Jurnal Ekonomi & Keuangan Islam
2026, 12(1), 186-205

# Do profit-and-loss sharing and regional growth buffer credit risk in Islamic rural banks?

Chaerani Nisa, Tia Ichwani, Dewi Kurniawati

Department of Management, Faculty of Economics and Business, Universitas Pancasila, Jakarta, Indonesia

**Article Info**

**Article History**
Received : 2025-11-20
Revised : 2026-01-23
Accepted : 2026-02-09
Published : 2026-02-12

**Keywords:**
Profit loss sharing, Islamic rural banks, Non-performing financing, Regional economic growth

**DOI:**
10.20885/JEKI.vol12.iss1.art11

**JEL Clasification:**
G21, G32, R11, G28, 016

**Corresponding author:**
Chaerani Nisa
chaerani.nisa@univpancasila.ac.id

**Author's email:**
tiaichwani@univpancasila.ac.id
dewikurniawati@univpancasila.ac.id

**Paper type:**
Research paper

## Abstract

**Purpose** – This study investigates how credit risk, profit-and-loss sharing (PLS) financing, and regional economic growth shape the profitability of Islamic rural banks in Indonesia and whether PLS portfolios and local conditions buffer the adverse effect of non-performing financing (NPF) on profitability through a moderating effect.

**Methodology** – The analysis uses a balanced panel of 135 Islamic Rural Banks (IRBs) for 2019–2024, combining bank-level data with Gross Regional Domestic Product (GRDP) per capita growth. Fixed-effects panel regressions with two- and three-way interactions between NPF, PLS measures (total PLS, mudharabah, musharakah), and regional growth were estimated, controlling for size, capital adequacy, efficiency, funding structure, and time effects.

**Findings** – The results demonstrate a robust negative association between non-performing financing (NPF) and return on assets (ROA). Mudharabah-based profit-and-loss sharing (PLS), rather than aggregate PLS or Musharakah alone, attenuates the impact of NPF. Similarly, higher regional growth weakens the marginal effect of credit risk. A negative and significant triple interaction indicates that Mudharabah intensity and favorable regional growth act as substitutes rather than complements, with the strongest mitigation of the NPF effect observed at low to moderate levels of both variables.

**Implications** – The evidence suggests that IRB managers and regulators should calibrate PLS portfolios for regional macroeconomic conditions. Understanding local growth environments can guide the PLS configurations that are most appropriate for promotion within supervisory areas.

**Originality** – This study is among the first to jointly examine the roles of PLS contract composition and regional economic growth in the credit-risk–profitability nexus of IRBs, showing how risk-sharing finance and local business cycles interact in shaping Islamic bank performance.

**Cite this article:**
Nisa, C., Ichwani, T., & Kurniawati, D. (2026). Do profit-and-loss sharing and regional growth buffer credit risk in Islamic rural banks? *Jurnal Ekonomi & Keuangan Islam*, *12*(1), 186-205. https://doi.org/10.20885/JEKI.vol12.iss1.art11

Center for Islamic Economics Studies and Development, Faculty of Business and Economics, Universitas Islam Indonesia

## Introduction

Microfinance Institutions (MFIs) pursue two primary objectives: to generate social impact by extending financing to low-income households, and to sustain sound financial performance so that they can remain self-sustaining (Afriadi et al., 2024; Ahmad et al., 2020). In Indonesia, one manifestation of MFIs is Bank Perekonomian Rakyat, or rural banks, which comprise two main types: conventional rural banks and Islamic rural banks (IRBs) (Addury & Ramadhani, 2024). Unlike conventional rural banks, the IRBs provide interest-free financing. Consequently, financing

P ISSN 2088-9968 | E ISSN 2614-6908

from Islamic MFIs offers an important solution for households that cannot access banking services for religious reasons (Azmat et al., 2021). Profit and loss sharing (PLS) is a commonly used riba-free contract among Islamic MFIs (Mohamed & Elgammal, 2023).

Many scholars have highlighted the advantages of PLS contracts, such as mudarabah and musharakah, over non-PLS financing modes, such as murabahah (Alhammadi et al., 2022; Askari & Mirakhor, 2014; Moosa, 2023). Asutay and Yilmaz (2025) and Mergaliyev et al. (2021) argue that PLS is more consistent with the *Maqasid al Shariah* because it embeds risk sharing and is not driven solely by profit, thereby upholding social ethics. This contrasts with traditional banks, which employ risk transfers in their operations (Islahi, 2013). This perspective is echoed by Bakhouche et al. (2022), who note that the limited implementation of PLS constrains the performance of Islamic banks. The underutilization of PLS relative to debt-based modes has prompted apprehension that Islamic banks could, in the end, fail to embody the Islamic spirit that has long been proclaimed (Okumuş, 2024). This state of affairs has, in the end, encouraged many to challenge the standards used in recognizing murabahah debt-based financing because they are viewed as inconsistent with Islamic standards and behave as conventional banks do (Bhatti et al., 2025; Moosa, 2023).

Evaluations of the performance of the PLS schemes indicate that PLS delivers solid outcomes. Asutay (2012) notes that Islamic banks often select non-PLS financing because it is perceived to involve lower risk. Nevertheless, Annizar and Junarsin (2025) and Mukhibad et al. (2023) show that PLS can mitigate financing risk and support higher income generation. With respect to IRBs sustainability indicators, several studies report a positive relationship between PLS and IRBs sustainability (Addury & Ramadhani, 2024; Handoko & Firmansyah, 2022). One explanation is that PLS allows IRBs to appropriate a larger share of gains when financed ventures yield substantial profits for borrowers (Argantara & Fitriyah, 2024) while also providing IRBs with enhanced control mechanisms (Rafidah, 2023).

Building on this debate, we contend that credit risk does not translate into profitability. For IRBs, the extent to which Non-Performing Financing (NPF) erodes returns depends on the internal risk-sharing architecture, in this case, the PLS composition. Beyond the internal factor, profitability is also conditioned by the external business cycle of borrowers (Athari & Bahreini, 2023; Jaapar et al., 2025; Sandhyapranita et al., 2024). Mechanistically, stronger output growth relaxes borrowers' cash flow constraints and raises collateral resale values, improving both repayment capacity and loss-given defaults (Galow et al., 2024; Pancotto et al., 2024). For IRB, this pass-through is typically stronger than for conventional ones because a larger share of PLS contracts allows IRBs to participate directly upside when financed ventures expand, lifting returns beyond mere interest margins (Fahamsyah et al., 2024). Accordingly, in counties with faster per capita income growth, better cash generation and resale values facilitate repayment and recovery; thus, the adverse effect of NPF on profitability is weaker.

The existing literature richly contrasts PLS with non-PLS contracts and documents links between PLS and IRBs sustainability, yet three gaps remain (Handoko & Firmansyah, 2022; Hidayah & Karimah, 2023). First, most evidence comes from Islamic commercial banks or mixed samples, leaving the IRBs under examination despite their distinct mandates and borrower profiles (Meslier et al., 2020; Warninda et al., 2019). Second, prior works typically study credit risk, contract choice, and macro conditions in isolation (Fahamsyah et al., 2024). Existing studies rarely examine how a bank's internal risk-sharing architecture, measured by the share of PLS in its portfolio, may condition the transformation of NPF into profitability. Third, the external environment is often proxied to national aggregates, and little is known about whether the locally measured regional economic growth in which borrowers operate weakens the pass-through from NPF to returns (Athari & Bahreini, 2023; Mohamed & Elgammal, 2023s; Rafidah, 2023; Salman, 2023; Sandhyapranita et al., 2024). The novelty of our study is that it integrates these three layers into one framework for IRBs by modeling a joint mechanism in which NPF affects profitability conditional on the bank's PLS composition and regional output growth. Methodologically, we implement an interaction-based panel specification with bank and time effects and focus on marginal effects that are interpretable for managerial decisions on the contract mix. Therefore, this study contributes to the literature by extending the conventional risk–return framework of IRBs through a three-way interaction model.

Guided by this contribution, we asked the following four questions: Research Question (RQ) 1: What is the baseline effect of NPF on IRB profitability? RQ2: Does a higher portfolio share and contract composition of PLS financing, particularly mudarabah and musharakah, attenuate the NPF's impact on profitability? RQ3: Does stronger regional economic growth weaken the adverse effects of NPF on profitability? RQ4: Is the attenuation of the NPF effect strongest when the PLS share is high and regional growth is strong, indicating a three-way interaction between NPF, PLS, and regional growth? The corresponding objectives are to quantify these marginal effects, assess whether the portfolio share and composition of PLS (mudarabah and musharakah) best cushion profitability against credit risk across the business cycle, and derive actionable implications for IRB portfolio strategy and for policymakers concerned with the sustainability of Islamic rural finance.

