

NPF AS A MODERATOR OF INTERNAL AND EXTERNAL FACTORS ON TOTAL ASSETS: EVIDENCE FROM ISLAMIC COMMERCIAL BANKS IN INDONESIA 2011-2024

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Abstract

This study examines the role of Non-Performing Financing (NPF) as a risk-based moderating mechanism in shaping the relationship between internal bank conditions, external macroeconomic factors, and total asset in Indonesian Islamic commercial banks. Drawing on financial intermediation and risk management theory, the study argues that the effectiveness of liquidity, capitalization, and macroeconomic stability in driving asset expansion depends critically on credit risk conditions. Using monthly time-series data from 2011 to 2024 and a causal quantitative framework, the analysis evaluates how key internal factors (Financing to Deposit Ratio and Capital Adequacy Ratio) and an external factor (exchange rate) influence total assets under varying levels of NPF. The results show that while internal and external factors positively contribute to asset growth, NPF significantly weakens the impact of liquidity, capital adequacy, and exchange rate movements on total assets, indicating that rising credit risk constrains the transmission of financial and macroeconomic strengths into balance sheet expansion. Conversely, the moderating role of NPF is not evident in profit-sharing financing. These findings provide novel empirical evidence that credit risk does not merely affect bank performance directly but systematically alters the effectiveness of core total asset drivers in Islamic banking. From a policy perspective, the results underscore that asset growth strategies in Islamic banks must be accompanied by strengthened risk governance and financing quality controls to ensure sustainable expansion, particularly during periods of macroeconomic volatility.

Keywords: CAR, FDR, Mudharabah, Exchange Rate, NPF, Total Assets of Islamic Commercial Banks.

Abstrak

Penelitian ini mengkaji peran Non-Performing Financing (NPF) sebagai mekanisme moderasi berbasis risiko dalam membentuk hubungan antara kondisi internal bank, faktor makroekonomi eksternal, dan total aset pada bank umum syariah di Indonesia. Berlandaskan teori intermediasi keuangan dan manajemen risiko, penelitian ini berargumen bahwa efektivitas likuiditas, permodalan, dan stabilitas makroekonomi dalam mendorong pertumbuhan aset sangat bergantung pada kondisi risiko pembiayaan. Dengan menggunakan data runtut waktu bulanan periode 2011–2024 dan pendekatan kuantitatif kausal, analisis dilakukan untuk mengevaluasi pengaruh faktor internal utama, yaitu Financing to Deposit Ratio (FDR) dan Capital Adequacy Ratio (CAR), serta faktor eksternal berupa nilai tukar, terhadap total aset pada tingkat NPF yang berbeda. Hasil

penelitian menunjukkan bahwa meskipun faktor internal dan eksternal berkontribusi positif terhadap pertumbuhan aset, NPF secara signifikan melemahkan pengaruh likuiditas, kecukupan modal, dan pergerakan nilai tukar terhadap total aset, yang mengindikasikan bahwa peningkatan risiko pembiayaan membatasi transmisi kekuatan finansial dan makroekonomi ke dalam ekspansi neraca bank. Sebaliknya, peran moderasi NPF tidak ditemukan pada pembiayaan berbasis bagi hasil. Temuan ini memberikan bukti empiris baru bahwa risiko pembiayaan tidak hanya memengaruhi kinerja bank secara langsung, tetapi juga secara sistematis mengubah efektivitas faktor-faktor utama pendorong total aset dalam perbankan syariah. Dari sisi kebijakan, hasil penelitian menegaskan bahwa strategi pertumbuhan aset bank syariah harus disertai dengan penguatan tata kelola risiko dan peningkatan kualitas pembiayaan guna menjamin pertumbuhan yang berkelanjutan, khususnya pada periode volatilitas makroekonomi.

Kata Kunci: CAR, FDR, Mudharabah, Nilai Tukar, NPF, Total Aset Bank Umum Syariah.

INTRODUCTION

Islamic Commercial Banks (BUS) in Indonesia face a fundamental paradox: despite consistent asset growth from IDR 7.8 trillion (2003) to IDR 955.2 trillion (2024), their market share remains stagnant below 8% of total national banking assets, far behind Conventional Commercial Banks' IDR 12,460.9 trillion (OJK, 2024). This persistent underperformance contradicts Indonesia's position as the world's largest Muslim-majority nation and its 9th rank globally in Islamic banking with 6.1% market share (Kristianingsih et al., 2022). While the upward trend highlights the significant contribution of Islamic banking in supporting national economic development, aligning with Kchouri & Lehnert (2020) findings that identified a positive relationship between the expansion of Islamic bank assets and economic growth, the reality reveals a critical structural weakness. According to Schumpeter, (1983) theory of economic development, the growth of banking assets reflects the efficiency of financial intermediation, the strength of risk management practices, and the institution's ability to adapt to changing economic conditions, yet Islamic banks demonstrate growth without proportional systemic relevance. This is supported by Antonio, (2001) and Ascarya et al., (2022), who found that the growth of Islamic Commercial Bank assets is closely related to the effectiveness of financing and risk management, while Sari, (2018) emphasized that the increasing number of sharia financial institutions has also led to a rise in the total assets of the sharia financial industry. The critical question emerges: what internal and external factors truly determine Islamic banking asset growth, and how does financing risk moderate these relationships? This urgency is amplified by the concerning reality that while absolute

growth appears robust with a 15.87% increase in 2022 (Nada, 2024), the structural contribution to national financial intermediation remains marginal, suggesting that asset expansion alone does not translate into systemic relevance or competitive strength against conventional banking dominance.

