. It is worth noting that this perspective is necessary, as it highlights the challenges that Islamic financial organizations face in terms of risk management and stability preservation. In a separate investigation, Ledhem (2022) examined the impact of sukuk market development on the financial stability of Islamic banks. The study's results are positive, demonstrating that the development of the sukuk market enhances financial stability among Islamic banks. This means that Islamic financial instruments are crucial in balancing and strengthening the banking sector over time. In a study by Ghouse et al. (2023), the performance of Islamic and non-Islamic banks in six OIC countries was compared before and during the COVID-19 pandemic. Islamic banks had better performance rates before the pandemic, while non-Islamic organizations' performance was more successful during the crisis period.

Raouf & Ahmed (2022) discuss the link between risk governance and financial stability in both Islamic and conventional banks in GCC countries. In this way, it is possible to note that while conventional banks suffer from risk governance that has an inverse relationship with stability, Islamic banks are similarly affected by these conditions. Thus, the two types of banks differ in terms of their impact factors. In

their study, Trad et al. (2017) explore the potential of Islamic finance as a response to the 2008 global financial crisis. In the context of the present value of the differences, it is essential to note that bank size and capital are significant variables that contribute to the profitability and stability of Islamic banks. Regarding liquidity and asset quality, the relationship is not statistically significant.

Overall, the literature reviewed gives a comprehensive review of the performance of Islamic and conventional banks in various economic contexts and situations. As a part of the financial industry, why are Islamic banks in Indonesia also subject to fluctuations in the economic cycle from which Islamic banking credit can suffer? Nevertheless, the literature on Islamic banks has unique characteristics that can present opportunities. However, although individual responses to unstable economic conditions are part of a complex dynamic, this must be recognized.

The importance of studying how economic shocks affect Islamic banking credit in Indonesia Can be seen as an increasingly urgent issue. In this context, the research contributes to our understanding of the risk management strategies employed by banks, the effectiveness of monetary policy, and liquidity management by Islamic banks in the face of economic uncertainty. Based on the literature review, this research aims to contribute to a comprehensive understanding of the impact of Islamic banking credits on Indonesian society under economic shocks. This will ultimately form a foundation for more effective policies and risk management strategies, which also help bring about sustainable development in future generations.

H₁: Economic Shocks and Market Dynamics Affect the Credit Portfolio in the Short and Long Term

H₂: Credit Portfolio Responds to Economic Shocks and Market Dynamics

H₃: Economic turmoil and market dynamics influence the variability of prediction errors in Islamic banking credit portfolios

RESEARCH METHOD

To examine the relationship between Islamic bank credit growth and various macroeconomic variables, this study utilizes monthly data from 2002 to 2023, aggregated over time series analyses for Indonesia. The independent variables consist of Gross Domestic Product (GDP), Inflation Rate (IFL), Interest Rate (BRTE), Currency Exchange Rate (EXCRT), Index Composite Stock Price (IDX), Foreign Direct Investment (FDI), Crude Oil Price (CRO), and Industrial Production Index (IPI). Official sources for these data sets include Bank Indonesia, the Central Statistics Agency (BPS), the Financial Services Authority (OJK), and the associated financial institutions. The Augmented Dickey-Fuller (ADF) and Phillips-Perron tests are both used to examine whether the time series data are stationary.

$$\Delta Y_t = \Pi_0 + \Pi_1 \Delta Y_{t-1} + \Pi_2 \Delta Y_{t-2} + \dots + \Pi_p \Delta Y_{t-p} + \Gamma D_t + \varepsilon_t$$

ΔY_t is a column vector representing changes in the dependent variable values at time t , $\prod_i$ is the coefficient matrix associated with ΔY_{t-i} where i denotes a specific lag, D_t is a matrix of dummy vectors including dummy or deterministic variables influencing the dependent variable, ε_t is a residual vector containing random errors at time t . The vector error correction model (VECM) is employed to test whether there is any integration relationship between macroeconomic variables and the growth rate of Islamic bank credit. The error correction coefficients provide information about the direction of long-term relationships between these variables. The Impulse Response Function (IRF) is used to analyze the dynamic impact of changes in macroeconomic variables on Islamic bank credit growth at a specific period; meanwhile, the Forecast Error Variance Decomposition (FEVD) can be employed to sort out and detect the relative contribution of each variable for how much it impacts Islamic bank credit growth.

