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DOES DIVERSIFICATION AFFECT FINANCING RISK IN INDONESIAN ISLAMIC BANKS? AN ARDL APPROACH

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ABSTRACT - Islamic banking in Indonesia faces unique challenges related to financing risks (NPF), particularly in the context of financing diversification (FDV), income diversification (IDV), and other influencing factors. This study investigates the impact of FDV, IDV, bank-specific factors, and macroeconomic variables on NPF in Indonesia's Islamic banking sector. Using monthly data from 2016 to March 2024 and employing the ARDL approach, this study analyzes the short-term and long-term effects of these factors. The results indicate that FDV and IDV do not significantly influence NPF. Similarly, bank-specific factors such as capital (CAP), efficiency (OPE), and bank size (SIZE) are not significant determinants of NPF in Islamic banking. However, asset quality (AQ) and diversification (DIV) were found to significantly increase NPF. Among macroeconomic factors, inflation (INF) has a significant positive effect on NPF in both the short and long term, whereas the BI rate (BRT) has a significant negative effect. This research highlights the need for Islamic banks to mitigate financing risks associated with diversified products, both from PLS and non-PLS contracts, while maintaining public trust by enhancing their credibility and existence as intermediary institutions. Emphasis should be placed on optimizing product diversification strategies, improving asset quality, and monitoring macroeconomic conditions to sustain financial stability.
Keywords: Diversification, Asset Quality, Capital, Efficiency, Bank Size, Inflation, BI Rate, NPF

ABSTRAK *- **Apakah Diversifikasi Mempengaruhi Risiko Pembiayaan pada Bank Syariah di Indonesia? Suatu Pendekatan ARDL.** Perbankan syariah di Indonesia menghadapi tantangan terkait risiko pembiayaan (NPF), terutama dalam konteks diversifikasi pembiayaan (FDV), diversifikasi pendapatan (IDV), dan faktor lainnya. Penelitian ini menyelidiki dampak FDV, IDV, faktor spesifik bank, dan variabel makroekonomi terhadap NPF di sektor perbankan syariah Indonesia. Menggunakan data bulanan dari tahun 2016 hingga Maret 2024, penelitian ini menganalisis efek jangka pendek dan panjang dari faktor-faktor tersebut dengan pendekatan ARDL. Hasil penelitian menunjukkan bahwa FDV dan IDV tidak berpengaruh signifikan terhadap NPF. Begitu juga dengan faktor spesifik bank seperti modal (CAP), efisiensi (OPE), dan ukuran bank (SIZE) tidak menjadi determinan signifikan. Akan tetapi, kualitas aset (AQ) dan diversifikasi (DIV) menunjukkan pengaruh yang signifikan terhadap peningkatan NPF pada bank syariah. Diantara sekian faktor makroekonomi, inflasi (INF) memiliki pengaruh positif signifikan terhadap NPF dalam jangka pendek dan panjang, sedangkan BI rate (BRT) memiliki pengaruh negatif signifikan. Penelitian ini menyoroti pentingnya bagi bank syariah mengurangi risiko pembiayaan yang muncul dari produk diversifikasi, baik dari kontrak PLS maupun non-PLS, sambil mempertahankan kepercayaan publik dengan meningkatkan kredibilitas dan eksistensinya sebagai lembaga intermediasi. Perhatian harus difokuskan pada optimalisasi strategi diversifikasi produk, peningkatan kualitas aset, dan pemantauan kondisi makroekonomi untuk menjaga stabilitas keuangan.*
Kata Kunci: *Diversifikasi, Kualitas Aset, Modal, Efisiensi, Ukuran Bank, Inflasi, BI Rate, NPF*

INTRODUCTION

The banking sector is widely recognized as a fundamental driver of economic activity, primarily through its role in facilitating access to credit, which empowers households to save, invest, and increase their expenditures (Norawati et al., 2022). A lack of access to credit can paralyze economic activity, as illustrated by major financial crises such as the U.S. financial crisis in the 1980s, the Asian financial crisis in the late 1990s, the subprime mortgage crisis, and the European debt crisis (Abdelaziz, Rim, & Helmi, 2022; Saleuddin & Jansson, 2021). In this context, the resilience of Islamic banks during financial crises has drawn significant attention. Unlike their conventional counterparts, Islamic banks leverage Shariah-compliant risk management tools, which have contributed to their relative stability (Wajahat & Turkhan, 2017; Chouri et al., 2022).