The existing literature reveals three critical empirical inconsistencies across key determinants of total assets that demand systematic resolution through moderation analysis. First, regarding mudharabah financing as a profit-sharing mechanism central to Islamic banking's productive intermediation function, Antonio, (2001) stated that an increase in mudharabah financing leads to a corresponding rise in the bank's total assets, and this aligns with the study by Munir & Bhutta, (2023) which found a significant relationship between profit-sharing contracts and asset growth. However, Nazir et al., (2021) reported contrasting results without explaining this divergence, suggesting an unmapped moderating mechanism where Non-Performing Financing (NPF) potentially weakens mudharabah's contribution through profit-sharing risk channels. This inconsistency is particularly significant given that mudharabah comprises less than 20% of total Islamic banking financing while trade-based murabahah dominates over 60% (OJK, 2024), indicating structural underutilization of productive financing. Second, concerning liquidity management measured through the Financing to Deposit Ratio (FDR), which according to Allen & Santomero, (1997) in *The Theory of Financial Intermediation* reflects the effectiveness of a bank's capability to efficiently convert third-party funds into productive financing, Ma'aji et al., (2025) confirmed that a higher FDR ratio reflects more efficient financing allocation which enhances profitability and contributes to the growth of total assets. Atahau et al., (2025) found opposing evidence, indicating that rising NPF may diminish FDR's effectiveness by constraining liquidity allocation to productive financing rather than risk absorption.

Third, on capital adequacy measured through the Capital Adequacy Ratio (CAR), which as highlighted in Berger, (1995) *Capital Buffer Theory* posits that strong capitalization enables banks to expand their asset base and absorb potential risks, empirical findings diverge sharply. The CAR serves as an indicator of a bank's capacity to fulfill its capital obligations (Kholbi & al., 2021), with capital representing the owners' equity in the institution (Widyastuti, 2018). Supporting the positive relationship, Yasin et

al., (2025) found that CAR significantly affects total assets, while Fikri, (2021) reported otherwise. Additionally, regarding external macroeconomic factors, the exchange rate's influence on total banking assets remains disputed. According to Financial Development Theory (Schumpeter, 1983), the banking sector plays an essential role in economic growth through financing and capital accumulation, where exchange rate stability is a key factor because its fluctuations affect transaction costs, capital flows, and the bank's balance sheet. Studies by Sahoo, (2025), Abbasi et al., (2025), as well as Kelmendi, (2024) reveal that the exchange rate has a significant impact on total assets, whereas Crowley, (2015) reported contrasting results. Moreover, the Non-Performing Financing (NPF) ratio, which represents the level of problematic financing, also influences the effectiveness of a bank's intermediation function. Based on the Credit Risk Theory proposed by Gorton & Winton, (2003), an increase in the NPF ratio leads to greater disruption in the intermediation process and hinders asset growth, with empirical evidence from Mahendra & Musthofa, (2023) along with Gupta & Bansal, (2024) confirming that NPF exerts a significant negative effect on the asset growth of Islamic banks. These contradictions collectively indicate that NPF's moderating role across multiple determinants, not merely as a direct predictor of asset quality, has been systematically ignored, creating a critical gap in understanding why Islamic banking asset expansion remains structurally constrained despite favorable absolute growth trends.

This study advances beyond existing literature by repositioning NPF from a standalone risk variable to a comprehensive moderating framework that fundamentally alters how mudharabah financing, FDR, CAR, and exchange rate influence total assets, integrating three theoretical foundations where Financial Intermediation Theory (Allen & Santomero, 1997; Diamond, 1984; Hellwig, 1990) explains mudharabah and FDR as core intermediation functions whose asset-generating capacity depends on NPF-mediated credit quality that either facilitates or disrupts delegated monitoring efficiency (Gorton & Winton, 2003; Pagano, 2001), Capital Buffer Theory (Berger, 1995) demonstrates CAR's protective function is contingent on NPF levels as high financing risk diverts capital toward loss provisions rather than productive growth aligning with Islamic principles of trustworthy fund management (Kholbi & al., 2021; Widyastuti, 2018), and Financial Development Theory (Gurley, 1960; Schumpeter, 1983) reveals exchange rate stability's

growth impact is moderated by NPF as financing risk amplifies external shock vulnerabilities creating compounding pressures through currency effects and credit deterioration. Unlike prior studies treating NPF in isolation (Gupta & Bansal, 2024; Mahendra & Musthofa, 2023) or examining single moderation effects (Barizi et al., 2022; Febrianti et al., 2024; Suaeb & Fajar, 2023), this research theorizes NPF as a dynamic risk filter conditioning both internal mechanisms and external exposures across all determinants simultaneously, testing eight hypotheses in dual tiers where direct effects examine mudharabah, FDR, CAR, and exchange rate positively influencing total assets through productive allocation, intermediation efficiency, capital strength, and macroeconomic stability (Allen & Santomero, 1997; Berger, 1995; Diamond, 1984; Schumpeter, 1983), while moderation effects test whether NPF weakens these relationships by increasing moral hazard in profit-sharing, forcing liquidity into loss absorption, diverting capital buffers to allowance provisions, and compounding depreciation pressures with financing defaults (Gorton & Winton, 2003).

This framework systematically resolves contradictions between (Antonio, 2001) and (Nazir et al., 2021) on mudharabah or Ma'aji et al., (2025) and Atahau et al., (2025) on FDR by identifying omitted moderation variables, addressing the academic urgency of whether Islamic banking's structural weakness (persistent 8% market share despite favorable demographics) stems from financing composition inefficiency (mudharabah below 20% versus murabahah exceeding 60%) or risk management failure (NPF volatility 2.04% to 6.17% during 2013-2018), with immediate policy implications that if NPF weakens CAR and FDR effectiveness regulators must prioritize financing quality over capital accumulation as buffers cannot drive expansion when risk diverts resources to provisions, while if mudharabah remains insignificant even under low NPF conditions structural reforms require fundamental redesign including regulatory incentives, digital monitoring, or alternative governance mechanisms (Imsar et al., 2022; Osundina et al., 2016), employing monthly time series data 2011-2024 with NPF interaction terms to capture temporal moderation dynamics across economic cycles including COVID-19 pandemic, exchange rate crises, and regulatory shifts addressing cross-sectional limitations.