## Literature Review

### Theoretical framework

Belkhaoui et al.(2020) emphasize that a core fundamental aspect of Islamic finance is the absence of intrinsic value in money; therefore, the charging of interest is prohibited, and financial resources must be channeled into real economic activities. Accordingly, the central principle of Islamic finance is that profits generated from productive economic activities are shared between the capital provider (financing partner or *Rabb al-Māl*) and skilled partner (entrepreneur). Saleem et al. (2024) reinforced this argument by asserting that the essence of Islamic finance lies in the mutual sharing of profits and losses, commonly referred to as profit-and-loss sharing (PLS). PLS constitutes the cornerstone of Islamic finance because it promotes economic and social justice by ensuring equal opportunities and balanced risk sharing between contracting parties (Asutay, 2012; Azmat et al., 2015; Khandker & Khaled, 2014).

Theoretically, these principles imply that Islamic bank returns must be grounded in the performance of real economic activities, and that contractual design matters because it structures how risks and rewards are distributed between financiers and entrepreneurs. Thus, profitability can be interpreted as the outcome of allocating funds to productive projects while managing real-sector uncertainty, where PLS operates not only as a compliance feature, but also as an incentive and governance mechanism that shapes effort, disclosure, and monitoring within partnership-based finance (Farihana & Rahman, 2021).

### Credit risk and bank profitability

Credit-risk-profitability linkages in Islamic institutions continue to show a canonical negative association between problem assets and returns, and recent work has brought IRBs explicitly into view (Hendri et al., 2025; Rafidah, 2023; Setiawan, 2024). Studies using IRB samples also indicate that financing models choose shape stability through their effect on credit risk, with profit-sharing finance generally comparing favorably to profit-margin finance in terms of risk transmission to earnings (Annizar & Junarsin, 2025; Pramesti & Anggraini, 2024).

### Profit-and-loss sharing as a risk-sharing mechanism

Research on Islamic financing contracts has increasingly revisited the role of PLS, emphasizing that mudarabah and musharakah embody risk-sharing and align more closely with maqasid al-shariah than non-PLS modes (Ali, 2022; Mukhibad et al., 2023). Recent assessments have documented both conceptual merits and practical frictions. PLS can better internalize entrepreneurial risk and distribute outcomes more equitably (Cahyani et al., 2024; Harahap et al., 2023); however, its adoption remains limited because of monitoring costs, informational asymmetries, and governance capacity (Salman, 2023; Sutrisno & Widarjono, 2022). Systematic and empirical contributions reiterate that wider PLS use is associated with ethical conformity and long-run resilience (Butt & Chamberlain, 2025) while cautioning that implementation quality and institutional settings are decisive for performance (Mimoun et al., 2024). Recent research increasingly links the portfolio share of PLS finance to Islamic banks' performance, moving beyond broad assertions to panel-based tests that relate PLS intensity to profitability and risk-return trade-offs (Meslier et al., 2020a;

Warninda et al., 2019a). Extending to Indonesia's IRBs, recent evidence shows that a higher and well-governed portfolio share of PLS supports stronger intermediation performance and bank stability relative to non-PLS financing, indicating that the general PLS rationale is operationally relevant in the IRBs context (Addury & Ramadhani, 2024; Nb et al., 2024).

### Contract composition: mudharabah vs musharakah

The PLS scheme consists of Mudharabah and Musyarakah contracts. Under the mudharabah arrangement, the bank provides the entire capital, whereas in the musyarakah scheme, both parties, the bank and the entrepreneur, jointly contribute capital to the project (Meslier et al., 2020; Warninda et al., 2019). El et al. (2022) found that mudharabah has a positive effect on profitability, whereas musyarakah has a negative effect. In contrast, Chairina (2025) concludes that musyarakah positively affects profitability, whereas mudharabah has no significant effect on profitability. Meanwhile, Annizar and Junarsin (2025) report that neither PLS scheme has a statistically significant impact on profitability.

### Regional economic growth and bank performance

External macroeconomic conditions operate alongside the internal contract architecture (Galow et al., 2024; Jaapar et al., 2025; Mergaliyev et al., 2021). Recent studies show that in IRB, stronger real activity improves borrower cash flows and collateral values, reducing defaults and loss given default, whereas downturns increase both, and the general mechanisms imply that local business cycle conditions shape how credit risk passes through to profitability for IRBs serving SMEs and microenterprises (Abusharbeh, 2023; Fithria et al., 2021; Mohamed & Elgammal, 2023).

### Moderating interactions between risk, contracts, and macroeconomic conditions

Within Islamic banking, the contract–risk nexus is particularly salient because mudharabah and musyarakah embed distinct allocations of capital contribution, control rights, and monitoring intensity, implying different agency frictions and default dynamics (Belkhaoui et al., 2020). Empirical evidence shows that mudarabah and musharakah can affect credit/financing risk differently, consistent with the view that equity-like contracts may reduce risk through genuine risk sharing, but can also increase informational and monitoring costs when governance is weak (Warninda et al., 2019). Annizar and Junarsin (2025) find turning points at which the mudharabah share switches from risk-mitigating to risk-aggravating, with corresponding implications for proxies for performance and stability. Complementary profitability-oriented results also suggest that equity financing composition matters, with musyarakah often emerging as a more profit-supportive component than aggregate equity financing (Widarjono, 2021).

Macroeconomic conditions frequently operate as state variables that reshape both the baseline risk and the effectiveness of contractual risk sharing (Bilgin et al., 2021). Crisis episodes, inflationary surges, or abrupt demand contractions can intensify borrower distress and weaken the profitability channel from financing expansion, thereby strengthening the adverse risk–performance linkage. Zafir and Sudarjah (2025) model the interaction between non-performing loan and a Covid-period indicator, and report that the pandemic regime materially changes how credit risk maps into conventional bank profitability. In the Islamic banking context, Afkar et al. (2025) apply moderation regression and show that NPF can condition the profitability implications of profit-sharing financing, with differences across the pre-, during-, and post-pandemic periods. Beyond crisis dummies, macro shocks can also be amplified or dampened by strategic behavior and market structure; for instance, Le et al. (2022) find that competitive strategic interaction moderates how macroeconomic and monetary shocks are transmitted into bank lending.

### Research gap and contribution positioning

Taken together, the recent literature establishes three points. First, the PLS shares in Islamic portfolios have empirically detectable effects on risk and performance. Second, NPF erodes profitability in Islamic institutions, including IRBs. Third, macroeconomic conditions shape the

default and recovery dynamics. By modeling profitability as a function of NPF interacting with both PLS share and regional output growth, this study directly addresses these gaps and yields managerial marginal effects on the contract mix that are interpretable for the IRB portfolio strategy.

## Hypotheses Development

A higher NPF is expected to depress profitability because impaired contracts reduce realized income, trigger higher loss recognition or provisioning, and increase monitoring and recovery costs, which collectively compress profitability (Salsabilla & Jaya, 2024; Zafir & Sudarjah, 2025). Recent evidence using Islamic bank samples reports that profitability is adversely and significantly affected by non-performing financing ratios (Syahadatina et al., 2025). Consistent with this argument, studies on Indonesian IRB also document a negative association between NPF and profitability, reinforcing that asset quality risk is a binding constraint for smaller Sharia intermediaries that operate with narrower buffers and higher exposure to local borrower shocks (Rosmelyana et al., 2024). Therefore, the proposed hypothesis for the relationship between NPF and profitability is

$H_1$: Non-performing financing (NPF) has a significant negative impact on the profitability of Islamic banks.

Building on Islamic finance theory, a larger share of PLS financing should attenuate the adverse credit risk–profitability nexus because PLS embeds risk-sharing and closer partnership-based screening and monitoring, which can reduce default propensity and dampen the transmission of deteriorating asset quality into earnings (Farihana & Rahman, 2021). Empirical evidence indicates that PLS financing can reduce Islamic banks' credit risk, implying that when PLS exposure is higher, the profitability penalty from a given increase in non-performing financing (NPF) is expected to be insignificant (Wicaksono et al., 2024). At the same time, the buffering role of PLS is unlikely to be uniform across contracts, because mudharabah and musharakah differ in capital contribution, control rights, and agency frictions, leading to different risk profiles and non-linearities; therefore, they affect financing risk and performance differently (Warninda et al., 2019; Wicaksono et al., 2024). Accordingly, we propose the following hypothesis:

$H_{2a}$: Profit and loss sharing (PLS) moderates the credit risk profitability link, such that the negative association between NPF and profitability is weaker when the PLS share is larger.

$H_{2b}$: The moderating role of PLS on the credit risk–profitability link differs across contract types, with the composition between mudarabah and musharakah shaping how NPF affects profitability.

Economic conditions are expected to moderate the credit risk–profitability nexus because macroeconomic expansions strengthen borrowers' cash flows, reduce default intensity, and improve loan recovery prospects, thereby lowering the earnings drag from asset quality deterioration (Dimitrios et al., 2016). Ghosh (2015) shows that under micro- or state-level economic conditions, when regional growth is higher, banks can more readily offset credit losses through stronger financing demand and revenue generation, implying that the marginal profitability impact of a rise in credit risk should be less severe. This moderation logic is consistent with cross-country evidence showing that macro upswings enhance bank profitability, and that the adverse implications of credit risk conditions become more pronounced in downturn regimes (Le & Ngo, 2020; Mateev et al., 2024). Therefore, we propose the following hypotheses:

$H_3$: Regional growth moderates the credit risk profitability link such that the negative association between NPF and profitability is weaker when regional growth is higher.