RESULTS AND DISCUSSION

Stationarity Test

The stationarity tests, based on two methods—the Augmented Dickey-Fuller (ADF) and the Philip-Perron—can tell us a great deal about the stationary or non-stationary characteristics of various economic variables. After differencing, FINC and NPF variables are now stationary at the 5% level of significance. This is a fundamental characteristic rather than a systematic pattern—something inherent in our data from the beginning (time 0). In contrast, EXCRT and BRTE variables are not stationary at the level, but they become stationary after differencing. At the level and after differencing, the IFL, GDP, FDI, CRO, and IPI variables all exhibit stationary properties, which is suitable for summary model analysis. The 5% significance level allows us to get a more precise result here. IFLT shows that this variable becomes stationary after differencing at a 5% confidence level.

Table 1. Stationarity Test

Indicator	Augmented Dickey-Fuller		Philip-Perron	
	Level	Difference	Level	Difference
FINC	0.0031*	0.0000*	0.0013*	0.0000*
NPF	0.0395*	0.0361*	0.0505	0.0000*
EXCRT	0.9052	0.0000*	0.8892	0.0000*
IFL	0.0000*	0.0000*	0.0000*	0.0000*
BRTE	0.0566	0.0000*	0.0911	0.0000*
GDP	0.0015*	0.0000*	0.0000*	0.0001*
IDX	0.2110	0.0000*	0.2198	0.0000*
FDI	0.0000*	0.0000*	0.0000*	0.0000*
CRO	0.0042*	0.0000*	0.0004*	0.0000*
IPI	0.0000*	0.0000*	0.0000*	0.0001*

*significant at 5%

Lag Optimal

Diverse models, such as the Akaike Information Criterion (AIC), Schwarz Criterion (SC), Hannan-Quinn Criterion (HQ), Likelihood Ratio (LR), Final Prediction Error (FPE), and Loglikelihood (LogL), produce various evaluation metrics to assess the best lag in time series analysis. Choosing data lag one yields the best performance based on the Schwarz Criterion (SC). A lower SC value at lag one simultaneously suggests that adding variables from lag one substantially improves the modeling of the time series data. By these criteria, the optimal lag for explaining observed time series data is the one that yields the model with the highest explanatory power, typically lag one. Therefore, the SC value at lag one is the most suitable for explaining information at the same time. The ability to balance the accuracy and complexity of the model can be reflected in the lower SC values, indicating that models that require more investment in terms of resources may also be less effective.

Table 2. Lag Alternative

Lag	Logl	LR	FPE	AIC	SC	HQ
0	-1549.048	NA	1.07e-07	12.3244	12.4641	12.38068
1	1253.334	5361.079	5.63e-17	-9.03821	-7.50196*	-8.42012
2	1440.147	342.6132	2.84e-17	-9.72448	-6.79163	-8.54449*
3	1546.923	187.3859	2.72e-17	-9.77805	-5.44860	-8.03616
4	1654.237	179.8455	2.61e-17	-9.83586	-4.10981	-7.53208
5	1786.320	210.9160	2.08e-17*	-10.0894*	-2.96684	-7.22381
6	1876.050	136.1900	2.35e-17	-10.0083	-1.48905	-6.58072
7	1951.128	108.0184	3.03e-17	-9.81129	0.10454	-5.82181
8	2086.044	183.4420*	2.49e-17	-10.0873	1.22513	-5.53593

*Lag alternative

Stability Lag

The result of the VAR stability test shows that the VAR model used in time series analysis represents a stable condition. In an analysis of characteristic roots from the vector autoregression equation, all characteristic roots lie within or on the unit circle. In particular, the modulus of each characteristic root is less than one, meaning that the VAR model is stable.

