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Determinants of Islamic Commercial Bank Stability in Indonesia during the 2019–2024: A Fixed Effects Panel Model with Driscoll–Kraay Standard Eror Approach

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ABSTRACT

Stability in the banking sector is essential for maintaining financial system resilience, particularly in the context of Islamic finance. This study aims to examine the effects of internal and external factors on the stability of Islamic commercial banks in Indonesia over the 2019–2024 period. Secondary data were obtained from the Financial Services Authority (OJK) and the Central Bureau of Statistics (BPS). The sample comprises ten Islamic commercial banks selected via purposive sampling. The analysis was carried out using panel-data regression with Driscoll–Kraay standard errors to correct for heteroskedasticity, and serial correlation. Findings indicate that financial performance indicators, BOPO, NPF, NOM, and CAR significantly affect bank stability, whereas the FDR does not significant. Among macroeconomic factors, inflation and HHI exert significant effects, while GDP growth and exchange-rate remain insignificant to Islamic Commercial Banking.

Keywords: *Islamic Banking, Bank Stability, Internal Determinants, External Determinants.*

ABSTRAK

Stabilitas di sektor perbankan sangat penting untuk menjaga ketahanan sistem keuangan, khususnya dalam konteks keuangan syariah. Penelitian ini bertujuan untuk mengkaji pengaruh faktor internal dan eksternal terhadap stabilitas bank umum syariah di Indonesia selama periode 2019-2024. Data sekunder diperoleh dari Otoritas Jasa Keuangan (OJK) dan Badan Pusat Statistik (BPS). Sampel terdiri dari sepuluh bank komersial syariah yang dipilih melalui *purposive sampling*. Analisis dilakukan dengan menggunakan regresi panel-data dengan kesalahan standar Driscoll-Kraay untuk mengoreksi heteroskedastisitas, dan korelasi serial. Temuan menunjukkan bahwa indikator kinerja keuangan, BOPO, NPF, NOM, dan CAR secara signifikan mempengaruhi stabilitas bank, sedangkan FDR tidak signifikan. Di antara faktor makroekonomi, inflasi dan HHI memberikan efek yang signifikan, sementara pertumbuhan PDB dan nilai tukar tetap tidak signifikan bagi Perbankan Komersial Islam.

Kata kunci: Perbankan Islam, Stabilitas Bank, Penentu Internal, Penentu Eksternal.

INTRODUCTION

The financial sector plays a critical role in sustaining national economic dynamics and growth. Purboyanti & Yogatama (2018) argue that a country's economic expansion is closely linked to the development and effectiveness of its

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financial services industry. In other words, when financial institutions operate efficiently, the allocation of funds is optimized, thereby driving broader economic growth at the national level. This significance is reflected in the sector's asset composition in Indonesia, the banking industry commands the largest asset share at 77.9%, followed by the insurance industry at 9.7%, pension funds at 8.3%, financing institutions at 3.4%, and all other financial subsectors combined at 0.7% (Ahdiat, 2024).

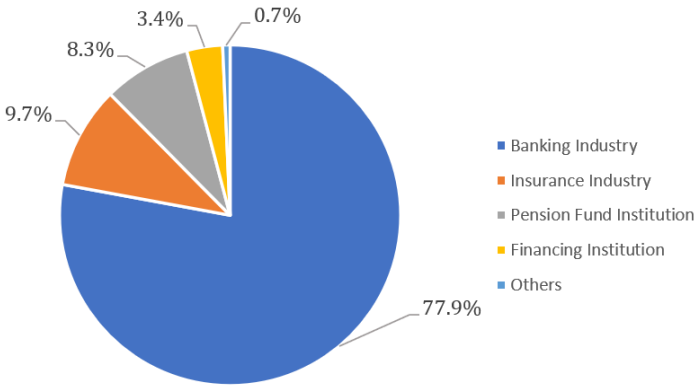

Figure 1. Financial Sector Asset

As the financial sector's largest asset contributor, banks serve as financial intermediaries by collecting deposits from the public and channeling those funds through loans to other parties for both productive and consumptive economic activities. The banking industry plays an instrumental role in driving both economic growth and financial system stability (Acharya & Ryan, 2016; Saddam et al., 2024). Banks serve as vital communication channels between the public and financial institutions, operating on the foundational principle of trust (Ali & Puah, 2019). When this trust is firmly established, customers are more confident in engaging with banking products and services, which in turn enhances their loyalty and deepens their participation in the broader financial ecosystem.