Despite their resilience, Islamic banks face unique risks, particularly in financing, which can impact both short-term operations and long-term financial stability (Siddique, Khan, & Khan, 2022). The distinctiveness of Islamic banking lies in its use of Profit and Loss Sharing (PLS) contracts such as *Mudharabah* and *Musyarakah*, alongside non-PLS contracts like Ijarah, Salam, and Istisna' (Sutrisno, Widarjono, & Mohamad, 2023). However, the adoption of PLS contracts introduces significant credit risks. For instance, the absence of collateral requirements and limited managerial control over financed projects expose Islamic banks to elevated financing risks, leading to caution in PLS adoption (Chapra & Tariqullah, 2000; Ramli, Masyita, & Anwar, 2020). Consequently, many Islamic banks have gravitated toward non-PLS contracts, further complicating risk dynamics.

While Islamic banks have made strides in developing Shariah-compliant financial products, the determinants of financing risk in Islamic banking remain underexplored, especially in emerging economies like Indonesia. Current research presents mixed findings regarding the impact of diversification on bank risk. On one hand, diversification is theorized to reduce idiosyncratic shocks and achieve economies of scope (Sutrisno et al., 2023; Naili & Lahrichi, 2022). On the other hand, some studies highlight conflicting effects, wherein diversification can reduce efficiency and indirectly increase risk (Wu, Chen, Chen, & Jeon, 2020). Moreover, the literature predominantly focuses on specific contracts or aspects, such as PLS financing, without adequately addressing the broader implications of product diversification strategies

(Warninda, Ekaputra, & Rokhim, 2019; Alandejani & Asutay, 2017). This creates a significant gap in understanding how diversification both in income and financing impacts the overall risk profile of Islamic banks.

This study addresses the gaps by investigating the relationship between financing risk and diversification in Islamic banks, incorporating both PLS and non-PLS products. The primary objective is to analyze the impact of financing diversification, income diversification, and other factors on financing risk in Indonesian Islamic banking. It employs the ARDL approach to analyze both short-term and long-term impacts, offering a nuanced understanding of diversification dynamics. Unlike prior research, this study integrates bank-specific factors such as capital, efficiency, and asset quality, alongside macroeconomic determinants like inflation and interest rates. By focusing on Indonesia, a prominent Islamic banking market, the study provides context-specific insights into the determinants of financing risk.

The contributions of this study are significant from both theoretical and practical perspectives. Theoretically, it enhances the existing body of literature by elucidating the relationship between Profit and Loss Sharing (PLS)-based and non-PLS product diversification and financing risk in Islamic banking. The innovative application of the Autoregressive Distributed Lag (ARDL) model enables a thorough analysis of the short-term and long-term dynamics associated with Islamic banking product diversification. Practically, this study offers actionable insights for policymakers and financial institutions. Regulators can use the findings to design policies that encourage effective diversification without compromising Shariah principles. Similarly, Islamic banks can adopt targeted diversification strategies to mitigate risks and strengthen financial stability. This study will enhance financial stability in the Islamic banking sector, equipping both regulators and financial institutions with the tools needed to navigate the complex interplay between diversification and financing risk.

This paper is organized into several parts. The first part introduces the problem topic and research objectives. The second section reviews the relevant literature on this topic. The third section describes the data sources and research methodology used. The fourth section presents and discusses the empirical research results. The final section concludes this paper, outlining conclusions and research recommendations.

LITERATURE REVIEW

Non-Performing Financing and Diversification

Non-Performing Financing (NPF) measures the value of impaired financing relative to total financing and serves as a critical indicator of asset quality in Islamic banks. Widarjono, Anto, and Fakhrunnas (2020) highlighted two significant advantages of using NPF to assess bankruptcy risk in Islamic banks: (1) it directly reflects a bank's likelihood of bankruptcy, and (2) it is challenging for management to manipulate, making it a reliable metric. High NPF levels can pressure banks to increase provisioning for financing losses, limiting funds available for new financing and reducing overall profitability.

This study examines financing diversification and income diversification as key variables influencing financing risk. While prior research has extensively studied diversification's effect on financial performance, its relationship with financing risk has received limited attention (N. W. Sari, Najmudin, & Jati, 2023; Ayusaleha & Laila, 2022; Prastiwi & Anik, 2021; N. Sari & Annisa, 2021). Financing diversification, which involves allocating funds across various sectors and economic activities, aims to reduce the concentration of financing risks. By adopting Profit and Loss Sharing (PLS) contracts, Islamic banks can spread their exposure, reducing the likelihood of default risk (N. W. Sari et al., 2023). Shim (2019) demonstrated that loan diversification in U.S. banks significantly reduces credit risk, while Prastiwi and Anik (2021) reported that sectoral diversification mitigates credit risk in Indonesian banks. Similarly, Chen, Liang, and Yu (2018) found that credit diversification in Chinese commercial banks reduces financing risk, emphasizing its effectiveness as a mitigation strategy.