This investigation establishes that the 8% market share ceiling facing Indonesian Islamic banking represents a systematic risk-intermediation inefficiency that NPF moderation analysis can empirically expose and quantify, moving beyond the time-and-organic-growth narrative to address fundamental structural constraints. The expected scholarly contributions include theoretical advancement by demonstrating NPF as a conditional variable that fundamentally reshapes established finance theories' predictions in Islamic banking contexts, transforming understanding from static linear relationships to dynamic risk-contingent associations; empirical resolution of contradictory findings across mudharabah, FDR, CAR, and exchange rate studies through systematic moderation analysis that prior research overlooked by treating NPF only as a direct predictor rather than examining its interaction effects with core determinants; methodological innovation by integrating time series interaction modeling to capture how financing risk moderates determinant effectiveness across economic cycles, providing more robust evidence than cross-sectional approaches that cannot account for temporal variations in risk quality; and policy guidance specifying whether growth strategies should prioritize risk quality improvement, capital strengthening, liquidity optimization, or macroeconomic stability management based on empirically validated moderation patterns showing which pathways NPF constrains most severely. These contributions directly address the identified research gap by providing the first comprehensive analysis of NPF as a systematic moderator rather than isolated outcome variable, offering both theoretical insights into Islamic banking's structural challenges and practical recommendations for enhancing asset growth effectiveness through targeted risk management interventions aligned with empirically validated moderation mechanisms, ultimately enriching academic understanding and providing practical insights for regulators and bank management in improving financial intermediation, maintaining stability, and strengthening the competitiveness of the Islamic banking industry in Indonesia.

LITERATURE REVIEW

Financial Intermediation Theory

The Financial Intermediation Theory (Diamond, 1984) describes banks as intermediaries that transfer funds from surplus units to deficit units while managing risks through delegated monitoring (Allen & Santomero, 1997), thereby improving market efficiency and ensuring financial system liquidity (Hellwig, 1990). Within the framework of Islamic Commercial Banks, this intermediary role is carried out through mudharabah contracts, which allocate funds to the real sector based on profit-sharing principles. The Financing to Deposit Ratio (FDR) reflects the efficiency of fund allocation, the Capital Adequacy Ratio (CAR) indicates the bank's capital strength, and Non-Performing Financing (NPF) represents the level of financing risk that may reduce the quality of intermediation (Gorton & Winton, 2003b; Pagano, 2001). Prophet Muhammad SAW emphasized the importance of believers who uphold integrity, competence, and responsibility in every task. He valued individuals who are honest, trustworthy, professional, and courageous in making decisions according to their abilities. These virtues are considered essential keys to success in all aspects of life, including business and economic activities (Khusnudin, 2020). This perspective is in harmony with Islamic teachings that stress justice and trustworthiness, as stated in QS. An-Nisa: 58, where managing collected funds is viewed as a trust that must be handled fairly and wisely. Therefore, the Financial Intermediation Theory provides a strong theoretical foundation that the growth of Islamic bank assets is driven by productive financing (mudharabah), capital adequacy (CAR), and liquidity (FDR), with NPF acting as a moderating factor influencing the effectiveness of intermediation within Indonesia's Islamic banking system.

Financial Development Theory

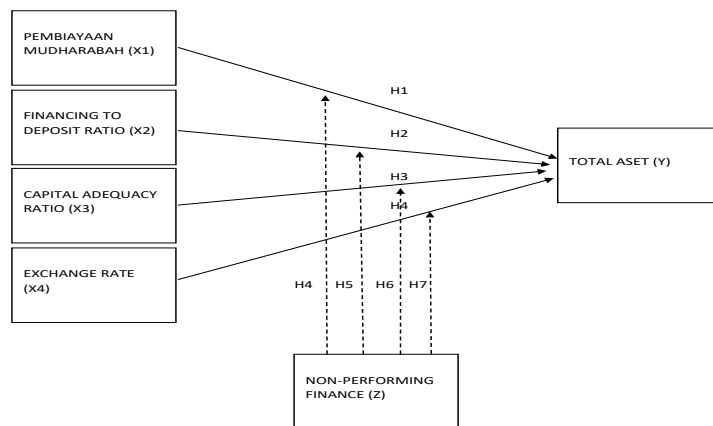
According to the Financial Development Theory introduced by Schumpeter, (1983), the banking industry holds a vital position in driving economic growth by ensuring efficient allocation of financing and the accumulation of productive capital. The theory highlights that progress in the financial sector, especially in banking, can stimulate innovation, encourage investment, and increase productivity by directing funds toward

sectors with strong growth prospects. Therefore, the advancement of financial intermediation not only strengthens economic stability but also functions as a key engine for achieving sustainable economic development.

Money in a Theory of Finance

According to Gurley, (1960) in Money in a Theory of Finance, financial institutions function not only as intermediaries that facilitate the flow of funds between surplus and deficit units but also as entities that manage the accumulation of assets and liabilities, which collectively shape and determine the financial strength of an institution. Through this role, financial institutions help maintain monetary stability and improve the efficiency of resource allocation, thereby reinforcing the contribution of the financial sector to economic growth and the resilience of banking institutions. Building upon the theoretical framework and prior empirical findings on the effects of Mudharabah Financing, CAR, FDR, and the exchange rate on the total assets of Islamic commercial banks at the national level, while taking into account the moderating influence of the NPF variable, the conceptual flow of this research can be outlined as follows:

Figure 1.1 Kerangka Konseptual



Source: Processed by researchers, 2025

Relations Between Variables

The Impact of Mudharabah Financing on Total Assets of General Islamic Banks in Indonesia

According to Financial Intermediation Theory (Diamond, 1984), productive financing like mudharabah is the core function of a bank in driving asset growth. Antonio, (2001) explained that through the profit-sharing mechanism, mudharabah financing can increase the asset portfolio and expand the investment of Islamic banks. The larger the distribution of funds in this contract, the higher the total assets owned. This is reinforced by the findings of Munir & Bhutta, (2023), which show that mudharabah financing significantly influences the increase in total assets of General Islamic Banks.