Globally, banking systems split into two broad models, Islamic banks and conventional banks. In practical terms, conventional and Islamic banking systems employ distinctly different revenue models. Whereas conventional banks accrue earnings chiefly through interest charges, Islamic banks utilize a profit-and-loss sharing (PLS) mechanism (Salman & Nawaz, 2018). According to Islamic principles, Islamic banking operations must categorically avoid *riba* (usury or interest), *gharar* (uncertainty), and *maysir* (speculation). Islamic banking has expanded rapidly across the globe, particularly in Muslim-majority countries. Assets compliant with Sharia principles climbed from USD 1.761 billion in 2012 to USD 3.058 billion by December 2021 (Marnouch & Khamlichi, 2024). This rapid growth is reflected in the increase in the number of Islamic banking institutions and the expansion of the Islamic capital market (Prahendratno, 2023).

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Over the past few decades, a growing body of research has examined the stability of banking systems. This surge in interest is driven by the need to anticipate and prevent future global financial crises by drawing on insights from past market disruptions. Bank stability indicates a bank's healthy condition and its effective execution of financial intermediation in channeling public funds (Kanapiyanova et al., 2022; Saddam et al., 2024). Higher stability fosters public confidence and shields banks from financial distress or insolvency risk (Muhri et al., 2023; Sari & Pangestuty, 2024). Conversely, instability disrupts the intermediation process essential for economic growth. Given its vital role as the foundation of sustainable growth, ensuring financial stability remains a primary economic objective (Ozili & Lorember, 2023). Bank vulnerability may arise from both internal and external conditions. According to Iqbal et al. (2021), economic instability signifies the financial system's exposure to shocks. Hence, maintaining the stability of Islamic banks is vital, as they serve as intermediaries that mobilize and allocate capital and wealth. This intermediary role prevents asset concentration among a limited group and ensures that financial resources remain productive (Firdaus et al., 2023).

The global recession precipitated by the COVID-19 pandemic substantially affected almost every financial and economic sector, including Indonesia's banking industry (Ikhwan & Riani, 2023; Qomaria et al., 2021). In response, Governments enforced social distancing and lockdowns to stem viral spread, prompting a swift transition to remote work. Widespread adoption of work-from-home arrangements became the new norm, while companies unable to weather sharp revenue declines implemented mass layoffs. According to Firdaus et al. (2023), these shifts weakened national economic performance and triggered a significant slowdown in growth.

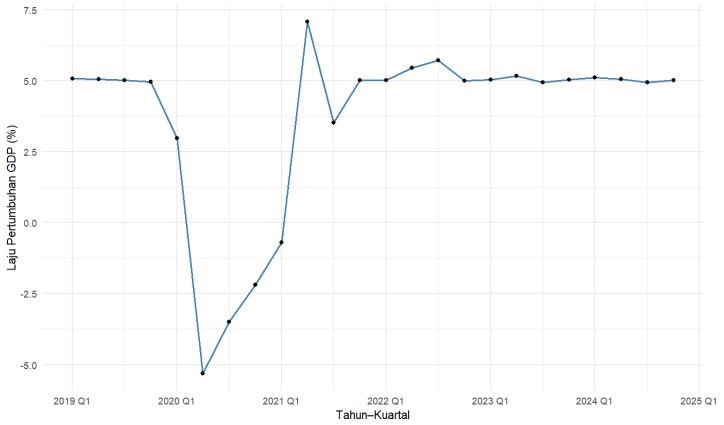

Figure 2. GDP Growth Rate From 2019 to 2024

In Figure 2 at the height of the COVID-19 pandemic, Indonesia's economic growth contracted to –5.32%, down from 7.08% in the previous year. Rani et al. (2024) demonstrate that GDP has a positive effect on the stability of Islamic banking in both Indonesia and Malaysia, meaning that higher GDP levels are associated with greater bank stability. Similarly, Fatoni & Sidiq (2019) find a significant positive