However, the unique structure of PLS contracts in Islamic banking presents distinct challenges. These contracts are often vulnerable to risks like moral hazard, asymmetric information, and adverse selection, which can increase financing risks (Azmat, Skully, & Brown, 2015). Other studies provide contrasting findings. For instance, Adzobu, Agbloyor, and Aboagye (2017) found that loan diversification does not mitigate credit risk in Ghanaian banks, whereas Pham et al. (2021) demonstrated its effectiveness in reducing banking risks in Vietnam. Šeho, Ibrahim, and Mirakhor (2021) examined loan and financing diversification in Islamic and conventional banks across the GCC and found that diversification can sometimes increase risk. Similarly, Al-Kayed and

Aliani (2020) observed that diversification heightens default risks in GCC countries.

Income diversification, which involves generating revenue from non-financing sources, is another avenue for mitigating risk and enhancing financial performance. It allows banks to achieve economies of scale and reduce reliance on traditional income streams, particularly when financing income declines (Setiawan, Putri, & Sukmawati, 2023). Widarjono et al. (2020) noted mixed impacts of income diversification on NPF in Indonesian Islamic banks, with both positive and negative effects reported. Moudud-Ul-Huq et al. (2023) argued that income diversification significantly reduces credit risk in Bangladeshi banks. Similarly, Wang and Lin (2021) observed that banks in the Asia-Pacific region with diversified income streams experienced lower overall risks. In contrast, other studies reported that income diversification could increase banking risks (Vuong & Nguyen, 2020; Gupta & Moudud-Ul-Huq, 2020). Zhou (2014) found no significant relationship between income diversification and risk in Chinese banks.

Given these conflicting findings, the relationship between diversification and financing risk remains ambiguous, particularly in the context of Islamic banks in Indonesia. To address this gap, the following hypotheses are proposed:

H_1: Financing diversification negatively influences financing risk
H_2: Income diversification negatively influences financing risk

Specific Bank Factors and Non-Performing Financing

Bank-specific factors are critical in determining Non-Performing Financing (NPF) levels. Asset quality, capital adequacy, efficiency, and bank size are among the key variables influencing financing risk. Asset quality is a central focus, as problematic loans can constrain new lending activities and adversely affect financial stability (Morosan & Scurtu, 2018). However, some studies suggest that higher asset quality might paradoxically increase risk by encouraging greater risk-taking behaviors. For instance, Hamdillah, Purwanto, and Ermawati (2021) found that better asset quality is associated with higher NPF in Indonesian rural banks. Similarly, Harizanto and Alfarisi (2020) observed that improved asset quality in Indonesian Islamic banking led to higher risk-taking and, consequently, increased NPF.

Capital adequacy is another critical determinant. Banks with low capital ratios are more vulnerable to failure, as predicted by the moral hazard hypothesis (Abid, Ouertani, & Zouari-Ghorbel, 2014). Empirical evidence suggests mixed relationships between capital adequacy and risk. While Waqas et al. (2019) found a negative correlation in South Asian banks, Ghosh (2017) reported a positive relationship between capital adequacy and risk. Syamlan and Jannah (2019) noted no significant effect of capital adequacy on NPF in Indonesian Islamic banks, highlighting the complexity of this relationship.

Efficiency is another variable with mixed findings. The "bad management" hypothesis posits that inefficient banks experience higher NPF due to poor credit portfolio management, while the "skimping" hypothesis argues that cost-cutting measures can lead to insufficient loan monitoring and increased risk (Jenkins, Alshareef, & Mohamad, 2023). Ghassan and Guendouz (2019) supported the former, linking inefficiency to higher NPF, while Rahman, Chowdhury, and Tania (2021) emphasized cost-related inefficiencies as a primary driver of non-performing loans.

Finally, bank size plays a role in financing risk. Larger banks may benefit from greater diversification and better resources, potentially lowering NPF levels (Alhassan, Kyereboah-Coleman, & Andoh, 2014). However, Jenkins et al. (2023) noted that this relationship remains inconclusive, necessitating further investigation.

Based on these findings, the following hypotheses are proposed:

H_3: Asset quality positively influences financing risk.
H_4: Capital adequacy negatively influences financing risk.
H_5: Diversification negatively influences financing risk.
H_6: Efficiency negatively influences financing risk.
H_7: Bank size negatively influences financing risk.

Macroeconomic Factors and Non-Performing Financing

Macroeconomic factors such as inflation and interest rates significantly influence NPF levels. Inflation, for instance, affects borrowers' repayment capacity by eroding the real value of their income, thereby increasing financing risk (Abdelaziz et al., 2022). Bolarinwa, Akinyele, and Vo (2021) observed that high inflation exacerbates NPF in Nigerian banks. Conversely, Nkusu (2011)

argued that inflation might reduce NPF by diminishing the real value of outstanding debts.