H1: Mudharabah Financing Has an Influence on Total Assets of General Islamic Banks in Indonesia

The Influence of Financing to Deposit Ratio (FDR) on Total Assets of General Islamic Banks in Indonesia

The Financing to Deposit Ratio (FDR) indicates a bank's capability to convert third-party funds into financing activities. According to Allen & Santomero, (1997) in *The Theory of Financial Intermediation*, the effectiveness of a bank's intermediation process can be evaluated by how efficiently it channels collected funds into productive uses. This ratio reflects the extent to which a bank relies on financing as a key source of liquidity (Ariani et al., 2022). An increase in FDR signifies more effective and efficient financing distribution, which in turn enhances profitability and stimulates asset growth. The findings of Ma'aji et al., (2025) confirm that FDR has a significant positive impact on the growth of total assets in Islamic Commercial Banks.

H2: Financing to Deposit Ratio Has an Influence on Total Assets of General Islamic Banks in Indonesia

The Influence of Capital Adequacy Ratio (CAR) on Total Assets of General Islamic Banks in Indonesia

Another important determinant of Islamic banks' total assets is capital adequacy. According to the Capital Buffer Theory proposed by (Berger, 1995), a strong capital base

enables banks to expand their assets while managing intermediation risks effectively. Capital adequacy is assessed through the Capital Adequacy Ratio (CAR), which indicates a bank's capability to maintain sufficient capital to support its operations and withstand potential risks (Kholbi & al., 2021). Capital represents the ownership interest in the institution and serves as the foundation for attracting third-party funds (Widyastuti, 2018). A higher CAR demonstrates a greater ability of banks to increase their asset base and improve profitability. Empirical findings from Yasin et al., (2025) reveal that CAR has a significant impact on the total assets of Islamic Commercial Banks.

H3: Capital Adequacy Ratio Has an Influence on Total Assets of General Islamic Banks in Indonesia

The Influence of Exchange Rates on Total Assets of General Islamic Banks in Indonesia

According to Financial Development Theory proposed by Schumpeter, (1983), the banking sector plays an important role in driving economic growth through financial intermediation functions and capital accumulation. Exchange rate stability is a crucial factor as exchange rate fluctuations can affect transaction costs, capital flows, and the bank's financial balance. Rupiah depreciation can increase default risk for debtors with foreign currency obligations, ultimately suppressing financing quality and hindering asset growth. Conversely, Rupiah appreciation strengthens purchasing power and boosts market confidence, thereby positively impacting banking asset expansion. Empirical findings by Sahoo, (2025), Abbassi & Bräuning, (2023), as well as Kelmendi, (2024) show that exchange rates significantly influence bank total assets.

H4: Exchange Rates Influence Total Assets of General Islamic Banks in Indonesia.

The Effect of Mudharabah Financing on Total Assets Moderated by NPF at Islamic Commercial Banks in Indonesia

Non-Performing Financing (NPF) represents the proportion of problematic financing that may undermine the effectiveness of a bank's intermediation role. Based on the Credit Risk Theory proposed by (Gorton & Winton, 2003), the quality of financial intermediation largely depends on how well management controls credit risk, as a higher

NPF ratio increases the likelihood of disruptions in fund distribution and hampers asset growth. Studies by Mahendra & Musthofa, (2023) as well as Gupta & Bansal, (2024) indicate that NPF has a significant negative impact on both asset growth and the efficiency of Islamic banking intermediation, emphasizing that financing risk is a crucial factor influencing banking stability. Furthermore, Febrianti et al., (2024) discovered that NPF can act as a moderating variable in the relationship between mudharabah financing and total assets. Based on these insights, the research hypothesis can be formulated as follows.

H5: NPF Can Moderate the Influence of Mudharabah Financing on Total Assets in Islamic Commercial Banks in Indonesia

The Effect of Financing to Deposit Ratio (FDR) on Total Assets Moderated by NPF at Islamic Commercial Banks in Indonesia

Non-Performing Financing (NPF) represents the level of financing risk that can hinder the efficiency of a bank's intermediation process. According to the Credit Risk Theory formulated by Gorton & Winton, (2003), an increase in NPF raises the likelihood of disruptions in fund distribution and slows down asset expansion. Empirical studies by Mahendra & Musthofa, (2023) as well as Gupta & Bansal, (2024) demonstrate that NPF has a significant negative impact on the asset growth of Islamic banks, while Suaeb & Fajar, (2023) highlight its moderating role in weakening the influence of FDR, CAR, DPK, and liquidity on profitability. Therefore, maintaining effective control over NPF is essential to achieving optimal asset growth in Islamic banking institutions.

H6: NPF Can Moderate the Influence of FDR on Total Assets in Islamic Commercial Banks in Indonesia

The Effect of Capital Adequacy Ratio (CAR) on Total Assets Moderated by NPF at Islamic Commercial Banks in Indonesia

Non-Performing Financing (NPF) represents the level of financing risk that diminishes the effectiveness of a bank's intermediation activities. According to the Credit Risk Theory by Gorton & Winton, (2003), a higher NPF ratio increases the likelihood of disruptions in fund allocation and hampers asset expansion. Findings from Mahendra &

Musthofa, (2023) as well as Gupta & Bansal, (2024) reveal that NPF has a significant negative impact on asset growth and the efficiency of Islamic bank intermediation. In addition, research by Barizi et al., (2022) indicates that NPF can act as a moderating variable in the relationship between CAR and a bank's financial performance, while Imsar et al., (2022) discovered that NPF weakens the influence of CAR on financial performance. Therefore, from a theoretical perspective, NPF is also likely to moderate the relationship between CAR and total assets, as the quality of financing determines how effectively capital contributes to the expansion of Islamic bank assets.