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impact of GDP on Islamic bank stability in Indonesia, implying that an economic slowdown undermines this stability. The COVID-19 pandemic generated high uncertainty across sectors, leading corporate management to take a more cautious approach to decision-making. It weakened banking industry performance, especially among borrowers (Burhanuddin & Abdi, 2020). In the first quarter, Islamic banks saw a slowdown in financing activities as many customers struggled to earn income, which hurt financing collectability (Ningsih & Mahfudz, 2020). Poor borrower performance then threatened a rise in non-performing financing, endangering overall banking sector stability (Disemadi & Shaleh, 2020).

Bank stability is determined by two main dimensions, internal factors and external (macroeconomic) factors (Khatib & Savoia, 2024; Saddam et al., 2024). Internal drivers can be accessed via banking performance or the CAMEL (Capital, Assets, Management, Earnings, Liquidity) framework, which includes capital adequacy measured by the CAR ratio (Sari & Pangestuty, 2024), liquidity assessed through NPF and FDR efficiency captured by BOPO (Ramadhina et al., 2024), profitability gauged by ROA, ROE, and NOM (Ketaren & Haryanto, 2020). Although CAMELS-based studies abound, highlighting its theoretical foundations and practical relevance, some research questions its overall efficacy (Popovska, 2014). On the external side, stability depends on macroeconomic indicators such as GDP growth, inflation, interest rates, and exchange rates (Čihák & Hesse, 2008; Iqbal et al., 2021). Market characteristics, such as market structure, behavior, and performance, also play a pivotal role in shaping banks' resilience (Revida & Septiarini, 2017).

Most existing studies on the stability of Islamic banks have relied on widely used profitability measures such as Return on Assets (ROA) (Hasanah & Umiyati, 2024; Lassoued, 2018; Rani et al., 2024) and Returns on Equity (ROE) (Anjom & Faruq, 2023; Joudar et al., 2023; Khatib & Savoia, 2024) as proxies for profitability. Although these ratios capture overall profit performance, they rarely account for the Net Operating Margin (NOM) as a stability indicator. While ROA and ROE capture overall income generation relative to assets and equity, they mix core operating returns with one-time gains, provisioning effects, and accounting adjustments, potentially obscuring a bank's underlying resilience. In contrast, the Net Operating Margin (NOM) isolates operating profit derived strictly from financing and investment activities, Islamic banks' primary revenue drivers and excludes non-recurring items. By focusing on the ratio of net operating income to total productive assets, NOM provides a clearer signal of how efficiently Islamic banks deploy their financing portfolio and investment instruments to sustain profits under stress. In this study, we introduce NOM as the principal profitability metric for assessing bank stability, arguing that its emphasis on pure operating performance offers a more sensitive and policy-relevant indicator of an Islamic bank's capacity to absorb shocks without recourse to extraordinary accounting measures.

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Based on the foregoing, this study utilizes the recent data from 2019–2024 to assess the impact of internal and external factors on the stability of Islamic commercial banks in Indonesia. Unlike previous studies that predominantly rely on ROA or ROE as profitability indicators, this research addresses a gap by incorporating the Net Operating Margin (NOM) as an alternative proxy for profitability.

METHOD

Data and Sample Selection

This study uses a quantitative approach with panel data drawn from ten Indonesian Islamic commercial banks (Bank Muamalat, Bank Mega Syariah, Bank BCA Syariah, Bank Panin Dubai Syariah, Bank BTPN Syariah, Bank Victoria Syariah, Bank Aceh Syariah, Bank KB Syariah, Bank Jabar Banten Syariah, and Bank NTB Syariah). Observations cover quarterly data from Q1 2019 through Q4 2024. All variables are obtained as secondary data from Bank Indonesia and the Financial Services Authority (OJK).