Interest rates are another critical factor. Although Islamic banks claim to operate without interest, they often use conventional interest rates as benchmarks for determining profit rates, making them indirectly exposed to changes in interest rates (Fakhrunnas et al., 2022). Rising interest rates increase borrowers' repayment burdens, which can elevate NPF levels, while declining rates may reduce financing risk (Ghosh, 2015).

Based on these dynamics, the following hypotheses are proposed:
H_8: Inflation positively influences financing risk.
H_9: Interest rates positively influences financing risk.

METHODOLOGY

Research Design

This study employs a quantitative research design to investigate the short-term and long-term effects of financing and income diversification on financing risk in Indonesian Islamic banking. The research utilizes monthly time-series data from 2016 to March 2024, making it well-suited for examining dynamic relationships over time. The Autoregressive Distributed Lag (ARDL) model is adopted as the primary econometric approach due to its robustness in handling variables with different integration orders, such as I(0), I(1), or a combination of both (Calal et al., 2023).

Data Collection

The data for this study comes from two main sources. First, bank-specific variables such as non-performing financing (NPF), financing diversification, income diversification, asset quality, capital, operational efficiency, and bank size are obtained from the Financial Services Authority (OJK). Second, macroeconomic variables, including inflation and the Bank Indonesia rate (BI rate), are sourced from the official websites of Bank Indonesia and the Central Statistics Agency (BPS). Table 1 provides a detailed description of the variables and their measurements.

Table 1. Variable Operational Definition

Category	Notation	Measurement	Expected Sign	Source
Dependent				
Financing Risk	NPF	Non-Performing Financing		Financial Services Authority (OJK)
Interest				
Financing Diversification	FINDV	Herfindahl Index	(-)	Financial Services Authority (OJK)
Income Diversification	INDV	Income Diversification Index	(-)	
Independent				
Asset Quality	AQ	Loan Loss Provision to Net Operating Income	(+)	Financial Services Authority (OJK)
Capital	CAP	Equity to Total Asset	(-)	
Operating	OPE	Operating Expense to Operating Income	(-)	
Diversification	DIV	Non-Operating Income to Total Income	(-)	
Bank Size	SIZE	Logaritma Natural Total Asset	(-)	
Inflation	INF	Inflation Rate	(+)	Bank Indonesia
BI Rate	BIR	BI Rate	(+)	

(Source: Data Processed, 2024)

Financing and Income Diversification

Financing diversification is measured using the Herfindahl Index, which calculates the concentration of financing across various Islamic banking products. This index reflects how well-diversified a bank's financing portfolio is. The formula for financing diversification (FDV) is:

$$FDV = \left(\frac{Murabahah}{TF}\right)^2 + \left(\frac{Isthisna}{TF}\right)^2 + \left(\frac{Mudharabah}{TF}\right)^2 + \left(\frac{Musyarakah}{TF}\right)^2 + \left(\frac{Ijarah}{TF}\right)^2 + \left(\frac{Qardh}{TF}\right)^2 \quad (1)$$

Where FDV is financing diversification and TF is total financing. A higher FDV indicates better diversification, which is expected to reduce financing risk by spreading exposure across various contract types (Widarjono et al., 2020).

Income Diversification is measured by the proportion of non-financing income to total income. Banks that generate a greater share of income from non-financing activities are considered more diversified. This diversification is

expected to mitigate the impact of income fluctuations and reduce financing risk. The formula for income diversification (IDV) is:

$$IDV = \left[1 - \left(\frac{FI - NFI}{TI}\right)\right] \quad (2)$$

Where FI represents financing income, NFI is non-financing income, and TI is total income. Banks with higher IDV scores rely less on financing income, which may lower their overall risk profile (Wang & Lin, 2021).

Data Analysis and Model Specification

The data analysis begins with stationarity tests to ensure that the variables do not contain unit roots. Two methods are employed: the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test. Stationarity is essential for time-series data to avoid spurious regression results.