Building on evidence that deteriorating asset quality erodes bank profitability, we posit that this adverse credit risk–profitability linkage is state-contingent on both the bank's financing structure and macroeconomic environment. In periods or regions of stronger economic growth, borrower cash flows and repayment capacity typically improve, which reduces the intensity and persistence of problem financing and crucially weakens the pass-through from credit impairment to earnings and provisions (Albertazzi & Gambacorta, 2009; Louzis et al., 2012). In parallel, a larger

share of PLS financing embeds risk-sharing and partnership-based governance that can strengthen ex-ante screening and ex-post monitoring while aligning incentives between banks and entrepreneurs, thereby mitigating agency frictions that otherwise amplify default risk and losses (Abdul-Rahman et al., 2014). Empirically, PLS portfolios have also been shown to be associated with lower credit risk in Islamic banking settings, consistent with a channel in which PLS dampens the profitability impact of deteriorating financing quality (Farihana & Rahman, 2021), The risk implications of PLS composition further underscore that banks' monitoring capability and contract mix conditions realize credit risk outcomes (Warninda et al., 2019). Taken together, these strands imply a triple moderation mechanism: when regional growth is strong and PLS intensity is high, the negative association between NPF and profitability should be most attenuated. Accordingly, we hypothesize as follows:

$H_4$: The triple moderation effect, such that in areas with stronger regional growth and banks with larger profit and loss-sharing portfolios, the adverse association between NPF and profitability is most strongly attenuated.

## Research Methods

### Research design

This study used a quantitative panel design to examine how credit risk and profit- and loss-sharing financing are related to profitability under varying regional growth conditions for Islamic rural banks. The analysis employed bank fixed effects and year fixed effects, enabling identification of within-bank changes over time while controlling for time-invariant bank heterogeneity and common time shocks. A panel fixed-effects approach is preferred over pooled OLS or repeated cross sections because it exploits within-bank variation over time while differentiating unobserved, time-invariant bank characteristics that are plausibly correlated with both NPF and PLS exposure, thereby reducing omitted-variable bias and strengthening causal interpretation (Hsiao, 2007).

### Data sources and sample

We constructed a balanced annual bank-level panel covering 2019–2024 for Indonesian IRBs. Bank financial indicators were obtained from the Sharia Banking Statistics (SPS) of the Financial Services Authority (Otoritas Jasa Keuangan, OJK) and the underlying IRBs periodic publication reports used in the SPS compilation. Regional macroeconomic controls were compiled at the district or city level from Statistics Indonesia using Gross Regional Domestic Product (GRDP) per capita growth measures to match the actual service area where each IRBs operates and where its borrowers are concentrated.

This period was selected to capture (i) a pre-pandemic baseline year (2019), (ii) the Covid-19 shock and policy response period (2020–2021), and (iii) the post-pandemic recovery/normalization phase (2022–2024). In Indonesia, output contracted in 2020 and rebounded in 2021, followed by stronger growth in 2022, and continued expansion by 2024. Importantly, the banking environment during the shock was shaped by a regulator, which materially affected credit risk recognition and bank profitability dynamics during the pandemic.

Although the observation window spans the Covid-19 episode, we do not introduce a separate Covid-19 dummy in the baseline specification because the model includes year-fixed effects. Year effects absorb all time-specific shocks that are common across banks each year, such as pandemic shocks, macro-policy responses, and concurrent regulatory measures, through year-specific intercept shifts. In addition, we include district or city GRDP per capita growth matched to each IRB operating area to capture the heterogeneity in local economic contractions and recoveries during the period. Accordingly, coefficient estimates of NPF, PLS exposure, and their interaction terms are interpreted as within-bank relationships over time, the net of common year shocks, and local macroeconomic conditions, rather than as pandemic-specific causal effects.

We applied purposive sampling to ensure (a) consistent reporting comparability and (b) the successful merging of bank fundamentals with local macro conditions. The samples were reduced sequentially as follows:

1. Initial population frame (173 IRB): IRBs with an annual publication report on the OJK website.
2. Annual publication report availability (135 IRBs): retained IRBs with accessible annual publication-report items on the OJK website, which are needed to compute the study's bank-level variables. Data must be collected from 2019 to 2024. IRBs with incomplete data were not included in the analysis.
3. District- or city-level data (135 IRBs): Retained banks with available district- or city-level GRDP per capita growth data.
4. Balance-panel data (135 IRBs): retained banks observed over six years (2019–2024), yielding 810 bank-year observations

According to the Syariah Banking Statistics by OJK, the number of operating IRB at the year-end ranged from 164 institutions (December 2019) to 174 institutions (December 2024). Our final balanced panel contains 135 IRB, implying coverage of approximately 78–82% of the year-end IRB population over the study window. The included banks span 21 provinces and 87 regencies/cities, supporting the geographic breadth and reducing concerns that the sample reflects only a narrow subset of the industry.

**Model estimation**

Our empirical specification follows the established bank-profitability determinant framework that models profitability as a function of bank-specific fundamentals and macroeconomic conditions in a panel setting. Prior studies show that profitability is jointly shaped by internal balance sheet characteristics such as asset quality, capitalization, efficiency, liquidity, size, and external macro conditions, motivating the inclusion of both bank-level covariates and regional growth in the baseline model (Athanasoglou et al., 2008; Dietrich & Wanzenried, 2011). In addition, the model builds on the problem-loan literature, which documents that deteriorating asset quality is associated with weaker bank performance through provisioning needs, lower interest income realization, and higher intermediation costs, providing the theoretical basis for the expected adverse association between non-performing financing NPF and ROA (Berger & De Young, 1997). Lastly, our focus on PLS is grounded in Islamic banking scholarship emphasizing the asset-based and risk-sharing character of Islamic intermediation and its implications for risk transmission and stability, making PLS composition a theoretically relevant dimension of Islamic rural bank performance (Hasan & Dridi, 2010).

To test our contingency hypotheses, we employ multiplicative interaction terms, which are the standard econometric approach for evaluating whether the marginal effect of a focal variable varies systematically with a moderator and to assess whether such moderation is conditional on a third factor (three-way interaction) (Brambor et al., 2006). Substantively, the NPF X PLS interaction evaluates whether a larger PLS share attenuates the adverse NPF–profitability link, consistent with Islamic finance arguments that risk-sharing and partnership-based contracting can alter how asset quality deterioration translates into earnings (Hasan & Dridi, 2010). The interaction NPF X GRDP captures whether local macro expansions mitigate the profitability consequences of impaired financing, consistent with the evidence that credit risk and loan performance are strongly linked to growth conditions (Beck et al., 2013). The term PLS × GRDP allows the profitability contribution of PLS to vary with the cycle, reflecting that PLS returns are more state-contingent and that profitability sensitivities can differ across banking business models and macro environments (Bonaccorsi Di Patti & Palazzo, 2020). The three-way interaction NPF × PLS × GRDP tests our proposition that the buffering role of PLS is state-dependent, which is the extent to which PLS moderates the NPF–ROA relationship varies with regional growth (Jeon & Wu, 2014; Wong & Zhang, 2024; Yuan et al., 2021).

$$ROAit = \beta_0 + \beta_1 NPF_{it} + \beta_2\, PLS_{it} + \beta_3 GRDP_{rt} + \beta_4(NPF_{it} \times PLS_{it}) + \beta_5(NPF_{it} \times GRDP_{it}) + \beta_6(PLS_{it}t \times GRDP_{rt}) + \beta_7(NPF_{it} \times PLS_{it} \times GRDP_{it}) + \gamma' X_{it} + \mu i + \tau t + \varepsilon it \quad (1)$$

$ROA_{it}$ denotes net income over total assets for bank $i$ in year $t$. $NPF_{it}$is is the ratio of non-performance financing for bank $i$ in year $t$. $PLS_{it}$is is the share of profit-and-loss sharing contracts (mudharabah plus musyarakah) in the financing portfolio of bank $i$ in year $t$. $GRDP_{rt}$is is the growth rate of gross regional domestic product per capita in district or city $r$ during year $t$, which we treat as a regional moderator. Vector $X_{it}$ contains control variables. A summary of operational variables, including expected signs and data sources, is provided in Table 1.