H7: NPF Can Moderate the Influence of CAR on Total Assets in Islamic Commercial Banks in Indonesia

The Effect of Exchange Rate on Total Assets Moderated by Non-Performing Financing

Non-Performing Financing (NPF) represents the level of financing risk that may hinder the effectiveness of a bank's intermediation process. Based on the Credit Risk Theory by Gorton & Winton, (2003), a higher NPF ratio increases the likelihood of disruptions in fund distribution and slows asset growth. Meanwhile, the Financial Development Theory proposed by Schumpeter, (1983) emphasizes that exchange rate stability plays a vital role in fostering economic growth through financing activities and capital accumulation, as fluctuations in exchange rates can influence transaction costs and the overall financial stability of banks. Within this framework, NPF functions as a moderating variable that can either amplify or diminish the effect of exchange rate movements on total assets, depending on how effectively the bank manages its financing risks. This relationship is supported by the study of Osundina et al., (2016), which found that NPF can moderate the link between exchange rate and total assets.

H8: NPF Can Moderate the Effect of Exchange Rates on Total Assets of Islamic Commercial Banks in Indonesia

RESEARCH METHODS

This study adopts a quantitative explanatory-causal design to analyze the effects of internal and external banking factors on the total assets of Islamic Commercial Banks

(BUS) in Indonesia using industry-level monthly data for the period 2011–2024 obtained from official publications of the Financial Services Authority (OJK) and Bank Indonesia (Sugiyono, 2021). BUS data are aggregated to represent systemic Islamic banking performance rather than individual bank behavior, with total assets specified as the dependent variable, mudharabah financing, Financing to Deposit Ratio (FDR), Capital Adequacy Ratio (CAR), and exchange rate as independent variables, and Non-Performing Financing (NPF) incorporated as a moderating variable. Data analysis follows the standard procedure of multiple linear regression, beginning with descriptive statistical analysis, followed by estimation of the baseline regression model to examine the direct effects of the explanatory variables on asset growth. The moderating role of NPF is then tested by extending the baseline model through interaction terms between NPF and each independent variable, allowing the assessment of conditional effects within a Moderated Regression Analysis (MRA) framework. Model estimation is conducted using EViews 12, with hypothesis testing based on F-tests and t-tests, and supported by classical diagnostic tests including multicollinearity (Variance Inflation Factor), heteroscedasticity (Breusch–Pagan or Glejser), autocorrelation (Durbin–Watson), and residual normality (Jarque–Bera) (Gujarati, 2009). This analytical sequence ensures a coherent and interpretable empirical assessment of how financing structure, capital adequacy, liquidity, macroeconomic conditions, and financing risk influence Islamic banking asset growth in Indonesia.

RESULT AND DISCUSSION

Descriptive Statistic Test

Tabel 4.1 Descriptive Statistic

| | MUDHARABAH FINANCE | FDR | CAR | EXCHANGE RATE | TOTAL ASET | NPF |
|--------------|--------------------|----------|----------|---------------|------------|----------|
| Mean | 71507.39 | 85.51458 | 19.17738 | 13139.82 | 315737.8 | 3.536726 |
| Median | 65834.00 | 82.06500 | 18.54500 | 13777.50 | 286712.0 | 3.300000 |
| Maximum | 198249.0 | 104.8300 | 26.28000 | 16352.00 | 664611.0 | 6.170000 |
| Minimum | 8560.000 | 68.98000 | 12.23000 | 8495.000 | 95743.00 | 2.040000 |
| Std. Dev. | 49527.47 | 9.266002 | 4.114684 | 2164.085 | 143761.6 | 1.073925 |
| Observations | 168 | 168 | 168 | 168 | 168 | 168 |

Source: Processed by Researchers, 2025

Based on the results of descriptive statistics with a total of 168 observations, a general overview of the characteristics of the research variables was obtained. The mudharabah

financing variable Mudharabah Finance had an average of Rp71,507.39 billion with high variation (SD Rp49,527.47 billion), reflecting the fluctuation of productive financing expansion due to changing economic conditions and bank policies. The FDR variable showed an average of 85.51% (SD 9.27), within the healthy range according to OJK regulations (78–92%), although in some periods it exceeded 100%, indicating liquidity pressure due to high credit disbursement. The CAR variable had an average of 19.18% (SD 4.11), indicating a very strong capital position and far above the minimum requirement of 8%, consistent with Capital Buffer Theory (Berger, 1995), which emphasizes the importance of capital reserves in maintaining financial stability. The rupiah exchange rate variable against the US dollar recorded an average of Rp13,139.82 (SD Rp2,164.09), indicating moderate fluctuations due to global dynamics and domestic macroeconomic factors; exchange rate stability has proven to support the bank's intermediation function as described in Financial Development Theory (Schumpeter, 1983). The total assets variable showed an average of Rp315,737.8 billion (SD Rp143,761.6 billion), reflecting consistent asset growth and the increased role of Islamic Commercial Banks in the national financial system. Meanwhile, NPF had an average of 3.54% (SD 1.07), still within the safe limit (<5%), indicating effective risk management in financing. Overall, these descriptive results affirm that the financial performance of Islamic Commercial Banks in Indonesia is in sound condition, with strong asset growth, solid capitalization, and controlled financing risks, although FDR and exchange rate volatility remain factors to watch in order to maintain long-term intermediation stability.