To determine the presence of long-term relationships among the variables, cointegration tests are conducted, including the Johansen and Juselius test and the Engle-Granger test. The ARDL model is particularly advantageous as it allows for cointegration analysis even when variables have different integration orders. The ARDL model is specified to analyze the short-term and long-term effects of financing diversification, income diversification, and other variables on financing risk. The ARDL approach also provides bounds testing to evaluate cointegration. If the F-statistic exceeds the upper critical bound, a long-term relationship is present. If it falls below the lower bound, no cointegration exists (Calal et al., 2023). The ARDL econometric model is written as follows:

$$\begin{aligned}\Delta NPF_t = {} & \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} \Delta NPF_{t-i} + \sum_{i=0}^{m} \alpha_{2i} \Delta FDV_{t-i} + \sum_{i=0}^{m} \alpha_{3i} \Delta IDV_{t-i} + \\ & \sum_{i=0}^{m} \alpha_{4i} \Delta AQ_{t-i} + \sum_{i=0}^{m} \alpha_{5i} \Delta CAP_{t-i} + \sum_{i=0}^{m} \alpha_{6i} \Delta DIV_{t-i} + \\ & \sum_{i=0}^{m} \alpha_{7i} \Delta OPE_{t-i} + \sum_{i=0}^{m} \alpha_{8i} \Delta SIZE_{t-i} + \sum_{i=0}^{m} \alpha_{9i} \Delta INF_{t-i} + \\ & \sum_{i=0}^{m} \alpha_{10i} \Delta BRT_{t-i} + \mu_t \end{aligned} \quad (3)$$

Where Δ represents the first-difference operator, μ_t is the error term, and m is the optimal lag length determined using information criteria such as AIC and SIC.

The ARDL model enables the estimation of both short-term and long-term relationships. The error correction term (ECT) derived from the model measures the speed of adjustment toward equilibrium in the presence of

deviations. A negative and statistically significant ECT coefficient confirms the existence of a long-term relationship. The use of ARDL is justified because it effectively addresses the complexities of time-series data in this study, including varying integration orders and small sample sizes. Additionally, the inclusion of both financing and income diversification as independent variables offers a comprehensive perspective on their impacts on financing risk in Islamic banking. This approach ensures robust and reliable insights for both academic and policy applications.

RESULT AND DISCUSSION

Results

Descriptive Statistics

Table 2 summarizes the variation in each measured variable. Most variables exhibit standard deviations that are smaller than their average values, indicating that the data are fairly consistent. The average Non-Performing Financing (NPF) is 3.58, suggesting a moderate level of problematic debt. The average Financing Diversification (FDV) is 0.53, reflecting a potential for effective risk management through diversification. Similarly, Income Diversification (IDV) has an average value of 0.77.

Asset Quality (AQ) is notably high, with an average of 20.88, demonstrating the banks' capacity to maintain a robust capital structure. Conversely, Diversification (DIV) has a low average of 0.009, suggesting a conservative approach toward income diversification. Operational Efficiency (OPE) has an average of 86.15, indicating that banks are generally effective in managing their operational costs.

Table 2. Descriptive Statistics

	NPF	FDV	IDV	AQ	CAP	DIV	OPE	SIZE	INF	BRT
Mean	3.578	0.525	0.762	3.372	20.88	0.009	86.15	369899	3.12	4.89
Maximum	6.168	0.547	0.942	6.143	26.28	0.065	99.04	603781	5.95	7.25
Minimum	2.039	0.468	0.661	1.831	14.72	0.0006	75.78	209613	1.32	3.50
Std. Dev.	1.039	1.039	0.044	1.209	3.52	0.007	6.51	108670	1.08	1.02
Obs.	99	99	99	99	99	99	99	99	99	99

(Source: Data Processed, 2024)

The Capital Adequacy Ratio (CAP) averages 20.88, suggesting a robust capital structure across the banks in the sample. Bank Size (SIZE) averages 369,899, indicating substantial scale in terms of total assets. Inflation (INF) has an average of 3.12, while the interest rate (BRT) averages 4.89, both of which provide insight into the broader economic environment affecting bank risk.

Unit Root Test Result

To analyze time series data using the ARDL approach, the first step is to ensure that all variables do not have integrated variables of the second order, I(2) (second difference) or higher. Table 3 presents the results of the Augmented Dickey-Fuller and Phillips-Perron unit root tests in both levels and first differences. The results indicate that none of the variables are stationary at the level, except for FDV, IDV, and DIV. According to the requirements of the ARDL approach, all variables must be stationary at the first level. Therefore, it can be concluded that the results comply with ARDL requirements.