**Table 1.** Summary of operational variables

| Type of variable | Name | Variable definition | Hypothesis (Expected sign) | Source of data |
|---|---|---|---|---|
| Dependent | ROA | Profit before tax / Average total assets (%) | — | OJK quarterly published financial reports |
| Main independent variables | NPF (Credit Risk) | Non-Performing Financing / Total Financing (%) | (−) | OJK quarterly published financial reports |
| | PLS Share | Share of profit-and-loss-sharing financing (mudarabah + musharakah) in total financing (%) | (+) | OJK quarterly published financial reports |
| | GDP per Capita Growth (GRDP) | Annual growth rate of real GDP per capita at the bank's service region (e.g., kabupaten/kota) (%) | (+) | BPS (Statistics Indonesia) |
| Control variables | Asset (Size) | Natural logarithm of total assets | (+) | OJK quarterly published financial reports |
| | KPMM (Capital adequacy) | Capital adequacy ratio(%) | (+/−) | OJK quarterly published financial reports |
| | BOPO (Cost efficiency) | Operating expenses / Operating income (%) | (−) | OJK quarterly published financial reports |
| | FDR (Intermediation/Liquidity) | Financing to Deposits Ratio (%) | (+/−) | OJK quarterly published financial reports |

Sumber: Author's own work (2025)

## Results and Discussion

The empirical analysis draws on a sample of 135 Islamic rural banks observed over six years, yielding 810 bank-year observations. This study uses annual data because the key regional variable (GRDP), the growth rate of gross domestic product per capita at the district and city levels, is only available at an annual frequency rather than quarterly. The IRB in the sample is spread across 21 provinces and 87 districts and cities, with the largest concentration located in Central Java, accounting for 25 institutions. Taken together, Central Java (25 IRBs), East Java (24 IRBs), West Java (18 IRBs), Aceh (9 IRBs), and the Special Region of Yogyakarta (9 IRBs) host roughly 60% of the IRBs in the sample, indicating that the sector is heavily concentrated in Java and Aceh. At the subnational level, the highest numbers of IRB are found in Bogor and Sleman Districts, each hosting five institutions, which indicates that IRB activity is clustered in a few relatively dense local markets rather than uniformly distributed across Indonesia. This geographic concentration may reflect systematic regional differences in market depth, borrower composition, and local economic structures, which could influence baseline profitability and risk dynamics. However, the fixed effects specification identifies relationships from within-bank changes over time, thereby absorbing

time-invariant location-specific characteristics that correlate with the observed concentration. In addition, regional GRDP growth enters directly (and through interactions), so the analysis explicitly conditions the NPF–profitability relationship on the differences between higher- and lower-growth local economies rather than treating regional heterogeneity as residual noise.

**Result**

**Table 2.** Descriptive statistic

| Variabel | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| ROA | 810 | 2.108 | 6.707 | -46.38 | 99.99 |
| NPF | 810 | 7.239 | 7.366 | 0 | 55.57 |
| PLS | 810 | 26.4 | 50.0 | 0 | 659.26 |
| PLSMUD | 810 | 2.09 | 5.76 | 0 | 56.73 |
| PLSMUS | 810 | 12.69 | 15.50 | 0 | 82.98 |
| GRDP | 810 | 3.124 | 3.965 | -20.46 | 25.75 |
| ASSET (Rp 000) | 810 | 112,000,000 | 201,000,000 | 19,672 | 1,910,000,000 |
| LN(ASET) | 810 | 17.875 | 1.132 | 9.887 | 21.371 |
| KPMM | 810 | 32.134 | 25.772 | -69.10 | 469.00 |
| BOPO | 810 | 92.140 | 82.358 | -25.87 | 1,556.02 |
| FDR | 810 | 98.330 | 42.081 | 0 | 523.78 |

Table 2 reports the descriptive statistics for the main variables used in the analysis. Average profitability, measured by return on assets (ROA), is 2.1%, but the large standard deviation of 6.7% and the wide range from −46.4% to 99.9% indicate substantial dispersion and the presence of extreme observations. The mean NPF ratio is 7.2%, with a standard deviation of 7.4% and a maximum above 55%, which suggests that credit risk varies markedly across banks. PLS financing accounts on average for 26.4% of total financing, while the mean shares of mudarabah and musharakah financing are 2.1% and 12.7% respectively, consistent with a relatively limited but non negligible use of profit and loss sharing contracts. Regional growth averages 3.1% per year but ranges from deep local contractions of −20.5% to expansions of 25.8%, so it captures considerable heterogeneity in local business cycle conditions. Mean total assets are about 112 billion rupiah, with values spanning from roughly 20 million to almost 1.9 trillion rupiah, and the log asset measure confirms a strongly right skewed size distribution. The average capital adequacy ratio (KPMM) is 32.134 percent, but its large standard deviation and very low minimum point to a mix of well capitalized and severely constrained banks. Finally, the average operating cost ratio (BOPO) of 92.1% and the financing to deposit ratio (FDR) of 98.3%, both with high variability and extreme maxima, indicate substantial differences in cost efficiency and liquidity management within the Islamic rural bank sector.

**Table 3.** Correlation matrix

| **Variable** | NPF | PLS | PLSMUD | PLSFIX | REGGDP | LN(ASET) | KPMM | BOPO | FDR |
|---|---|---|---|---|---|---|---|---|---|
| NPF | 1.000 | | | | | | | | |
| PLS | -0.041 | 1.000 | | | | | | | |
| PLSMUD | 0.090 | 0.027 | 1.000 | | | | | | |
| PLSMUS | -0.002 | 0.038 | -0.084 | 1.000 | | | | | |
| REGGDP | 0.064 | 0.063 | 0.068 | 0.030 | 1.000 | | | | |
| LN(ASET) | -0.221 | 0.257 | -0.017 | -0.091 | 0.020 | 1.000 | | | |
| KPMM | -0.073 | -0.007 | -0.057 | 0.008 | -0.018 | -0.255 | 1.000 | | |
| BOPO | 0.286 | -0.019 | -0.001 | 0.039 | 0.007 | -0.123 | 0.073 | 1.000 | |
| FDR | 0.039 | -0.048 | 0.028 | 0.013 | 0.047 | -0.062 | -0.023 | -0.027 | 1.000 |

Source: Data processed (2025)

Table 3 reports the Pearson correlation coefficients among the main variables and indicates that correlations are generally modest in magnitude, suggesting that the regressors capture distinct dimensions of IRBs risk, portfolio composition, and performance. NPF exhibits a weak negative

association with bank size and a modest positive association with operating expenses, implying that banks with higher NPF to be smaller and less operationally efficient, while its correlations with capital adequacy ratio (KPMM), FDR, and regional GDP per capita growth are close to zero. Regarding financing structure, the correlations between the overall PLS share (PLS) and its mudarabah (PLSMUD) and musharakah (PLSMUS) components are very small (0.027 and 0.038, respectively), and the slightly negative correlation between PLSMUD and PLSMUS (–0.084) suggests that these contract types are not strongly co-moved or mechanically substituted across banks. The positive correlation between PLS and bank size (0.257) indicates that larger banks tend to allocate somewhat higher shares to PLS, although the relationship remains weak, while correlations among the control variables are also low. Overall, all coefficients are well below conventional thresholds for serious multicollinearity, supporting the view that the subsequent multivariate analysis can reasonably identify the separate effects of credit risk, PLS intensity, and regional economic growth on bank performance.

**Table 4.** Regression result

| Variable | (1) PLS total | (2) PLS mudarabah | (3) PLS musharakah |
|---|---|---|---|
| Dependent variable | | ROA | |
| NPF | -0.2166** | -0.2756*** | -0.2485** |
| | (-2.01) | (-2.65) | (-2.37) |
| PLS | 0.0160 | -0.0289 | 0.0598* |
| | (0.64) | (-0.37) | (1.72) |
| GRDP | -0.1177* | -0.1845* | -0.1220 |
| | (-1.68) | (-1.94) | (-1.55) |
| NPF × PLS | -0.0023 | 0.0131* | 0.0010 |
| | (-0.64) | (1.95) | (0.19) |
| NPF × GRDP | 0.0118 | 0.0235** | 0.0185 |
| | (0.95) | (2.34) | (1.57) |
| PLS × GRDP | -0.0038 | 0.0089 | -0.0050 |
| | (-0.73) | (1.30) | (-0.82) |
| NPF × PLS × GRDP | 0.0006 | -0.0026** | 0.0000 |
| | (0.75) | (-2.13) | (0.00) |
| KPMM | 0.0242 | 0.0231 | 0.0248 |
| | (0.75) | (0.73) | (0.77) |
| BOPO | -0.0073 | -0.0071 | -0.0072 |
| | (-1.61) | (-1.50) | (-1.48) |
| FDR | 0.0044 | 0.0043 | 0.0043 |
| | (0.67) | (0.65) | (0.65) |
| LN(ASET) | 0.1226 | 0.1049 | 0.0843 |
| | (0.35) | (0.28) | (0.24) |
| Constant | 2.3991 | 3.0638 | 2.3712 |
| | (0.43) | (0.51) | (0.40) |
| Observations | 810 | 810 | 810 |
| Number of banks | 135 | 135 | 135 |
| R-squared (within) | 0.0725 | 0.0739 | 0.0773 |
| Bank fixed effect | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes |

Note: t-statistics are in parentheses. *p < 0.1, **p < 0.05, ***p < 0.01.
Source: Data processed (2025)

Table 4 shows the regression results. Across all three specifications, NPF is negatively and significantly associated with ROA, confirming Hypothesis 1 that higher problem financing systematically erodes the profitability of IRBs. The magnitude of the baseline effect ranges from –0.22 to –0.28 percentage points in ROA for each one-percentage-point increase in NPF, with the strongest effect appearing in the mudharabah specification (column 2), where the coefficient of –0.2756 implies that, starting from the sample mean ROA of about 2.1 percent, an increase in NPF by one percentage point (for example, from 5 to 6 percent) would lower ROA from approximately

2.1 to 1.8 percent, highlighting the economic significance of the estimated effect. By contrast, the direct impact of PLS shares is generally weak. The total PLS ratio in column (1) and the mudharabah ratio in column (2) are not statistically different from zero, whereas the musharakah ratio in column (3) is only marginally positive at the 10 percent level. Regional GDP per capita growth enters with a negative coefficient in all models and is weakly significant in the total PLS and Mudharabah regressions, which may reflect margin compression or increased competition in faster-growing local markets rather than higher returns.