Estimation Test and T Test

Tabel 4.2 Estimation and T-Statistic

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---------------------------|-------------|------------|-------------|--------|
| C | -1202701. | 247505.2 | -4.859296 | 0.0000 |
| MUDAHARABAH FINANCE | 0.649959 | 0.466059 | 1.394585 | 0.1651 |
| FDR | 6266.951 | 1507.368 | 4.157546 | 0.0001 |
| CAR | 24010.50 | 4883.919 | 4.916237 | 0.0000 |
| EXCRATE | 48.59793 | 9.592060 | 5.066475 | 0.0000 |
| NPF | 310702.6 | 73309.51 | 4.238230 | 0.0000 |
| Mudharabah Finance*NPF | 0.060428 | 0.166312 | 0.363340 | 0.7168 |
| FDR*NPF | -1846.550 | 485.3295 | -3.804735 | 0.0002 |
| CAR*NPF | -5902.470 | 1317.455 | -4.480205 | 0.0000 |
| EXCRATE*NPF | -7.142188 | 2.748037 | -2.599015 | 0.0102 |

Source: Processed by Researchers, 2025

Based on the time series regression results using 168 monthly observations, the model equation was formulated to describe the relationship between Mudharabah Financing, Financing to Deposit Ratio, Capital Adequacy Ratio, Exchange Rate, and the moderating variable Non-Performing Financing on the Total Assets of Islamic Commercial Banks, as presented below:

- 1) Mudharabah Financing has a positive but not significant effect (coef. 0.6499; $p = 0.1651$), indicating that increased profit-sharing financing has not made a significant contribution to total asset growth.
- 2) FDR has a significant positive effect (coef. 6,266.95; $p = 0.0001$), meaning that increased fund intermediation capability strengthens the asset expansion of Islamic banks.
- 3) CAR has a significant positive effect (coef. 24,010.50; $p = 0.0000$), indicating that capital adequacy enhances the capacity for asset expansion and financial stability.
- 4) Exchange Rate has a significant positive effect (coef. 48.59; $p = 0.0000$), suggesting that rupiah appreciation against the US dollar encourages an increase in the assets of Islamic banks.
- 5) The interaction Mudharabah \times NPF is not significant ($p = 0.7168$), meaning that financing risk does not moderate the effect of mudharabah on assets.
- 6) The interaction FDR \times NPF has a significant negative effect (coef. -1,846.55; $p = 0.0002$), indicating that increasing financing risk weakens the relationship between liquidity and assets.
- 7) The interaction CAR \times NPF has a significant negative effect (coef. -5,902.47; $p = 0.0000$), signifying that high NPF reduces the effectiveness of capital in boosting assets.
- 8) The interaction Exchange Rate \times NPF has a significant negative effect (coef. -7.142; $p = 0.0102$), indicating that fluctuations in financing risk weaken the effect of exchange rate on total assets.

F test (Simultaneous Test)

Tabel 4.4 F-statistic

| | |
|-------------------|----------|
| Prob(F-statistic) | 0.000000 |
|-------------------|----------|

Source: Processed by Researchers, 2025

The Prob(F-statistic) value of 0.000000 (< 0.05) indicates that the regression model is statistically significant overall, meaning that all independent variables, the moderating variable NPF (Z), and their interaction terms collectively exert a significant influence on the total assets of Islamic Commercial Banks in Indonesia.

Model Feasibility Test

Multicollinearity Test

Tabel 4.3 Correlation

| | X1 | X2 | X3 | X4 |
|----|-----------|-----------|-----------|-----------|
| X1 | 1.000000 | -0.726993 | 0.870688 | 0.868586 |
| X2 | -0.726993 | 1.000000 | -0.741132 | -0.770848 |
| X3 | 0.870688 | -0.741132 | 1.000000 | 0.700587 |
| X4 | 0.868586 | -0.770848 | 0.700587 | 1.000000 |

Source: Processed by Researchers, 2025

The results of the multicollinearity test reveal that all correlation coefficients among the independent variables are below 0.90. The highest correlations occur between mudharabah financing and CAR (0.87) and between mudharabah financing and the exchange rate (0.86). Since these values remain below the critical threshold, the time series regression model can be considered free from multicollinearity issues.

Heteroskedasticity Test

Tabel 4.5 Heteroskedasticity Test

| | |
|--|--------|
| Heteroskedasticity Test: Breusch-Pagan-Godfrey | |
| Null hypothesis: Homoskedasticity | |
| Prob. F(4,163) | 0.6534 |
| Prob. Chi-Square(4) | 0.6460 |
| Prob. Chi-Square(4) | 0.8288 |

Source: Processed by Researchers, 2025

The Breusch–Pagan–Godfrey test results indicate that all probability values exceed 0.05, confirming that the model exhibits homoskedasticity and is not affected by heteroskedasticity. This suggests that the regression estimates are both efficient and unbiased.

Autocorrelation Test

Tabel 4.6 Durbin Watson Stat

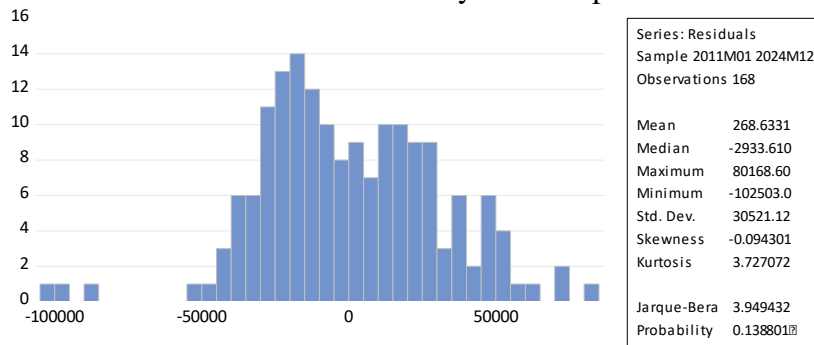
| | |
|--------------------|----------|
| Durbin-Watson stat | 2.157565 |
|--------------------|----------|

Source: Processed by Researchers, 2025

With a Durbin–Watson (DW) value of 2.157565, it can be inferred that the model’s residuals are independent, showing no signs of serial correlation across observation periods. This indicates that the regression model meets one of the essential assumptions in time series analysis, namely the randomness of errors. Therefore, the estimation results are deemed reliable and unbiased, as the model is free from autocorrelation.