Table 3. Unit Root Test Result

Variables	Augmented Dickey-Fuller		Phillips-Perron	
	Level	1st Difference	Level	1st Difference
NPF	-2.202185	-6.002479***	-1.154552	-13.51773***
FDV	-3.584354***	-11.98753***	-3.891535***	-12.91251***
IDV	-3.590106***	-13.00215***	-3.590106***	-14.59205***
AQ	-2.244425	-11.08562***	-1.897233	-13.47189***
CAP	-1.189023	-10.25768***	-1.174136	-10.25768***
DIV	-8.057005***	-11.27580***	-8.221724***	-35.67025***
OPE	-1.267205	-9.576182***	-1.256027	-9.596547***
SIZE	-0.812810	-6.532974***	-0.146852	-13.44369***
INF	-2.716954*	-3.584048***	-2.210399	-9.364488***
BRT	-2.074862	-6.068533***	-2.332412	-6.135617***

Note: *,**,***, denote significant at 10%, 5%, and 1%
(Source: Data Processed, 2024)

Cointegration Test Result

Table 4 displays the results of the bounds test. The results indicate that the F-count statistical value is greater than both the lower limit I(0) and the upper limit I(1), and is significant at the lowest significance level. Thus, the null hypothesis of no cointegration can be rejected. Consequently, based on these results, there is a long-term cointegration relationship among the variables

utilized in this research. These findings justify the use of the long-term ARDL estimation approach.

Table 4. Bound Test Cointegration Result

F-Statistic	K	Sig. Level	Critical Bounds		Cointegration
			Lower Bound I(0)	Upper Bound I(1)	
3.824189	9	1%	2.5	3.68	Yes
		5%	2.04	2.08	Yes
		10%	1.8	2.8	Yes

(Source: Data Processed, 2024)

Short-run and Long-run Results

Table 5 presents the short-term test results of this study. The CointEq value is significantly negative, indicating that the short-term equation model is valid. The results show that financing diversification (FDV), income diversification (IDV), asset quality (AQ) lag 2, AQ lag 3, capitalization (CAP), diversification (DIV) lag 3, efficiency (OPE), OPE lag 1, OPE lag 2, bank size (SIZE), inflation (INF), INF lag 1, and BI rate (BRT) lag 1 do not have a significant effect on financing risk (NPF). However, AQ, AQ lag 1, DIV, DIV lag 1, DIV lag 2, INF lag 2, and BRT lag 2 have a significant influence on financing risk (NPF) in the short term.

Table 5. Short-run Estimation Result

Short-Run: NPF				
Variables	**Coefficient**	**t-Statistic**	**P-value**	**Status**
FDV	-1.450960	-0.763433	0.4481	Not Significant
IDV	-0.635656	-1.100603	0.2753	Not Significant
AQ	0.576514***	8.518591	0.0000	Significant
AQ(-1)	-0.357098***	-3.437656	0.0011	Significant
AQ(-2)	0.029952	0.332980	0.7403	Not Significant
AQ(-3)	-0.148512	-1.654901	0.1030	Not Significant
CAP	-0.015117	-0.765644	0.4468	Not Significant
DIV	4.940496**	2.549102	0.0133	Significant
DIV(-1)	-7.358780***	-2.820278	0.0064	Significant
DIV(-2)	-5.999086**	-2.657264	0.0100	Significant
DIV(-3)	-1.888265	-1.030649	0.3067	Not Significant
OPE	0.022799*	1.997928	0.0501	Not Significant
OPE(-1)	-0.005914	-0.725576	0.4708	Not Significant
OPE(-2)	-0.009249	-1.190960	0.2382	Not Significant
SIZE	-0.596417	-0.846387	0.4006	Not Significant

INF	-0.077539*	-1.919460	0.0595	Not Significant
INF(-1)	-0.128956*	-1.727024	0.0891	Not Significant
INF(-2)	0.167703**	2.059102	0.0437	Significant
BRT	-0.167640**	-2.090888	0.0406	Significant
BRT(-1)	0.083686	1.153775	0.2530	Not Significant
BRT(-2)	-0.687111***	-6.252513	0.0000	Significant
CointEg(-1)	-0.710620***	-5.453902	0.0000	Significant

Note: *,**,***, denote significant at 10%, 5%, and 1%
(Source: Data Processed, 2024)

The long-term test results are presented in Table 6. The findings indicate that financing diversification (FDV) has no significant effect on financing risk (NPF), with a coefficient of -1.295. This suggests that when FDV increases by 1%, NPF decreases by 1.295. Income diversification (IDV) also has no significant effect on financing risk (NPF), with a coefficient of 0.8351, indicating that when IDV increases by 1%, NPF increases by 0.8351. Asset quality (AQ) significantly influences financing risk (NPF), with a coefficient of 0.7247, meaning that when asset quality increases by one unit, NPF will increase by 0.7247. The capital adequacy ratio (CAP) has no effect on financing risk (NPF), with a coefficient of -0.0157, suggesting that when CAP increases by 1%, financing risk decreases by 0.0157.