The interaction terms provide more insight into how PLS and regional conditions shape the credit-risk–profitability link and allow a direct assessment of Hypothesis 2a until Hypothesis 4. In the mudharabah model (column 2), the NPF×PLS and NPF×REGGDP interactions are both positive and statistically significant, implying that banks with larger mudharabah shares and those operating in regions with higher growth experience less negative impact of NPF on ROA. These patterns are consistent with Hypotheses 2a and 3 in the mudharabah specification, indicating that both PLS intensity and regional growth mitigate the adverse effect of credit risk on profitability. Comparing the mudharabah and musharakah specifications further shows that the moderating effect arises predominantly through mudharabah rather than musharakah, so that the composition of PLS contracts matters for how NPF feeds into profitability, in line with Hypothesis 2b. However, the negative and significant three-way interaction (NPF×PLS×REGGDP) indicates that mudharabah and regional growth jointly moderate the transmission of credit risk in a nonlinear way.

The cushioning role of mudharabah is strongest in weaker-growth environments, and tends to taper off as regional growth improves. This pattern runs counter to Hypothesis 4, which predicts that the attenuation of the NPF effect would be most pronounced when both PLS shares and regional growth are high. By contrast, the corresponding interaction terms in the total PLS and musharakah specifications are small and imprecisely estimated, suggesting that aggregating contracts or focusing on musharakah alone does not capture the stabilizing mechanism as clearly. Control variables behave as expected but are generally not significant, and the within R-squared values around 7–8 percent are typical for bank-level panel regressions with fixed effects, indicating that much of the cross-sectional heterogeneity in profitability is absorbed by the bank dummies. Overall, the results support Hypothesis 1, provide partial support for Hypotheses 2a and hypothesis 3, substantiate the contract-heterogeneity channel in Hypothesis 2b, and do not support the triple-moderation pattern posited in Hypothesis 4.

While these patterns appear in all three specifications, the interaction structure is most clearly identified in the Mudharabah model. Although Table 4 reports three alternative specifications, we focus on the discussion and marginal-effects analysis of the mudharabah specification in column (2). This is the only model in which the interaction terms between the NPF, PLS, and regional growth are jointly estimated and statistically meaningful. The NPF×PLS and NPF×REGGDP terms were both positive and significant, and the three-way interaction NPF×PLS×REGGDP was negative and significant at the 5 percent level. Taken together, these coefficients yield a coherent pattern that is consistent with the interpretation that mudharabah and regional growth jointly attenuate the pass-through from NPF to profitability, with the cushioning effect being strongest at low-to-moderate levels of mudharabah and regional growth and tapering off when both are high.

Formally, the marginal effect of NPF on ROA implied by the Mudharabah model based on Equation (1) can be written as

$$\frac{\partial ROA_{it}}{\partial NPF_{it}} = \beta_1 + \beta_4 PLS_{it} + \beta_5 GRDP_{rt} \times + \beta_7 \left(PLS_{it} X\ GRDP_{it}\right) \quad (2)$$

Equation (2) shows the conditional marginal effect of NPF on ROA, as implied by Equation (1). As Equation (1) includes interaction terms involving NPF, the effect of NPF is not constant and varies with PLS and regional growth. Accordingly, Equation (2) is obtained by taking the partial derivative of Equation (1) with respect to the NPF. Where $\beta_1$is the main effect of NPF, $\beta_4$captures how the NPF effect changes with PLS, $\beta_5$captures how the NPF effect changes with regional growth, and $\beta_7$captures how the NPF–PLS moderation varies across GRDP conditions.

Using the estimated coefficients from Column (2), we evaluate this expression for different combinations of mudharabah shares and regional GDP per capita growth. Figure 1 plots the resulting marginal effects of NPF on ROA for mudharabah shares of 0, 2, 5, and 10 percent of total financing on the horizontal axis, and for regional growth fixed at the 25th (low), 50th (median), and 75th (high) percentiles of the sample distribution. All lines lie below zero, confirming that NPF is always detrimental to profitability, but the marginal effect becomes less negative as mudharabah share increases. The slope is steepest under low regional growth and flattens as the growth improves.

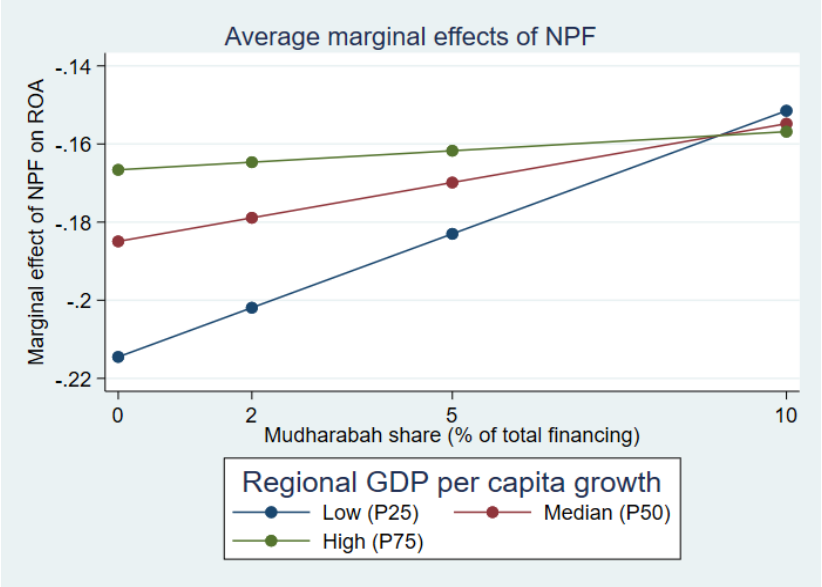


**Figure 1.** Marginal effect of NPF considering the level of mudharabah share and regional GDP per capita growth
Source: Data processed (2025)

A detailed explanation is provided in Figure 1. When the mudharabah share is zero, a one-percentage-point increase in NPF reduces ROA by approximately 0.21 percentage points at low regional growth, 0.18 percentage points at median growth, and 0.17 percentage points at high growth. As the mudharabah share rises to 10 percent of total financing, the marginal effect of NPF becomes less negative, stabilizing at roughly –0.15 to –0.16 percentage points across the three growth levels. Thus, over the grid of values considered, larger mudharabah portfolios and somewhat stronger regional growth clearly attenuate the adverse impact of NPF on profitability, even though the effect remains negative in all cases. Consistent with this, the 95-percent confidence intervals associated with these marginal effects lie entirely below zero for all combinations of mudharabah and regional growth, indicating that problematic financing is always significantly harmful for IRB profitability within the range observed in our data.

## Discussion

To interpret these findings, we relied on three mechanisms developed in the literature review. First, the asset quality channel implies that non-performing financing (NPF) reduces profitability through impairment costs, recovery expenses, and the expansion of non-earning assets. Second, the risk-sharing promise of PLS contracts (mudharabah and musharakah) can attenuate this transmission, but only conditionally, because PLS also introduces agency frictions, verification costs, and governance demands that may offset its stabilizing properties. Third, regional macroeconomic conditions operate as state variables that reshape borrower cash flows and competitive intensity, thereby modifying both baseline credit risk and the effectiveness of contractual risk-sharing (Belkhaoui et al., 2020; Bilgin et al., 2021; Saleem et al., 2024; Sutrisno & Widarjono, 2022; Warninda et al., 2019).

The results first reaffirm a strong and economically meaningful credit risk channel for IRBs. Across all three specifications, higher NPF is robustly associated with lower ROA, and marginal-effect analysis shows that this adverse impact remains negative for all combinations of PLS intensity and regional growth, even though its magnitude varies. This result is consistent with impairment and income mechanisms. As NPF increases, a larger share of financing ceases to generate realized returns, while expected loss recognition and workout costs increase, mechanically compressing ROA. In the IRBs setting, which serves medium, small, and micro borrowers with localized information, monitoring and recovery costs can be relatively high, amplifying the profitability penalty for deteriorating asset quality (Addury & Ramadhani, 2024). Similarly, recent IRB evidence for Indonesia identifies credit risk as a key driver of stability and performance outcomes (Hendri et al., 2025).

At the same time, the interaction terms reveal that how credit risk translates into profitability depends on both the financing mix and regional conditions, with mudharabah playing a distinct role. The mudharabah specification shows that the NPF×PLS and NPF×GRDP interactions are positive and significant, while the three-way term NPF×PLS×GRDP is negative and significant. The marginal-effect plot indicates that increasing the mudharabah share from 0 to approximately 10 percent systematically dampens the sensitivity of ROA to NPF. This pattern is consistent with the PLS literature, which emphasizes that mudharabah can soften the risk–profitability pass-through when it is deployed selectively and supported by adequate monitoring and governance. At modest portfolio shares, banks may allocate mudharabah to relationship-based clients, where screening and verification are operationally feasible, enabling risk-sharing and partnership features to dampen the marginal earnings impact of deteriorating financing quality. However, PLS effects are widely documented as conditional when moral hazard and adverse selection risks, together with the cost of verification, dominate when governance quality and monitoring capacity are weak or when PLS scales too quickly (Meslier et al., 2020b; Mimoun et al., 2024; Salman, 2023; Sutrisno & Widarjono, 2022).