Normality Test

Gambar 4.7 Normality Test Graph



Source: Processed by Researchers, 2025

The normality test results indicate a Jarque-Bera value of 3.994832 with a probability of 0.138001, which is greater than 0.05, leading to the acceptance of H_0 . This implies that the residuals in the regression model are normally distributed.

Discussion

The estimation results indicate that mudharabah financing does not significantly influence the total assets of Islamic Commercial Banks in Indonesia, a finding that directly contradicts Financial Intermediation Theory's prediction that profit-sharing contracts should be central to Islamic banking asset growth (Diamond, 1984). Rather than interpreting this as mudharabah's inherent inefficiency, our results expose a fundamental institutional failure: Indonesian BUS have responded to information asymmetry not by developing superior monitoring technologies as Diamond (1984) would predict, but by

substituting toward debt-like murabahah contracts, explaining why profit-sharing financing remains below 20 percent while murabahah dominates over 60 percent of portfolios (OJK, 2024). This reveals that despite assets growing from IDR 7.8 trillion (2003) to IDR 955.2 trillion (2024), BUS asset growth is predominantly driven by debt-like contracts rather than equity-based intermediation, fundamentally contradicting the risk-sharing principles that distinguish Islamic finance and raising questions about whether Indonesian Islamic banking operates under a different paradigm or merely replicates conventional banking with Shariah-compliant labeling. The causal direction warrants careful scrutiny: it is equally plausible that banks with larger asset bases possess economies of scale that enable them to bear mudharabah's monitoring costs, suggesting potential reverse causality our approach cannot definitively resolve.

We found something particularly intriguing when examining NPF's moderating role: the interaction shows no significant effect, but this null result exposes a critical measurement failure. Unlike murabahah defaults measured by payment delinquency, mudharabah 'underperformance' manifests as profit shortfalls relative to projections, a dimension entirely absent from conventional NPF metrics as currently constructed by OJK. This means NPF is fundamentally misspecified for equity-based contracts, producing systematically biased risk assessments that undermine both regulatory oversight and managerial decision-making (Febrianti et al., 2024; Nazir et al., 2021). Therefore, hypotheses H1 and H5 are rejected, but rather than representing mudharabah's failure, these results expose critical institutional gaps: the absence of profit-sharing-specific risk metrics (such as Profit Equalization Reserve adequacy ratios or project-level IRR variance indices), the lack of digital monitoring infrastructure to reduce information asymmetry, and the absence of regulatory incentives that would make mudharabah economically competitive with murabahah, all of which are policy-addressable constraints rather than inherent limitations of the profit-sharing model itself.

The Financing to Deposit Ratio (FDR) demonstrates a significant positive effect on total assets, aligning with the Theory of Financial Intermediation (Allen & Santomero, 1997). With FDR averaging 85.51 percent (median 82.06 percent) within OJK's healthy range of 78-92 percent, the relationship could operate through three channels: the direct income channel (higher FDR generates financing revenue translating into capital

accumulation), the confidence channel (optimal FDR signals efficiency and attracts deposits), or the regulatory compliance channel (FDR compliance results in favorable ratings and reduced capital requirements). However, establishing causality requires acknowledging that larger banks may achieve higher FDR through economies of scale, meaning the correlation could partially reflect size advantages rather than pure intermediation efficiency, and the positive coefficient may be contaminated by survivor bias as institutions with unsustainable FDR-asset combinations likely exited during 2013-2018.

Interestingly, NPF moderation reveals critical conditionality that directly contradicts the implicit assumption in Allen & Santomero (1997) that intermediation effectiveness is primarily a function of fund conversion efficiency; our results demonstrate that credit quality is an equally binding constraint. Under average NPF conditions of 3.54 percent, the effective FDR contribution to asset growth is nearly neutralized by financing quality deterioration, as rising non-performing financing reduces intermediation effectiveness when productive funds become tied up in non-performing assets (Gorton & Winton, 2003). The 2020-2021 pandemic provides quasi-experimental validation: banks maintaining excessively high FDR experienced greater NPF increases and lower net asset growth despite higher nominal financing volumes, suggesting that aggressive financing expansion without risk management infrastructure produces perverse outcomes. The optimal FDR appears to converge around the observed median of 82.06 percent through institutional learning rather than regulatory guidance, suggesting OJK's current guidelines (78-92%) may be too broad to effectively constrain excessive risk-taking (Ariani et al., 2022; Ma'aji et al., 2025; Suaeb & Fajar, 2023). Hypotheses H2 and H6 are accepted, with the specific policy implication that OJK should tighten the FDR regulatory band to 82-85 percent while simultaneously mandating enhanced credit screening protocols for banks operating at band ceilings, a dual approach that would prevent the NPF escalation that neutralizes FDR's asset growth benefits.

The Capital Adequacy Ratio (CAR) shows a positive and significant influence on total assets, ostensibly supporting Capital Buffer Theory (Berger, 1995). However, with CAR averaging 19.18 percent (ranging from 12.23 to 26.28 percent), far above the 8 percent minimum requirement, the disproportionately large coefficient relative to FDR

reveals an empirical anomaly that Capital Buffer Theory cannot adequately explain. Our results suggest that in the Indonesian Islamic banking context, capital functions primarily as a market confidence signal rather than an operational enabler, with the inflated coefficient likely capturing omitted institutional factors such as founder commitment effects or supervisory pressure unrelated to actual intermediation capacity.