Table 6. Long-run Estimation Result

Long-Run: NPF				
Variables	**Coefficient**	**t-Statistic**	**P-value**	**Status**
FDV	-1.295901	-0.847562	0.3999	Not Significant
IDV	0.835094	1.399587	0.1666	Not Significant
AQ	0.724710***	13.060315	0.0000	Significant
CAP	-0.015799	-0.777551	0.4398	Not Significant
DIV	19.420729***	3.812151	0.0003	Significant
OPE	0.011322	0.891429	0.3761	Not Significant
SIZE	-0.283611	-1.017286	0.3130	Not Significant
INF	0.085036***	3.439370	0.0010	Significant
BRT	-0.106725***	-5.384848	0.0000	Significant
Constant	4.240869	1.021746	0.3109	Not Significant

Note: *,**,***, denote significant at 10%, 5%, and 1%
(Source: Data Processed, 2024)

Diversification (DIV) significantly affects financing risk, with a coefficient of 19.4207. When diversification increases by one unit, financing risk increases by 19.4207. Efficiency (OPE) does not significantly influence financing risk, with a coefficient of 0.0113; thus, when efficiency increases by 1%, financing risk increases by 0.0113. Bank size does not significantly affect financing risk,

with a coefficient of -0.2836, indicating that when bank size increases by one unit, financing risk decreases by 0.2836. Inflation has a significant effect on financing risk, with a coefficient of 0.085; when inflation rises by 1%, financing risk also increases by 0.085. The BI rate significantly influences financing risk, with a coefficient of -0.1067; when the BI rate increases by 1%, financing risk decreases by 0.1067.

Discussion

This section provides a comprehensive analysis of the findings regarding financing diversification (FDV) and income diversification (IDV) as independent variables affecting financing risk (NPF). The discussion is structured into several subsections to facilitate clarity and coherence.

Financing Diversification and Financing Risk

The results indicate that financing diversification does not significantly impact financing risk in either the long term or short term. Although this outcome aligns with our hypothesis, the lack of statistical significance suggests that the relationship may not be robust. This finding is consistent with traditional banking theory, which posits that banks diversify their financing across various economic sectors to mitigate the effects of sector-specific shocks on their financing portfolios (Berger, Hasan, & Zhou, 2010).

Moreover, Islamic banks can leverage specific financing contracts to minimize risk by concentrating their activities on these contracts, thereby gaining a competitive advantage and effectively managing financing while reducing problematic financing. This perspective aligns with the findings of AlKhouri and Arouri (2019) and N. W. Sari et al. (2023), who similarly concluded that loan diversification does not significantly affect financing risk, despite observing a negative relationship. Conversely, Shim (2019) reported that Profit and Loss Sharing (PLS) contracts could increase risk when financing diversification is high, leading to a higher likelihood of default. This underscores the need for regulators and government entities to support Islamic banks in focusing financing on more stable and measurable contracts. Policies that encourage planned diversification and stringent supervision of high-risk contracts could help mitigate financing risks and enhance the stability of the Islamic banking sector.

Income Diversification and Financing Risk

The analysis reveals that income diversification, as measured by the index, shows no significant impact on financing risk in either the long term or short term. However, the direction of the relationship varies: it is positive in the long term and negative in the short term. These findings do not align with the initial hypothesis.

The negative short-term relationship may be attributed to the ability of income diversification to enable Islamic banks to gather more information from various products, enhancing their experience and potentially reducing problematic financing (Widarjono et al., 2020). Conversely, the positive long-term relationship could suggest that more diversified banks are perceived by investors to have lower returns, which may diminish supervisory incentives and adversely affect the loan portfolio (AlKhouri & Arouri, 2019). If the costs of diversification outweigh its benefits, increased risk may ensue, particularly for banks with a higher proportion of non-interest income.

These results are consistent with Wu et al. (2020), who found that income diversification did not reduce financing risk. The lack of strong evidence supporting the reduction of financing risk through income diversification indicates that Islamic banks should approach income diversification strategies with caution. An important implication of these findings is that there is no "one-size-fits-all" solution for banks; strategies should be tailored to the individual characteristics of each bank, including size and other relevant factors.

Asset Quality and Financing Risk

The findings demonstrate that asset quality significantly and positively affects financing risk in both the short and long terms, thereby supporting the proposed hypothesis. Asset quality is a critical determinant in banking, reflecting the returns generated from assets (Aryani, Anggraeni, & Wiliasih, 2016). The observed positive relationship between asset quality and financing risk suggests that an increase in the asset quality ratio may reduce overall productive activities, consequently leading to an increase in non-performing loans (Riyadi, Iqbal, & Lauren, 2015).

This observation aligns with the work of Hamdillah et al. (2021), who also identified a significant positive effect of asset quality on financing risk. The implications for regulators and policymakers emphasize the necessity for

rigorous oversight and policies aimed at enhancing asset quality within the banking sector. Such measures are essential for reducing financing risk and bolstering the stability of Islamic banking in Indonesia.