Variables and Model Specifications

The dependent variable is banking stability, which is measured using the Z-Score. The Z-Score is a widely adopted indicator initially introduced by Boyd and Graham (1986) to capture the probability of bank failure. It combines profitability volatility (typically through return on assets), capital adequacy, and the standard deviation of returns to assess a bank's distance from insolvency. A higher Z-Score implies a lower probability of default, indicating stronger financial stability (Čihák & Hesse, 2008). This measure is particularly useful for evaluating risk in banking institutions, as it reflects both performance volatility and the strength of a bank's capital buffer in absorbing potential losses. The Z-Score is calculated using the following components:

$$Z = \frac{(ROA + CAR)}{\sigma ROA}$$

Where:

Z = Stability Index
ROA = *Return on Assets*
CAR = *Capital Adequacy Ratio*
σROA = Standard Deviation of ROA

The independent variables in this study consist of internal and external factors. Internal factors include the BOPO ratio as a proxy for banking efficiency, NPF representing credit risk, FDR as an indicator of liquidity, NOM reflecting profitability, and CAR measuring the bank's capital resilience against shocks. Meanwhile, the

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external factors are represented by macroeconomic variables such as GDP, inflation, exchange rate, and HHI. The definitions of each variable are summarized in the following table 1.

Table 1. Definition Variables

Variables	Concept	Source	Unit
BOPO (X_1)	The ratio of Operating Expenses to Operating Income is commonly used to measure a bank's operational efficiency.	OJK	(%)
NPF (X_2)	The ratio compares non-performing financing to total financing, serving as an indicator of the bank's asset quality and credit risk.	OJK	(%)
FDR (X_3)	The ratio measures the extent to which customer deposits are utilized to support financing activities, commonly referred to as the Financing-to-Deposit Ratio (FDR).	OJK	(%)
NOM (X_4)	An efficiency indicator that reflects a bank's ability to generate net operating income relative to its average productive assets	OJK	(%)
CAR (X_5)	The ratio of core and supplementary	OJK	(%)

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Variables	Concept	Source	Unit
	capital to risk-weighted assets.		
GDP (X_6)	Gross Domestic Product (GDP) Growth Rate.	BPS	(%)
Inflasi (X_7)	General increase in the prices of goods and services in an economy over a specified period.	BI	(%)
Exchange Rate (X_8)	Refers to the market price that indicates the amount of domestic currency required to obtain one unit of foreign currency, or vice versa.	BI	(IDR)
HHI (X_9)	Commonly used metric to assess market concentration by calculating the distribution of market shares among firms within an industry.	Data Processed	(Unitless)
Z-Score (Y)	Indicator used in financial literature to assess financial stability and estimate the probability of bank insolvency. $(ROA + CAR)/\sigma ROA$.	Data Processed	(Unitless)

Generally, the Z-Score variable exhibits extreme values and substantial skewness (Laeven & Levine, 2009). Therefore, in this study we apply a natural-log transformation to the Z-Score to control for distributional skewness (Dutta & Saha, 2021; Houston et al., 2010; Tan & Anchor, 2016). We apply a panel regression model with fixed effects to capture unobserved heterogeneity across banks and over time. The basic regression model used in this study is as follows:

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$$Ln(Z_{it}) = \alpha + x'_{it}\beta + \mu_i + \varepsilon_{it}$$

Where $Ln(Z_{it})$ represents the natural logarithm of the bank stability (Z-Score) for bank *i* in quarter *t*, x'_{it} is a vector of independent variables consisting of internal indicators (BOPO, NPF, FDR, NOM, CAR) and external indicators (GDP, inflation, exchange rate, HHI), μ_i denotes the bank-specific fixed effects and ε_{it} is the idiosyncratic error.

We obtain $\hat{\beta}_{FE}$ via the within estimator, $\hat{\beta}_{FE} = (X'MX)^{-1}X'MY$, $M = I - D_b(D_b'D_b)^{-1}D_b'$, where D_b is the dummy matrix for banks. To ensure robust inference under heteroskedasticity, serial correlation, and cross-sectional dependence, this study applies the Driscoll–Kraay standard error estimator which developed by (Hoechle, 2007). The robust variance estimator of Driscoll–Kraay is formulated as follows:

$$\widehat{Var}_{DK} = (X'MX)^{-1}\left(\sum_{k=-(T-1)}^{T-1} \omega_k \hat{\Gamma}(k)\right)(X'MX)^{-1}$$