This over-capitalization paradox is inconsistent with profit-maximizing behavior but explicable as defensive positioning against historical NPF volatility, and the CAR-asset relationship suffers from potential endogeneity as banks planning aggressive asset expansion may proactively raise capital, meaning causality could run from asset growth expectations to CAR rather than the reverse (Mahendra & Musthofa, 2023; Widyastuti, 2018; Yasin et al., 2025). NPF moderation exposes a critical fragility that fundamentally challenges Capital Buffer Theory's core premise: the interaction yields a strongly significant negative coefficient, substantially larger than FDR moderation, revealing that capital-based growth strategies are disproportionately vulnerable to credit risk deterioration. This directly contradicts Berger, (1995) foundational assumption that capital buffers absorb risk; our findings demonstrate that in high-NPF environments, capital becomes a risk amplifier rather than absorber, as rising NPF forces capital allocation toward loan loss provisions rather than productive financing. The 2020 pandemic illustrates this perversely: despite CAR reaching 21.4 percent, asset growth decelerated as surging NPF transformed capital strength into a growth constraint, with the net CAR effect effectively turning negative. The critical NPF threshold where CAR transitions from growth enabler to growth inhibitor lies below OJK's current 5 percent ceiling, with the sample mean NPF of 3.54 percent already approaching problematic levels (Barizi et al., 2022; Imsar et al., 2022). Hypotheses H3 and H7 are accepted, with the specific policy implication that OJK should implement tiered capital requirements: banks maintaining NPF below 3 percent could operate with 10 percent minimum CAR, while banks exceeding 3.5 percent NPF should face 14 percent minimum CAR, a risk-weighted framework that incentivizes credit quality over capital stockpiling and aligns regulatory requirements with the empirical reality that capital effectiveness is conditional on financing quality rather than absolute levels.

The exchange rate demonstrates a significant positive effect on total assets, supporting Financial Development Theory (Schumpeter, 1983). With the rupiah averaging IDR 13,139.82 (ranging from IDR 8,495 to IDR 16,352), the moderate coefficient magnitude relative to CAR and FDR reveals important contextual specificity that challenges the universal applicability of exchange rate transmission mechanisms documented in conventional banking literature. The exchange rate transmission operates differently in Islamic banking due to BUS's predominantly domestic financing portfolio and limited foreign currency exposure, suggesting that prior findings from conventional banking studies may have overstated exchange rate significance for Islamic banks specifically (Abbasi et al., 2025; Kelmendi, 2024; Sahoo, 2025). The positive coefficient could reflect multiple indirect channels, but critically, the observed correlation may suffer from common factor effects as periods of rupiah strength often coincide with favorable economic conditions that independently drive both currency appreciation and banking sector expansion, meaning the coefficient may partially capture omitted macroeconomic variables rather than pure currency effects. The resilience observed during the 2018 currency crisis (IDR 15,200+) and 2020 pandemic-induced volatility supports this interpretation, as BUS asset growth decelerated only modestly, suggesting structural insulation rather than effective risk management.

NPF moderation reveals a compound vulnerability mechanism that fundamentally alters exchange rate transmission dynamics: the interaction produces a significant negative coefficient, demonstrating that macroeconomic shocks interact multiplicatively with microeconomic fragilities to produce outsized negative effects on asset accumulation. This dual-shock dynamic represents an empirical regularity absent from standard Financial Development Theory, which typically treats macroeconomic and microeconomic risks as additive rather than multiplicative (Gorton & Winton, 2003; Osundina et al., 2016). During the 2018 crisis and 2020 pandemic, banks with elevated NPF (above 3.54 percent) experienced substantially lower asset growth despite facing identical exchange rate shocks, demonstrating that credit quality determines institutional resilience to macroeconomic shocks. Hypotheses H4 and H8 are accepted, with the critical policy implication that OJK must urgently facilitate development of Shariah-compliant hedging instruments, specifically wa'ad-based currency forwards or

commodity murabahah structures for natural hedging. The current absence of such instruments creates structural disadvantage during simultaneous currency and credit stress episodes, providing a parsimonious explanation for the persistent market share stagnation below eight percent (BUS assets at IDR 955.2 trillion versus conventional banks' IDR 12,460.9 trillion), not lack of demand for Islamic banking services per se, but structural fragility during stress periods that could be directly addressed through regulatory support for Islamic financial engineering innovation in risk management

CONCLUSION

The findings demonstrate that asset growth in Islamic Commercial Banks (BUS) in Indonesia is positively driven by liquidity intermediation (FDR), capital adequacy (CAR), and exchange rate stability, while mudharabah financing does not emerge as a statistically significant driver at the industry level. Rather than indicating a failure of profit-sharing contracts, this result reflects the structural reality that asset expansion in Indonesian Islamic banking remains dominated by non-profit-sharing mechanisms. The central contribution of this study lies in repositioning Non-Performing Financing (NPF) from a standalone risk indicator to a systematic moderating mechanism that conditions how internal and external factors translate into asset growth. Empirically, the results show that rising NPF significantly weakens the growth-enhancing effects of FDR, CAR, and exchange rate stability, thereby explaining why sustained asset expansion has not translated into stronger systemic relevance or market share gains. This finding extends financial intermediation and risk management theory by demonstrating that liquidity, capital strength, and macroeconomic stability are necessary but insufficient for asset growth when financing quality deteriorates. By providing industry-level, time-series evidence for Indonesia, this study offers one of the first comprehensive demonstrations that credit risk acts as a structural constraint on Islamic banking development, thereby resolving inconsistencies in prior empirical findings and contributing new insights to the Indonesian Islamic banking literature. From a policy perspective, the results imply that strategies aimed solely at increasing financing volume, capital buffers, or macroeconomic resilience will remain ineffective unless accompanied by enforceable improvements in

financing quality and risk governance, positioning NPF control as a prerequisite for sustainable and competitive asset growth.

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