The concentration of moderation effects in the mudharabah model is also consistent with evidence that mudharabah and musharakah transmit risk differently and can exhibit turning points where additional PLS shifts from risk-mitigating to risk-aggravating once agency costs and monitoring burdens dominate. This contract-specific and non-linear behavior has been documented for Indonesian Islamic banking and aligns with broader cross-country evidence on equity-based financing and risk (Annizar & Junarsin, 2025; Mukhibad et al., 2023; Warninda et al., 2019). Systematic reviews of PLS financing stress, however, that its stabilizing properties are conditional on governance quality, monitoring capacity, and institutional frictions so that benefits are not automatic (Fahamsyah et al., 2024). In this context, our results confirm that PLS moderates the NPF–profitability link, but the effect is concentrated in the Mudharabah model and does not generalize to musharakah or to an aggregate PLS measure, underscoring the importance of contract composition rather than total PLS exposure per se (Chairina, 2025; Widarjono, 2021).

Finally, the moderating role of regional growth and sign pattern of the interaction terms highlight the importance of local macroeconomic conditions. The negative coefficient on GRDP, alongside the positive NPF×GRDP term, is compatible with a setting in which fast-growing districts are more competitive, compressing margins on average, yet still attenuating the marginal damage of credit problems. This interpretation resonates with recent work showing that macroeconomic and socio-economic environments are crucial determinants of NPF and the performance of IRB and Islamic banking more broadly (Aprilian & Sudarmawan, 2024; Retnasih, 2023; Widarjono & Mifrahi, 2024). However, the significant negative three-way interaction suggests that mudharabah and favorable regional growth behave more like substitutes than complements in stabilizing profitability. Mudharabah appears to be the most effective risk-sharing buffer in weaker-growth areas, with its marginal cushioning effect tapering as growth increases. The macroeconomic results are consistent with the literature that treats regional growth as a state variable reshaping borrower repayment capacity and default dynamics. Stronger real activities can improve cash flow and reduce distress, thereby attenuating the marginal damage caused by credit deterioration. At the same time, the negative three-way interaction suggests that mudharabah's buffering role may

weaken as growth accelerates, which is plausible if faster-growing districts also exhibit stronger competition and strategic interaction in lending that compresses margins and strains monitoring resources.

Under such conditions, monitoring-intensive PLS contracts may deliver smaller incremental stabilization because operational bandwidth and verification capacity become binding constraints. More broadly, evidence shows that uncertainty regimes and macro conditions can materially shift stability dynamics across banking systems, supporting the interpretation that contractual risk-sharing and growth need not be complementary across all states of the world (Abusharbeh, 2023; Bilgin et al., 2021; Le et al., 2022; Mohamed & Elgammal, 2023). This contradicts Hypothesis 4, which anticipated the strongest attenuation of the NPF effect when both mudharabah shares and regional growth are high. For policy and practice, the findings imply that simply raising PLS share in high-growth markets is unlikely to guarantee resilience. Rather, the IRB needs to combine calibrated mudharabah exposure with strengthened screening, monitoring, and local information systems, particularly in slower-growing districts, where risk-sharing contracts can play a more critical counter-cyclical role.

## Conclusion

Utilizing bank fixed effects and interaction-based marginal effects for 135 Indonesian Islamic Rural Banks (IRBs) from 2019 to 2024, this study demonstrates that the impact of non-performing financing (NPF) on profitability depends on both the composition of Profit-and-Loss Sharing (PLS) contracts and regional economic conditions. The findings reveal a robust negative baseline relationship between NPF and Return on Assets (ROA), confirming credit risk as a primary determinant of profitability. Notably, the study finds that while aggregate PLS and musharakah do not consistently offer protection, a higher share of mudarabah systematically mitigates the damaging effects of NPF. Furthermore, stronger regional GDP per capita growth serves as a vital buffer, reducing the profitability loss associated with credit risk. However, the results suggest that high levels of mudarabah and strong regional growth act as substitutes rather than complements, meaning the strongest buffering effect occurs at low-to-moderate levels of both factors rather than when both are simultaneously at their peak.

These findings offer significant practical insights for IRB managers and policymakers, suggesting that management should focus on the strategic scale of mudarabah exposure—supported by rigorous screening and governance—particularly in regions with volatile growth. For regulators, the results highlight the need for a nuanced supervisory approach that recommends specific PLS configurations based on regional macroeconomic conditions rather than applying a uniform contractual template. To further enhance these insights, future research should adopt dynamic panel approaches to account for profitability persistence and utilize borrower-level data to directly test monitoring mechanisms. Additionally, employing stronger identification strategies, such as exploiting regulatory changes or regional shocks, and conducting cross-country comparisons would help validate whether the observed substitutability between contract types and regional growth remains consistent across different institutional settings and business cycles.

### Acknowledgements

This research was funded by the Hibah Internal Universitas Pancasila Tahun Akademik 2024/2025, Number: 4640/LPPM/UP/IX/2025.

### Author contributions

Conceptualization: Chaerani Nisa
Data curation: Chaerani Nisa
Formal analysis: Dewi Kurniawati
Investigation: Dewi Kurniawati
Methodology: Tia Ichwani
Project administration: Tia Ichwani

Supervision: Chaerani Nisa
Validation: Chaerani Nisa
Visualization: Chaerani Nisa
Writing – original draft: Dewi Kurniawati
Writing – review & editing: Tia Ichwani

## References

Abdul-Rahman, A., Abdul Latif, R., Muda, R., & Abdullah, M. A. (2014). Failure and potential of profit-loss sharing contracts: A perspective of New Institutional, Economic (NIE) Theory. *Pacific-Basin Finance Journal, 28*, 136–151. https://doi.org/10.1016/j.pacfin.2014.01.004

Abusharbeh, M. T. (2023). Modeling the factors of portfolio at risk for microfinance institutions in Palestine. *Cogent Economics & Finance, 11*(1), 2186042. https://doi.org/10.1080/23322039.2023.2186042

Addury, M. M., & Ramadhani, A. K. P. (2024). The influence of financing model and credit risk on financial stability (Study of Islamic Rural Banks in Java Island). *Journal of Islamic Monetary Economics and Finance, 10*(3), 427–444. https://doi.org/10.21098/jimf.v10i3.1788

Afkar, T., Widodo, U. P. W., Wisudanto, Naufalin, L. R., & Hariawan, F. (2025). Profit sharing system in Islamic banking before, during, and after Covid-19 pandemic, any moderation? *JASF: Journal of Accounting and Strategic Finance, 8*(1), 50–73. https://doi.org/10.33005/jasf.v8i1.569

Afriadi, F., Pranoto, P., Kurniawaty, E., & Zamzami, R. M. (2024). Islamic rural bank mission drift: Equity financing vs debt-based financing. *Jurnal Ekonomi & Keuangan Islam, 10*(1), 41–56. https://doi.org/10.20885/JEKI.vol10.iss1.art4

Ahmad, S., Lensink, R., & Mueller, A. (2020). The double bottom line of microfinance: A global comparison between conventional and Islamic microfinance. *World Development, 136*, 105130. https://doi.org/10.1016/j.worlddev.2020.105130

Albertazzi, U., & Gambacorta, L. (2009). Bank profitability and the business cycle. *Journal of Financial Stability, 5*(4), 393–409. https://doi.org/10.1016/j.jfs.2008.10.002

Alhammadi, S., Alotaibi, K. O., & Hakam, D. F. (2022). Analysing Islamic banking ethical performance from Maqāṣid al-Sharīʿah perspective: Evidence from Indonesia. *Journal of Sustainable Finance & Investment, 12*(4), 1171–1193. https://doi.org/10.1080/20430795.2020.1848179

Ali, N. (2022). Debt financing vs. equity financing in the context of Maqasid Al-Shari'ah in Islamic finance. *Journal of Development and Social Sciences, 3*(III), 191–202. https://doi.org/10.47205/jdss.2022(3-III)18

Annizar, R. A., & Junarsin, E. (2025). Mudharabah, musyarakah, financing risk, and performance of Islamic banks: Empirical evidence from Indonesia. *Jurnal Ekonomi & Keuangan Islam, 11*(1), 131–142. https://doi.org/10.20885/JEKI.vol11.iss1.art9

Aprilian, R. Z., & Sudarmawan, B. N. (2024). NPF of Islamic Rural Banks in Indonesia: Do socio-economic factors and bank performance matter? *Journal of Islamic Economics and Finance Studies, 5*(2), 405–422. https://doi.org/10.47700/jiefes.v5i2.10307

Argantara, Z. R., & Fitriyah, N. (2024). The effect of profit-sharing financing on the financial performance of Islamic banks. *Jurnal Ilmiah Manajemen Kesatuan, 11*(3), 1345–1354. https://doi.org/10.37641/jimkes.v11i3.2329

Askari, H., & Mirakhor, A. (2014). Risk sharing, public policy and the contribution of Islamic finance. *PSL Quarterly Review, 67*(271), 345–379. https://doi.org/10.13133/2037-3643/13022

Asutay, M. (2012). Conceptualising and locating the social failure of Islamic finance: Aspirations of Islamic moral economy vs the realities of Islamic finance. *Asian and African Area Studies, 11*(2), 93–113.