Where $\hat{\Gamma}(k) = \sum_{t=|k|+1}^{T} X'M\hat{\varepsilon}_t\hat{\varepsilon}'_{t-k}MX_{t-k}$ represents the covariance of residuals across time, and $\omega_k = 1 - \frac{|k|}{L+1}$ is the Bartlett kernel weight with lag truncation parameter $L = [1.2T^{1/3}]$. Using the Driscoll–Kraay correction ensures that the standard errors of the regression coefficients are robust to heteroskedasticity, serial correlation, and cross-sectional dependence in panel data. The t-statistic is then computed as:

$$t_j = \frac{\hat{\beta}_j}{Var_{DK}(\hat{\beta}_j)}$$

RESULTS AND DISCUSSION

Descriptive Analysis

Table 2. Descriptive Analysis

Variables	Obs	Mean	Std. Deviation	Min	Max
Ln(Z)	240	3.93	1.18	1.89	6.71
BOPO	240	87.37	16.85	54.85	206.19
NPF	240	1.55	1.53	0.00	4.98
FDR	240	84.40	20.56	38.33	196.73
NOM	240	1.68	3.31	-8.71	14.97
CAR	240	29.40	16.29	12.01	149.68
GDP	240	3.69	3.12	-5.32	7.08
Inflation	240	2.79	1.28	1.33	5.95

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Variables	Obs	Mean	Std. Deviation	Min	Max
Exchange Rate	240	14903	732.31	13880	16370
HHI	240	1512	237.39	1248	2027

Based on the table 2, Z-Score values ranged from 1.89 to 6.71, with a mean of 3.93 and a standard deviation of 1.18, indicating generally sound stability and low variation across banks. BOPO lay between 54.85 % and 206.19 %, averaging 87.37 % (SD = 16.85), which reflects moderate differences in operational efficiency. NPF ranged from 0.00 % to 4.98 %, with a mean of 1.55 % and SD of 1.53, suggesting that credit risk was largely under control but varied moderately. FDR spanned 38.33 % to 196.73 %, with an average of 84.58 % and SD of 20.56, signaling variation in intermediation effectiveness. NOM recorded a low of −8.71 % and a high of 14.97 %, averaging 1.68 % (SD = 3.31), which implies that some banks experienced operating losses and profitability varied considerably. CAR fell between 12.01 % and 149.68 %, with a mean of 29.40 % and SD of 16.29, reflecting generally robust capitalization but notable interbank differences.

On the macroeconomic side, GDP growth moved from a contraction of −5.32 % to an expansion of 7.08 %, averaging 3.69 % with an SD of 3.12—indicating moderate fluctuations over the observation period. Inflation ranged from 1.33 % to 5.95 %, with a mean of 2.79 % (SD = 1.28), denoting relatively stable price levels. The IDR/USD exchange rate varied between Rp 13,880 and Rp 16,370, averaging Rp 14,903 (SD = 732.31), which points to moderate currency fluctuations. Finally, the HHI (Herfindahl–Hirschman Index) lay between 1,248 and 2,027, with a mean of 1,512 and SD of 237.39, suggesting a relatively competitive banking market with acceptable variation in market concentration.

Panel Data Estimation

Chow Test

Table 3. Chow Test

Effect Test	Statistic	df	Sig.
Cross-Section F	1707.63	(9, 221)	0.0000

Based on the Chow test results reported in Table 3, the p-value is below 0.05, leading us to reject H_0. Consequently, the Fixed-Effects specification is statistically preferred. The analysis then proceeds with the Hausman test to decide between the Fixed Effects and Random Effects models.

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Hausman Test

Table 4. Hausman Test

Test Summary	Chi-Sq. Statistic	df	Sig.
Cross-Section Random	35.07	5	0.000

Based on the Hausman test results shown in Table 4, the p-value exceeds 0.05, so we fail to reject H_0 and conclude that the Fixed-Effects model is statistically more appropriate. Therefore, both the Chow and Hausman tests consistently indicate that the Fixed-Effects specification is the best estimation model for this study.