Table 3. Stability VAR

Root	Modulus
0.988052	0.988052
0.967445 - 0.003189i	0.967450
0.967445 + 0.003189i	0.967450
0.929901 - 0.064958i	0.932167
0.929901 + 0.064958i	0.932167
0.706612	0.706612
0.643270 - 0.048951i	0.645130
0.643270 + 0.048951i	0.645130
0.602968	0.602968
0.046714	0.046714

No root lies outside the unit circle

VAR satisfies the stability condition

There are three pairs of complex conjugate roots (the first, second, and third roots), and similar properties are found in the fourth, fifth, seventh, and eighth roots. Additionally, the sixth, ninth, and tenth roots are real. This indicates that all the roots of the VAR characteristics lie within the unit circle limits, which suggests that the VAR model is stable in both dimensions, namely the actual and complex dimensions. Thus, VAR meets the stability requirements needed to produce convergent and reliable solutions in analyzing patterns and relationships between variables in observed time series data.

Cointegration Test

The cointegration test results provide essential information about the long-term relationship between variables in a model. Based on the hypothesis tested, it can be concluded that the model has at least one or more cointegration relations. At a significance level of 5%, the hypothesis of no cointegration (None) is rejected with very low probability, indicating that the analyzed variables have a significant long-term relationship. The acceptance of the hypothesis strengthens the result that at most one (At Most 1) or two (At Most 2) cointegration relations are present, highlighting the complexity and diversity of relationships between variables in the model. When the number of cointegration equations is estimated to be greater (at most 3 to at most 9), the results still show rejection of the hypothesis of no cointegration. Therefore, these findings suggest that the analyzed variables have a significant long-term relationship, thereby strengthening our understanding of the structure and relationships within the observed time series data.

Table 4. Cointegration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None*	0.365591	528.5023	273.1889	0.0000
At most 1*	0.328547	410.6416	228.2979	0.0000
At most 2*	0.281753	307.4788	187.4701	0.0000
At most 3	0.224558	221.7649	150.5585	0.0000
At most 4	0.220104	155.8956	117.7082	0.0000
At most 5	0.104242	91.50972	88.80380	0.0314
At most 6	0.084168	62.99774	63.87610	0.0591
At most 7	0.069756	40.22598	42.91525	0.0906
At most 8	0.048916	21.49812	25.87211	0.1593
At most 9	0.032318	8.508504	12.51798	0.2129

*Cointegration

Short-Term and Long-Term Linkages

In the short term, the results of the VECM analysis underscore the significant impact of Non-Performing Financing (NPF) on Islamic bank credit in Indonesia. Due to a positive coefficient of 0.064214 on the NPF, the change in NPF level led directly

to an adverse change in the cointegration variable during this time section. While changes in the credit portfolio of conventional banks influenced fluctuations in their Islamic credit from short to long periods in ways that NPF data would not match, short-term changes occur as a result of two-way interactions between exposure to risk and asset quality.

Table 5. Short-Term and Long-Term Linkages

Indicator	Coefficient	Standard Error	t-statistic
Short-term			
CointEq1	0.000333	(0.00037)	[0.90106]
NPF	0.064214	(0.01674)	[3.83615]*
EXCRT	0.019055	(0.06892)	[0.27647]
IFL	-0.001162	(0.00106)	[-1.09184]
BRTE	-0.001180	(0.04007)	[-0.02945]
GDP	-0.001378	(0.00756)	[-0.18237]
IDX	0.036541	(0.02835)	[1.28880]
FDI	-0.000409	(0.00111)	[-0.36757]
CRO	0.006181	(0.00597)	[1.03530]
IPI	-0.000103	(0.00040)	[-0.25526]
C	0.012317	(0.00182)	[6.76358]
Long-term			
NPF	0.308514	(1.55437)	[0.19848]
EXCRT	4.987194	(6.52095)	[0.76480]
IFL	-0.858170	(0.24979)	[-3.43560]*
BRTE	-1.748641	(1.97277)	[-0.88639]
GDP	-4.590882	(1.62136)	[-2.83150]*
IHSG	6.331420	(2.89060)	[2.19035]*
FDI	-1.878298	(0.21984)	[-8.54406]*
CRO	-0.374453	(1.38475)	[-0.27041]
IPI	0.906996	(0.15103)	[6.00537]*
@TREND(02M01)	-0.086343	(0.02646)	[-3.26256]*
C	-102.7636		

*Significant at 5%

However, other variables, such as the exchange rate of currencies (EXCRT), the rate price index of crude oil (CRO), and the Industrial Production Index (IPI), are all indicators that do not exert a temporary effect on Islamic bank credit. These indicators, however, play a crucial role in the economy and finance, as such findings confirm that, at the short-term level, NPF is the predominant factor in determining the dynamics of Islamic bank credit. Emphasizing NPF as a key factor in the short term can only serve to remind all participants in credit markets of the importance that effective risk management holds when asset quality changes rapidly during times of turbulence. In the face of short-term challenges, Islamic banks must have robust enterprise risk management policies and practices to maintain the stable operation

of their credit portfolios, as well as their overall health (Grira & Labidi, 2021; Louhichi & Boujelbene, 2020).