Asutay, M., & Yilmaz, I. (2025). Financialisation of Islamic finance: A Polanyian approach on the hegemony of market logic over Islamic logic. *New Political Economy, 30*(2), 267–286. https://doi.org/10.1080/13563467.2024.2424170

Athanasoglou, P. P., Brissimis, S. N., & Delis, M. D. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money, 18*(2), 121–136. https://doi.org/10.1016/j.intfin.2006.07.001

Athari, S. A., & Bahreini, M. (2023). The impact of external governance and regulatory settings on the profitability of Islamic banks: Evidence from Arab markets. *International Journal of Finance & Economics, 28*(2), 2124–2147. https://doi.org/10.1002/ijfe.2529

Azmat, S., Hassan, M. K., Ali, H., & Azad, A. S. M. S. (2021). Religiosity, neglected risk and asset returns: Theory and evidence from Islamic finance industry. *Journal of International Financial Markets, Institutions and Money, 74*, 101294. https://doi.org/10.1016/j.intfin.2021.101294

Azmat, S., Skully, M., & Brown, K. (2015). Can Islamic banking ever become Islamic? *Pacific-Basin Finance Journal, 34*, 253–272. https://doi.org/10.1016/j.pacfin.2015.03.001

Bakhouche, A., El Ghak, T., & Alshiab, M. (2022). Does Islamicity matter for the stability of Islamic banks in dual banking systems? *Heliyon, 8*(4), e09245. https://doi.org/10.1016/j.heliyon.2022.e09245

Beck, R., Jakubik, P., & Piloiu, A. (2013). *Non-performing loans: What matters in addition to the economic cycle?* (SSRN Scholarly Paper No. 2214971). Social Science Research Network. https://doi.org/10.2139/ssrn.2214971

Belkhaoui, S., Alsagr, N., & van Hemmen, S. F. (2020). Financing modes, risk, efficiency and profitability in Islamic banks: Modeling for the GCC countries. *Cogent Economics & Finance, 8*(1), 1750258. https://doi.org/10.1080/23322039.2020.1750258

Berger, A. N., & De Young, R. (1997). Problem loans and cost efficiency in commercial banks. *Journal of Banking & Finance, 21*(6), 849–870. https://doi.org/10.1016/S0378-4266(97)00003-4

Bhatti, M., Saleem, M. S., & Mansor, F. (2025). Need for reform in AAOIFI standards on murabaha financing: Evidence from Islamic banks in Pakistan. *Quality & Quantity, 59*(1), 59–78. https://doi.org/10.1007/s11135-024-01974-y

Bilgin, M. H., Danisman, G. O., Demir, E., & Tarazi, A. (2021). Economic uncertainty and bank stability: Conventional vs. Islamic banking. *Journal of Financial Stability, 56*, 100911. https://doi.org/10.1016/j.jfs.2021.100911

Bonaccorsi di Patti, E., & Palazzo, F. (2020). Bank profitability and macroeconomic conditions: Are business models different? *Economic Notes, 49*(2), e12155. https://doi.org/10.1111/ecno.12155

Brambor, T., Clark, W. R., & Golder, M. (2006). Understanding interaction models: Improving empirical analyses. *Political Analysis, 14*(1), 63–82. https://doi.org/10.1093/pan/mpi014

Butt, U., & Chamberlain, T. (2025). Performance of Islamic banks during the Covid-19 pandemic: An empirical analysis and comparison with conventional banking. *Journal of Risk and Financial Management, 18*(6), 308. https://doi.org/10.3390/jrfm18060308

Cahyani, P. T., Rizaludin, R., & Janwari, Y. (2024). Musyarakah Mutanaqisah as a financing solution for working capital and productive property in Islamic financial institutions in Indonesia. *Mabahits Al-Uqud, 1*(2), 94–112. https://doi.org/10.15575/mau.v1i2.1238

Chairina, C. (2025). Analisis pengaruh pembiayaan mudharabah dan musyarakah terhadap profitabilitas Bank Syariah Indonesia periode 2021-2024. *Al-Muhtarifin: Islamic Banking and Islamic Economic Journal, 4*(1), 1–8. https://doi.org/10.30596/almuhtarifin.v1i1.23202

Dietrich, A., & Wanzenried, G. (2011). Determinants of bank profitability before and during the crisis: Evidence from Switzerland. *Journal of International Financial Markets, Institutions and Money, 21*(3), 307–327. https://doi.org/10.1016/j.intfin.2010.11.002

Dimitrios, A., Helen, L., & Mike, T. (2016). Determinants of non-performing loans: Evidence from Euro-area countries. *Finance Research Letters, 18*, 116–119. https://doi.org/10.1016/j.frl.2016.04.008

El, I., Masyhuri, M., & Yuliana, I. (2022). The effect of mudharabah and musyarakah financing on profitability of Islamic banks in Indonesia. *Indonesian Interdisciplinary Journal of Sharia Economics (IIJSE), 5*(1), 225–234. https://doi.org/10.31538/iijse.v5i1.1969

Fahamsyah, M. H., Laila, N., Rakhmat, A. S., & Shabbir, M. S. (2024). Profit-loss sharing in Islamic banking: Global insights from a systematic review. *Economica: Jurnal Ekonomi Islam, 14*(2), 175–203. https://doi.org/10.21580/economica.2023.14.2.26021

Farihana, S., & Rahman, M. S. (2021). Can profit and loss sharing (PLS) financing instruments reduce the credit risk of Islamic banks? *Empirical Economics, 61*(3), 1397–1414. https://doi.org/10.1007/s00181-020-01912-5

Fithria, A., Sholihin, M., Arief, U., & Anindita, A. (2021). Management ownership and the performance of Islamic microfinance institutions: A panel data analysis of Indonesian Islamic rural banks. *International Journal of Islamic and Middle Eastern Finance and Management, 14*(5), 950–966. https://doi.org/10.1108/IMEFM-05-2020-0257

Galow, B., Georgescu, O. M., & Ponte Marques, A. (2024). *Loss-given-default and macroeconomic conditions* (SSRN Scholarly Paper No. 4903843). Social Science Research Network. https://doi.org/10.2139/ssrn.4903843

Ghosh, A. (2015). Banking-industry specific and regional economic determinants of non-performing loans: Evidence from US states. *Journal of Financial Stability, 20*, 93–104. https://doi.org/10.1016/j.jfs.2015.08.004

Handoko, L., & Firmansyah, F. (2022). The performance of profit and loss sharing (PLS) products: Evidence from Indonesian Islamic Rural Banks (IRB). *Islaminomics: Journal of Islamic Economics, Business and Finance, 12*(1), 1–15. https://doi.org/10.47903/islaminomics.v12i1.180

Harahap, B., Risfandy, T., Futri, I. N., Harahap, B., Risfandy, T., & Futri, I. N. (2023). Islamic law, Islamic finance, and sustainable development goals: A systematic literature review. *Sustainability, 15*(8), 6626. https://doi.org/10.3390/su15086626

Hasan, M., & Dridi, J. (2010). *The effects of the global crisis on Islamic and conventional banks: A comparative study* (IMF Working Paper No. 2010/201). International Monetary Fund.

Hendri, Z., Arshad, N. C., Rahmany, S., Wiharto, S., & Sintarini, F. (2025). The nexus between risk and bank stability in the Indonesian Islamic Rural Bank. *Jurnal Ekonomi & Keuangan Islam, 11*(2), 287–301. https://doi.org/10.20885/JEKI.vol11.iss2.art8

Hidayah, N., & Karimah, N. A. (2023). Are Sharia financing schemes profitable? The case of Islamic Rural Banks in Indonesia. *EL DINAR: Jurnal Keuangan Dan Perbankan Syariah, 11*(1), 59–77. https://doi.org/10.18860/ed.v11i1.19561

Hsiao, C. (2007). Panel data analysis—Advantages and challenges. *Test, 16*(1), 1–22. https://doi.org/10.1007/s11749-007-0046-x

Islahi, A. A. (2013). *Risk-sharing in finance: The Islamic finance alternative* (SSRN Scholarly Paper No.