Diagnostic Test

Multicollinearity Test

Table 5. Multicollinearity Test

Variables	VIF	1/VIF
BOPO(X_1)	2.55	0.39
NPF(X_2)	1.80	0.55
FDR(X_3)	1.22	0.82
NOM(X_4)	2.55	0.39
CAR(X_5)	1.47	0.68
GDP(X_6)	1.32	0.75
Inflation(X_7)	1.26	0.79
Exchange Rate(X_8)	1.50	0.66
HHI(X_9)	1.78	0.56

Based on the multicollinearity results shown in Table 5, all independent variables exhibit VIF values below the critical threshold of 5 (Belsley et al., 1980). This finding indicates that no serious multicollinearity is present to compromise the regression model. Consequently, the model is deemed appropriate for further analysis.

Heteroskedasticity Test

Table 6. Heteroskedasticity Test

Chi-Sq.	df	Sig.
1651.64	10	0.0000

Based on the heteroskedasticity assessment in Table 6 using the Modified Wald test, a Chi-square statistic of 1,651.64 was obtained with a p-value of 0.00. Since the p-value is well below the 0.05 significance level, H_0 is rejected, indicating that the

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residual variances are not constant and that heteroskedasticity is present (Mehmood & Mustafa, 2014).

Serial Correlation Test

Table 7. Serial Correlation Test

F	df	Sig.
53.090	(1,9)	0.0000

Based on the Wooldridge test for autocorrelation reported in Table 7, the F-statistic is 53.090 with a p-value below 0.05. Since the p-value is far smaller than the $\alpha = 0.05$ threshold, we reject H_0, indicating the presence of autocorrelation in the regression model (Mehmood & Mustafa, 2014).

Regression Estimation Result

Diagnostic tests revealed the presence of heteroskedasticity and autocorrelation. When these issues occur, the standard errors of the estimated coefficients become biased, potentially invalidating the t-tests and rendering hypothesis testing unreliable. The following presents a comparison between Driscoll-Kraay estimates and fixed effect show in table 8.

Table 8. Regression Result

	Fixed-Effect	Fixed Effect + Driscroll-kraay
(Intercept)	4.3334*** (0.237)	4.3334*** (0.210)
BOPO(X_1)	-0.0021* (0.000)	-0.0021* (0.000)
NPF(X_2)	-0.0673*** (0.010)	-0.0673** (0.000)
FDR(X_3)	-0.0007 (0.000)	-0.0007 (0.000)
NOM(X_4)	0.0152 (0.007)	0.0152** (0.004)
CAR(X_5)	0.0167*** (0.000)	0.0167*** (0.002)
GDP(X_6)	0.0011 (0.002)	0.0011 (0.003)
Inflation(X_7)	-0.0174** (0.006)	-0.0174* (0.007)
Exchange Rate(X_8)	-1.76e-05 (0.000)	-1.76e-05 (0.000)
HHI(X_9)	-0.0001*** (0.000)	-0.0001*** (0.000)

The coefficient for BOPO is –0.0021, indicating that a one percentage point increase in BOPO is associated with an approximate 0.21% decrease in the Z-Score, holding other variables constant. In the initial estimate, this effect was significant ($t = -2.42$, $p = 0.016$), after applying Driscoll–Kraay standard errors, the coefficient remains –0.0021 and is still significant ($t = -2.79$, $p = 0.011$). For NPF, the coefficient is –0.0673, meaning that a one percentage point rise in NPF corresponds to an approximate 6.73% reduction in the Z-Score. Initially, the effect was significant ($t = -6.17$, $p < 0.001$), with Driscoll–Kraay errors, it remains –0.0673 and continues to be

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significant (t = –3.49, p = 0.002). The FDR coefficient is –0.0007, suggesting that a one percentage point increase in FDR is linked to an approximate 0.07% decline in the Z-Score. In the basic model, this was not significant (t = –1.33, p = 0.185), and after correction it remains non-significant (t = 0.76, p = 0.445). NOM shows a coefficient of 0.0152, indicating that a one percentage point increase in net operating margin tends to raise the Z-Score by approximately 1.52%. Originally marginally non-significant (t = 1.93, p = 0.055), it becomes significant after Driscoll–Kraay correction (t = 3.33, p = 0.003). For CAR, the coefficient is 0.0167, meaning that a one percentage point increase in CAR increases the Z-Score by approximately 1.67%. It was highly significant both before (t = 23.15, p < 0.001).