In long-term analysis, the findings indicate that several key variables have a significant impact on Islamic bank credit in Indonesia. The Inflation Rate (IFL) has a statistically significant positive coefficient. Rising inflation rates are considered beneficial to Islamic bank credit. That is why it has been said that increasing the speed with which nominal savings are converted into demand deposits will help us get out of this crisis example. The Gross Domestic Product (GDP) variable also has a positive long-term impact. Economic growth, as measured by GDP, is a crucial factor in sustainable credit demand (Boukhatem & Moussa, 2018; Rahman et al., 2018).

Foreign Direct Investment (FDI) has a positive impact on Muslim banks. The presence of foreign funds can significantly contribute to the long-term development of Islamic bank credit (Alzarooni et al., 2024). Foreign investors' trust supports a capitalist government through its financial system and acts as one of the pillars for those who write laws in favor of the wealthy (Al Sharif, 2023; Kamarudin et al., 2017). The Industrial Production Index (IPI) also has a significant positive effect on Islamic bank credit. As the industry booms, job opportunities arise, and people's purchasing power increases, resulting in a greater demand for Islamic bank loans. It is also important to note the long-term downward trends (negative coefficient for the TREND variable) and the possibility that fundamental changes may be occurring in economic or market conditions. This downward trend may reflect structural changes in the financial sector or the economy. That is why, faced with complex long-term dynamics, strategies for financial banking are so important.

Impulse Response Function

The Analysis of IRF results reveals a pattern of the impact of macroeconomic variables on Islamic banking credit over a specific period. First, it should be noted that the Exchange Rate has a negative sign and continues to decline over time after the shock period. This implies that exchange rate fluctuations have a positive impact on Islamic banking credit and affect its stability. However, a decline in the exchange rate would mean that the financing risks for business actors impacted by fluctuations in the exchange rate are increased; hence, Islamic banking institutions must consider foreign exchange risk management more carefully (Gatfaoui, 2017; Pop et al., 2018).

Another economic variable is inflation, whose impact can be observed by noting that it has been consistently declining. Hence, the results suggest that fluctuations in Islamic financing are negatively correlated with all other factors. However, with the rising rates of inflation (IFL), the cost of living increases, prompting Islamic banks to raise interest rates and implement stricter credit risk measures to stabilize their credits. Similarly, interest rates (BRTE) also experienced a negative shock but declined over time, suggesting that fluctuations in economic factors have a positive impact on banking interest rates. The fluctuation in interest rates (BRTE)

affects the profit margins of debtors as well as the cost of loans, and Islamic banks must adjust the rates and review the loan portfolios.

The data indicate that economic growth, as measured by GDP, has a positive impact on credit for Islamic banking. Moreover, GDP is experiencing a steady increase, indicating that Islamic banking is making significant contributions to the country's economic improvement. At the committee's conclusion, there appears to be a reduction in the growth of the GDP, which suggests that the country is facing a risk; this could result in increased credit risk. As a result, Islamic banks should scale up their risk monitoring and also restructure loans as needed. From the end of the stock market index, a steady increase appears, which is also positively impacting credit.

However, this data suggests that fluctuations in stock indices may adversely affect asset values, and investors may be reluctant to invest when these values depreciate. This would mean that Islamic banks would have regulated their investments to reduce the impacts resulting from the quality of their credit. Foreign Direct Investment (FDI) exhibits a gradual increase that is generally stable. The data indicate that foreign direct investment has a positive impact on credit for Islamic banking; however, a decrease in foreign direct investment would impact liquidity and capital for Islamic banks. Thus, Islamic banks are expected to monitor the diversification of their funding and develop the best Islamic banking products that are appealing to lenders.