3087187). Social Science Research Network. https://doi.org/10.2139/ssrn.3087187

Jaapar, A. M., Hamid, N. A. A., & Chukari, N. A. (2025). The determinant of Islamic bank profitability and stability in Malaysia. *International Journal of Management, Finance and Accounting, 6*(1), 195–224. https://doi.org/10.33093/ijomfa.2025.6.1.7

Jeon, B. N., & Wu, J. (2014). Global banks and internal capital markets: Evidence from bank-level panel data in emerging economies. *Journal of Multinational Financial Management, 28*, 79–94. https://doi.org/10.1016/j.mulfin.2014.10.003

Khandker, A., & Khaled, S. (2014). *Profit-loss sharing contract formation under zero interest financial system* (IDEAS Working Paper Series from RePEc). https://www.proquest.com/publiccontent/docview/1698362613

Le, H. N. Q., Nguyen, T. V. H., & Schinckus, C. (2022). Bank lending behaviour and macroeconomic factors: A study from strategic interaction perspective. *Heliyon, 8*(11), e11906. https://doi.org/10.1016/j.heliyon.2022.e11906

Le, T. D. Q., & Ngo, T. (2020). The determinants of bank profitability: A cross-country analysis. *Central Bank Review, 20*(2), 65–73. https://doi.org/10.1016/j.cbrev.2020.04.001

Louzis, D. P., Vouldis, A. T., & Metaxas, V. L. (2012). Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios. *Journal of Banking & Finance, 36*(4), 1012–1027. https://doi.org/10.1016/j.jbankfin.2011.10.012

Mateev, M., Sahyouni, A., & Al Masaeid, T. (2024). Bank performance before and during the Covid-19 crisis: Does efficiency play a role? *Review of Managerial Science, 18*(1), 29–82. https://doi.org/10.1007/s11846-022-00611-y

Mergaliyev, A., Asutay, M., Avdukic, A., & Karbhari, Y. (2021). Higher ethical objective (Maqasid al-Shari'ah) augmented framework for Islamic banks: Assessing ethical performance and exploring its determinants. *Journal of Business Ethics, 170*(4), 797–834. https://doi.org/10.1007/s10551-019-04331-4

Meslier, C., Risfandy, T., & Tarazi, A. (2020). Islamic banks' equity financing, Shariah supervisory board, and banking environments. *Pacific-Basin Finance Journal, 62*, 101354. https://doi.org/10.1016/j.pacfin.2020.101354

Mimoun, M. B., Hamrouni, D., & Raies, A. (2024). Islamic banking finance and private sector investment in dual banking systems: The impact of institutional quality. *International Journal of Islamic and Middle Eastern Finance and Management, 18*(1), 201–223. https://doi.org/10.1108/IMEFM-01-2024-0034

Mohamed, T. S., & Elgammal, M. M. (2023). Credit risk in Islamic microfinance institutions: The role of women, groups, and rural borrowers. *Emerging Markets Review, 54*, 100994. https://doi.org/10.1016/j.ememar.2022.100994

Moosa, R. (2023). An overview of Islamic accounting: The Murabaha contract. *Journal of Risk and Financial Management, 16*(7), 335. https://doi.org/10.3390/jrfm16070335

Muhammad, R., Suluki, A., & Nugraheni, P. (2020). Internal factors and non-performing financing in Indonesian Islamic rural banks. *Cogent Business & Management, 7*(1), 1823583. https://doi.org/10.1080/23311975.2020.1823583

Mukhibad, H., Jayanto, P. Y., Budiantoro, R. A., Hapsoro, B. B., Nurasyiah, A., & Musyaffi, A. M. (2023). Equity-based financing and risk in Islamic banks: A cross-country analysis. *Cogent Economics & Finance, 11*(2), 2235117. https://doi.org/10.1080/23322039.2023.2235117

Nb, F. R., Susamto, A. A., & Saleh, S. (2024). Profit-and-loss sharing financing, operating expenses, and the intermediation cost of Islamic rural banks in Indonesia. *Journal of Islamic Monetary Economics and Finance, 10*(2), 379–396. https://doi.org/10.21098/jimf.v10i2.1914

Okumuş, H. Ş. (2024). Performance assessment of participation banks based on Maqasid al-Shari'ah framework: Evidence from Türkiye. *Borsa Istanbul Review, 24*(4), 806–817. https://doi.org/10.1016/j.bir.2024.04.011

Pancotto, L., ap Gwilym, O., & Williams, J. (2024). The evolution and determinants of the non-performing loan burden in Italian banking. *Pacific-Basin Finance Journal, 84*, 102306. https://doi.org/10.1016/j.pacfin.2024.102306

Pramesti, C. A., & Anggraini, I. K. (2024). The impact of profit-sharing and sale-based financing on Islamic bank stability. *Jurnal Ekonomi Syariah Teori Dan Terapan, 11*(3), 254–267. https://doi.org/10.20473/vol11iss20243pp254-267

Rafidah, R. (2023). Indonesian Islamic bank return on assets analysis: Moderating effect of musyarakah financing. *Al-Uqud: Journal of Islamic Economics, 7*(2), 200–216. https://doi.org/10.26740/aluqud.v7n2.p200-216

Retnasih, N. R. (2023). Exploring the dynamic nexus between Indonesian economic forces and Islamic banking financial performance. *Journal of Islamic Economics and Finance Studies, 4*(2), 236–256. https://doi.org/10.47700/jiefes.v4i2.6581

Rosmelyana, F. N., Sumiati, A., & Susanti, S. (2024). Pengaruh pembiayaan jual beli, pembiayaan bagi hasil, dan non-performing financing terhadap profitabilitas Bank Pembiayaan Rakyat Syariah tahun 2023. *Indonesian Journal of Economy, Business, Entrepreneurship and Finance, 4*(2), 152–165. https://ijebef.esc-id.org/index.php/home

Saleem, A., Daragmeh, A., Zahid, R. M. A., & Sági, J. (2024). Financial intermediation through risk sharing vs non-risk sharing contracts, role of credit risk, and sustainable production: Evidence from leading countries in Islamic finance. *Environment, Development and Sustainability, 26*(5), 11311–11341. https://doi.org/10.1007/s10668-023-03298-7

Salman, K. R. (2023). Exploring moral hazard and adverse selection in profit sharing contract. *International Journal of Professional Business Review, 8*(3), e0955. https://doi.org/10.26668/businessreview/2023.v8i3.955

Salsabilla, L. Z., & Jaya, T. J. (2024). The impact of non-performing financing and operational efficiency on the stability of Islamic banks in Persian Gulf countries. *Journal of Islamic Economics Lariba, 10*(2), 623–640. https://doi.org/10.20885/jielariba.vol10.iss2.art1

Sandhyapranita, I., Andriansyah, Y., & Hasan, B. B. (2024). Macroeconomic impacts on Islamic bank profitability: Evidence from Indonesia's dual banking system. *Unisia, 42*(2), 178–190. https://doi.org/10.20885/unisia.vol42.iss2.art29

Setiawan, S. (2024). Optimizing Indonesian Sharia Rural Banks' performance: Insights from internal factors. *Ekspansi: Jurnal Ekonomi, Keuangan, Perbankan, Dan Akuntansi, 16*(2), 156–169. https://doi.org/10.31002/ekspansi.v16i2.1047

Sutrisno, S., & Widarjono, A. (2022). Is profit–loss-sharing financing matter for Islamic bank's profitability? The Indonesian case. *Risks, 10*(11), 207. https://doi.org/10.3390/risks10110207

Syahadatina, Z., Lestari, K. C., & Sahliyah, F. (2025). Financial ratio indicators and profitability in Islamic bank: The moderating effect of size and age bank. *JFBA: Journal of Financial Behavioural Accounting, 5*(1), 37–48. https://doi.org/10.33830/jfba.v5i1.12032

Warninda, T. D., Ekaputra, I. A., & Rokhim, R. (2019). Do Mudarabah and Musharakah financing impact Islamic Bank credit risk differently? *Research in International Business and Finance, 49*, 166–175. https://doi.org/10.1016/j.ribaf.2019.03.002

Wicaksono, S. A., Wulandari, P., & Hendranastiti, N. D. (2024). The effect of industry sector and profit-loss sharing financing on credit risk of Islamic banks in Indonesia considering Covid-19 pandemic. *Journal of Islamic Accounting and Business Research, 15*(5), 749–768.

https://doi.org/10.1108/JIABR-04-2023-0135

Widarjono, A. (2021). The role of equity financing on the profitability of Indonesian Islamic banks. *Muqtasid: Jurnal Ekonomi Dan Perbankan Syariah, 12*(2), 129–143. https://doi.org/10.18326/muqtasid.v12i2.129-143

Widarjono, A., & Mifrahi, M. (2024). Sectoral financing concentration and Sharia Rural Banks' profitability. *Jurnal Ekonomi Dan Bisnis Islam (Journal of Islamic Economics and Business), 10*(2), 264–284. https://doi.org/10.20473/jebis.v10i2.59121

Wong, J. B., & Zhang, Q. (2024). ESG reputation risks, cash holdings, and payout policies. *Finance Research Letters, 59*, 104695. https://doi.org/10.1016/j.frl.2023.104695

Yuan, M., Chen, W., & Qin, J. (2021). Bank-based financing and catch-up innovation: A three-way interaction approach. *Economics Letters, 209*, 110089. https://doi.org/10.1016/j.econlet.2021.110089

Zafir, A. A., & Sudarjah, G. M. (2025). Credit risk, Covid, and bank profitability in Indonesian conventional banks. *Economics, Finance, and Business Review, 2*(2), 78–87. https://doi.org/10.20885/efbr.vol2.iss2.art2