GDP has a coefficient of 0.0011, implying a positive but non-significant effect on the Z-Score approximately **0.11% increase** per one percentage point rise in GDP (initially t = 0.42, p = 0.674, after correction t = 0.36, p = 0.720). Inflation's coefficient is –0.0174, so a one percentage point increase in inflation reduces the Z-Score by approximately 1.74%. This negative effect remains significant before (t = –2.79, p = 0.006) and after Driscoll–Kraay correction (t = –2.23, p = 0.036). The exchange rate coefficient is –0.00001, suggesting that each one unit depreciation of the rupiah lowers the Z-Score by approximately 0.001%, a negligible effect. This effect is not significant either before (t = –1.49, p = 0.136) or after correction (t = –1.64, p = 0.144). Finally, HHI has a coefficient of –0.0001, indicating that a one unit increase in market concentration reduces the Z-Score by approximately 0.01%. It is highly significant in both the initial estimate (t = –4.04, p < 0.001).

Discussion

This study finds that the BOPO coefficient is –0.0021, indicating that a one percentage point increase in the BOPO ratio is associated with an approximate 0.21% decrease in the Z-Score. With a p-value of 0.010 (<0.05), this negative effect is statistically significant. The result supports the findings of Fatoni & Sidiq (2019) and (Ramadhina et al. (2024), who argue that operational inefficiency weakens a bank's capacity to absorb shocks, increasing its vulnerability to liquidity and solvency risks. According to efficiency theory, optimal resource allocation enables banks to reduce costs, enhance income, and strengthen capital buffers. In contrast, a higher BOPO ratio signals inefficiency and resource wastage, which erodes reserves and diminishes the bank's loss-absorbing capacity.

The coefficient for Non-Performing Financing (NPF) is –0.0678 (p = 0.020), suggesting a statistically significant negative relationship. A one percentage point increase in the NPF ratio is associated with an approximate 6.78% decrease in the Z-Score, implying that deteriorating asset quality directly undermines the bank's resilience against insolvency. In practical terms, this means that higher credit risk reflected by deteriorating asset quality, directly erodes the buffer the bank holds against insolvency. This finding is consistent with Hasnani (2022), who demonstrated that NPF significantly affects Islamic banks in both the short and long term. NPF

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reduces profitability as many customers fail to meet repayment obligations. Furthermore, Hamda & Sudarmawan (2023), found that NPF negatively impacts long-term stability, emphasizing the need for effective management strategies to mitigate financing risks

The coefficient for the Financing-to-Deposit Ratio (FDR) is –0.0008 and statistically insignificant ($p = 0.55 > 0.05$), indicating no systematic linear relationship between FDR and Islamic commercial bank stability. This result may reflect the effectiveness of regulatory liquidity frameworks, which require banks to maintain minimum reserve ratios and liquidity buffers. With a sample mean FDR of 84.4%, well below Indonesia's regulatory ceiling of 110% under BI Regulation No. 26/5/BPPP (29 May 1993) most banks operate within a stable funding zone. This finding contrasts with Ajizah & Widarjono (2023) and Munandar (2022), who reported a significant positive effect of FDR on bank stability.

Net Operating Margin (NOM) has a positive coefficient of 0.0130 and is statistically significant ($p = 0.003$). This implies that a one percentage point increase in the NOM is associated with an approximate 1.30% rise in the Z-Score. Net Operating Margin (NOM) reflects the profitability of a bank's productive (earning) assets in generating net income. A high NOM indicates strong operational performance and robust profitability, which can be allocated as a buffer for future operations or as protection against external shocks. Profitability is a critical determinant of bank resilience (Ramadani et al., 2025).