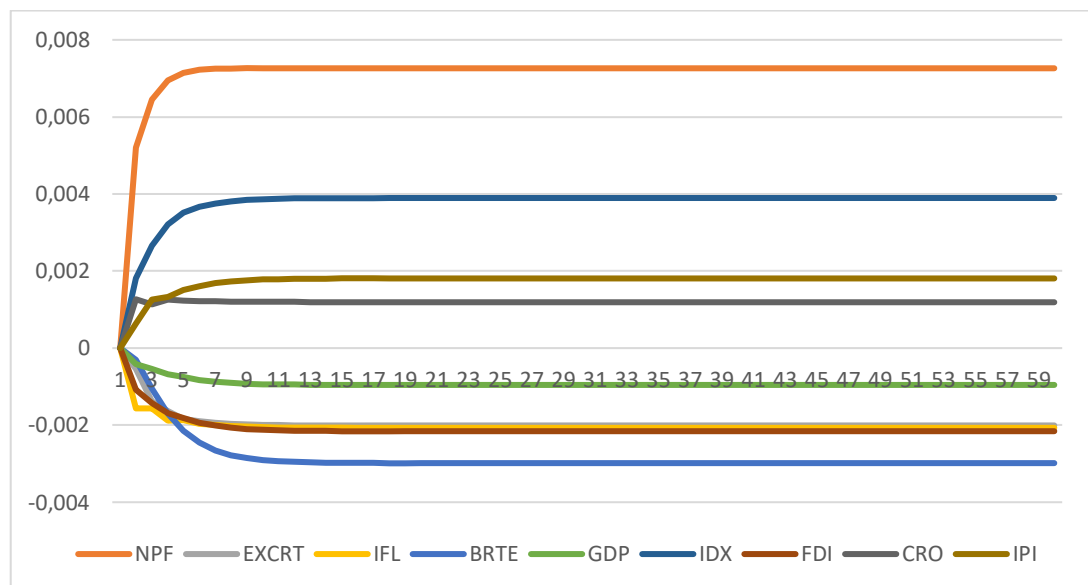


Figure 1. Impulse Response Function

Crude Oil Prices (CRO) exhibit a stable decline, suggesting that fluctuations in crude oil prices can affect Islamic banking credit. Islamic banks are required to focus on credit risk changes in order to keep or increase their profitability and stability. Therefore, it is essential to enhance credit risk management and develop effective risk management strategies, particularly in response to fluctuations in crude oil

prices. At last, the Industrial Production Index (IPI) shows a stable increase, meaning that Industrial Production activities can advantage Islamic banking credit. Nevertheless, credit obtained from industrial production will be directly relevant to their electricity needs. Therefore, it is expected that a decrease in IPI will impact the industrial sector's capacity to repay its debts. Hence, Islamic banks are required to some degree to transfer industrial sector exit and support their indebted customers – debtors (Masrizal & Trianto, 2022; Mertzanis, 2016).

Forecast Error Variance Decomposition

The results of the Forecast Error Variance Decompositions (FEVD) provide a rich insight into the sources of variations in Islamic banking credit within a specified period. Most significantly, Islamic Financing made the most considerable contribution during the specified period. The findings reveal that internal factors, as captured in the variable, account for fluctuations in Islamic banking credit. Second, the Non-Performing Financing (NPF) also made a significant contribution. Consequently, the findings reveal that problems related to non-current credit can lead to fluctuations in credit.

On the other hand, the Exchange Rate (EXCRT) contributed to some extent. The volatility, resulting from fluctuations in the currency exchange rate, affects Islamic Financing in economies that utilize Islamic banking. Finally, the fluctuations in the inflation rate (IFL) make a significant contribution. Deviations based on the cost of living and interest rates account for variations in Islamic financing.

On the other hand, interest rates (BRTE) have a lower but highly significant effect on the credit fluctuations in Islamic banking (Hossain, 2016; Mubarak et al., 2024). The increase in GDP generates a significant positive contribution, leading to better financing and credit opportunities. Additionally, stock market activity, as measured by the Indonesia Stock Exchange (IDX), also affects credit fluctuations. Another factor is Foreign Direct Investment (FDI), which has a positive impact on the liquidity and capital of Islamic banks. The Impacts of Crude Oil Prices (CRO) on IPI scores were moderate. However, the last force of variation is important in creating a significant positive anomaly in the IPI scores, as measured by the industrial production activity index.

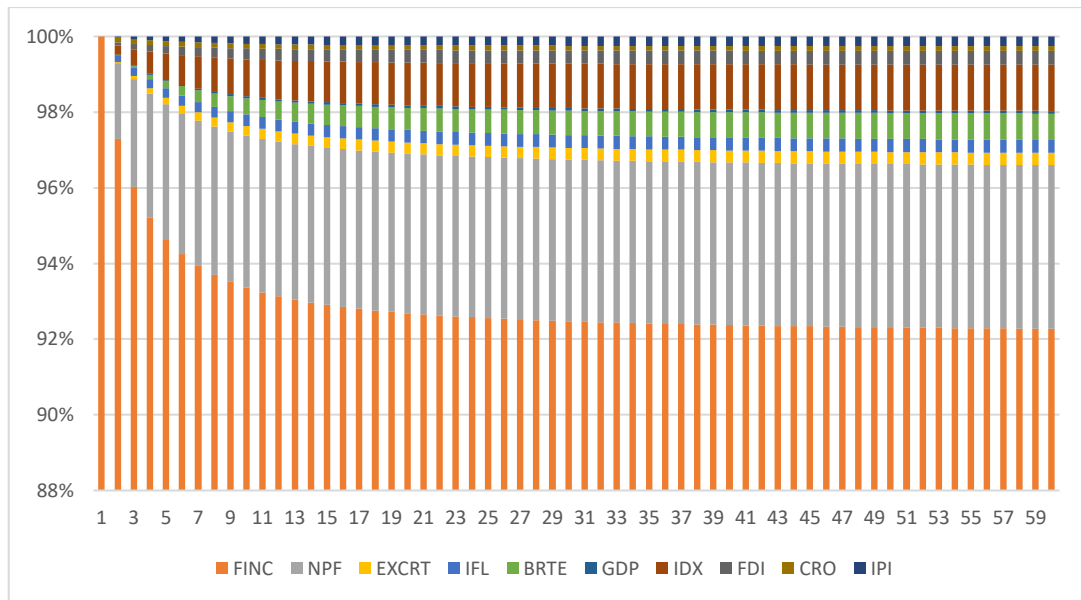


Figure 2. Forecast Error Variance Decomposition

CONCLUSION

This study concludes that macroeconomic factors play a pivotal role in shaping credit growth in Islamic banks in Indonesia. The presence of cointegration among key variables—including inflation, GDP, interest rates, and exchange rates—indicates a strong long-term equilibrium relationship between Islamic credit growth and macroeconomic fundamentals. The significance of the error correction term further confirms the system's ability to adjust toward equilibrium following short-term deviations. The Impulse Response Function (IRF) analysis reveals that Islamic credit is highly sensitive to macroeconomic shocks, particularly fluctuations in inflation, foreign direct investment, industrial production, and stock market performance. These shocks exert both immediate and enduring effects on financing behavior. Additionally, the Forecast Error Variance Decomposition (FEVD) underscores the dominant influence of macroeconomic variables—especially GDP and inflation—in explaining variations in credit growth over time. These findings highlight the critical importance of macroeconomic stability as a foundation for sustainable credit expansion and financial resilience within the Islamic banking sector. Accordingly, policymakers are advised to prioritize inflation control, stimulate real sector productivity, and foster a conducive investment climate—particularly in relation to foreign capital flows and industrial development. Moreover, enhancing coordination between monetary and fiscal policies will further support the growth of Islamic banking by ensuring that credit provision remains both responsive and stable in the face of economic volatility.

Based on the findings, it is recommended that policymakers, financial regulators, and banking practitioners in Indonesia prioritize macroeconomic stability as a key strategic objective to support the development of Islamic banking in Indonesia. These policies, designed to mitigate the adverse effects of inflation, exchange rate volatility, and external shocks on credit growth, have the potential to

significantly enhance the stability and growth of Islamic banking. Additionally, enhancing the responsiveness of Islamic banks to macroeconomic signals through improved risk management frameworks and adaptive financial instruments could strengthen their resilience, leading to a more robust financial system. International scholars and researchers are encouraged to explore the interaction between macroeconomic and microeconomic factors in Islamic finance, particularly in emerging markets, to inform more comprehensive and context-specific policy interventions.

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