The Capital Adequacy Ratio (CAR) shows a coefficient of 0.0167 and is highly significant ($p <0.001$) suggesting a strong positive relationship with Islamic commercial bank stability. Each one percentage point increase in CAR is associated with an approximate 1.67% rise in the Z-Score, indicating that well-capitalized banks possess greater loss-absorbing capacity. CAR measures a bank's ability to withstand risks arising from its operational and lending activities (Hassan et al., 2016; Ozili, 2018). To maintain stability, banks must allocate sufficient capital to cover potential losses from excessive risk-taking. These findings are consistent with Daoud & Kammoun (2020) and Jouini et al. (2021), who emphasize CAR as a critical buffer that determines a bank's capacity to absorb external shocks and maintain financial stability.

Regarding macroeconomic variables, GDP has a small positive coefficient (0.0010) but is statistically insignificant ($p = 0.658 > 0.05$), indicating no clear linear relationship between GDP growth and Islamic commercial bank stability. This null finding persists despite substantial economic variability in the data, with GDP growth ranging from -5.32% (indicating severe contraction) to 7.08% (robust expansion), and a sample mean of 3.69% reflecting moderate growth conditions. This finding contrasts with Karim et al. (2016) and Rani et al. (2024), who found a significant positive effect of GDP on bank stability. Sustained GDP growth generally enhances

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macroeconomic stability and reduces operational and credit risks (Anjom & Faruq, 2023).

The inflation coefficient is −0.0176 (p = 0.020), indicating a statistically significant negative effect. A one percentage point increase in the inflation rate is associated with an approximate 1.76% decrease in the Z-Score. High inflation reduces real income and purchasing power, weakening both financial and real sector performance. It may discourage saving, promote excessive consumption, increase deposit withdrawals, and trigger speculative behavior (Dornbusch & Fischer, 1992). These implications can disrupt banks' intermediation functions and trigger shocks that undermine banking stability. This result aligns with Paltrinieri et al. (2021) and Maudy et al. (2024), who also found a negative impact of inflation on bank stability.

The exchange rate coefficient is 0.00001 and statistically insignificant (p = 0.144), suggesting that nominal exchange-rate fluctuations do not significantly affect the Z-Score of Islamic commercial banks. This may be due to the asset-backed financing principles in Islamic banking, which limit speculative exposure. Moreover, only a few Islamic commercial banks such as Bank Muamalat, Bank Mega Syariah, and Bank Panin Dubai Syariah are licensed for foreign exchange operations. This finding contrasts with Dewi & Saraswati (2023) and Fauzukhaq et al. (2020), who report a significant negative effect of exchange rate movements on the stability of Islamic banks.

the Herfindahl–Hirschman Index (HHI) has a coefficient of −0.0001 and is statistically significant (p = 0.001), indicating that market concentration negatively affects bank stability. The mean HHI of 1,512 reflects moderate concentration and a trend toward more dispersed market shares. This decline in concentration enhances stability by reducing systemic linkages and encouraging competitive risk management. The result supports Čihák & Hesse (2008) and Rajhi & Hassairi (2013), who found that higher market concentration undermines the stability of Islamic banks.

CONCLUSION

This study investigates the determinants of Islamic bank stability in Indonesia over the 2019–2024 period using a panel fixed-effects model with Driscoll–Kraay standard errors. We find that operational efficiency (BOPO) and credit quality (NPF) exert significant negative effects on stability, while capital adequacy (CAR) delivers a significant positive impact. Inflation also undermines stability with a negative coefficient, whereas profitability (NOM) is positively and significantly associated with resilience. Liquidity deployment (FDR) and exchange-rate volatility carry negative coefficients but do not reach statistical significance, and macroeconomic growth (GDP) shows a positive yet insignificant effect. Market concentration, as measured by the Herfindahl–Hirschman Index (HHI), negatively and significantly affects bank

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stability. These results suggest that Islamic banks should priorities cost control, asset-quality management, profitability enhancement, and robust capital buffers to strengthen resilience, while policymakers should closely monitor efficiency, non-performing financing ratios, inflation, and market concentration to sustain sector stability.

For future research, the scope of Islamic banking can be expanded by including Sharia Business Units (UUS) and extending the time period to enhance the comprehensiveness of the analysis. In addition, external variables such as the impact of corruption levels on banking stability should be considered, especially given Indonesia's relatively high corruption rate. From a methodological perspective, applying a dynamic panel model such as the Generalized Method of Moments (GMM) is recommended to address potential endogeneity issues.

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