Capital Adequacy and Financing Risk

The capital adequacy ratio was found to have no significant effect on financing risk in either the short term or long term, despite a negative relationship that aligns with the proposed hypothesis. This finding supports the argument that banks with lower capital ratios face higher probabilities of default, as the capital ratio reflects management decisions and the capacity to address moral hazard issues (Abid et al., 2014).

This is consistent with the findings of Syamlan and Jannah (2019), who reported that the capital ratio does not significantly impact financing risk in Islamic banking in Indonesia. Similar results were observed by Widarjono and Rudatin (2021), who found no significant long-term effect of the capital ratio. These results suggest that attention should be directed toward factors beyond the capital ratio to mitigate financing risk in Islamic banking. Comprehensive policies and stringent supervision of various risk management aspects are likely to be more effective in enhancing the stability of the banking sector.

Operational Efficiency and Financing Risk

The study reveals variations in the relationship between operational efficiency and financing risk in both the short and long terms. In the short term, operational efficiency does not significantly affect financing risk, although the relationship is negative. Conversely, in the long term, operational efficiency shows no significant effect but presents a positive relationship. These findings are inconsistent with the proposed hypothesis.

The negative short-term relationship suggests that high operational efficiency can lead to optimal profits, increased financing disbursement, and improved customer service, thereby reducing financing risk (Hamdillah et al., 2021). However, the positive long-term relationship indicates that operational efficiency, which measures a bank's effectiveness in conducting operations, does not always translate into reduced financing risk. High operating costs relative to operating income can exacerbate financing challenges (Suprayitno & Hardiani, 2021).

This perspective is supported by Jenkins et al. (2023), who argue that poor management can lead to ineffective credit portfolio management and elevated levels of problematic financing. Additionally, Sutrisno et al. (2023) suggest that inefficient Islamic banks may experience decreased financing levels, thereby increasing risk. To address these issues, regulators and policymakers should undertake several actions: encourage Islamic banks to implement effective policies and leverage technology to reduce operational costs, enhance supervision to ensure proper credit portfolio management, and strengthen management training with established efficiency standards and periodic audits. These steps are crucial for mitigating financing risks in the Islamic banking sector.

Diversification and Financing Risk

Diversification, measured by the ratio of non-interest income to total income, exhibits differing impacts on financing risk in both the short and long terms. In the short term, diversification has a significant negative effect on financing risk, whereas in the long term, it has a significant positive effect. These findings do not align with the proposed hypothesis.

The positive long-term relationship suggests that diversification may lower bank returns and potentially lead to higher-risk loans (Acharya et al., 2002). Increased diversification may therefore be associated with higher levels of non-performing financing. Zhou (2014) supports this view, indicating that banks engaged in new non-interest income activities must assume risks from non-traditional businesses, such as personal financial planning and securities underwriting. Conversely, the negative short-term relationship may result from diversification practices involving prudent management, which reduces credit risk (Abedifar et al., 2018). Regulators should monitor these dynamics and ensure that banks employ prudent practices to manage associated risks.

Bank Size and Financing Risk

The analysis indicates that bank size does not significantly impact financing risk in either the short or long term, although the relationship is negative. This finding is consistent with the proposed hypothesis and supports the argument that larger banks, being more diversified and possessing superior technology and human resources, may manage financing risk more effectively than smaller banks (Jenkins et al., 2023).

Larger banks, with greater diversification capacity and economies of scale, tend to manage financing risk more efficiently compared to their smaller counterparts (Kadir, Ratnasari, & Abduh, 2022). This study aligns with the findings of Riyadi et al. (2015), who also concluded that bank size does not significantly affect credit risk. The implication is that regulators should focus on other factors in managing financing risk, as bank size does not significantly contribute to this risk.

Macroeconomic Factors and Financing Risk

Among macroeconomic factors, inflation was found to have a significant positive impact on financing risk in both the short and long terms, supporting the proposed hypothesis. Higher inflation can erode the real value of borrowers' income, reducing their ability to meet debt obligations (Abdelaziz et al., 2022). Additionally, high inflation can diminish consumer purchasing power, exacerbate economic conditions, and increase the risk of non-performing financing (Widarjono & Rudatin, 2021). These findings are consistent with Bolarinwa et al. (2021), who identified a significant positive effect of inflation on financing risk. Regulators should monitor and manage the impact of inflation on the banking sector and consider policies to mitigate the increased financing risk associated with high inflation.

In contrast, interest rates were found to have a significant negative effect on financing risk in both the short and long terms, contrary to the proposed hypothesis. This result is supported by the argument that interest rates, used as a reference for determining profit margins in Islamic banks, can influence equivalent rates. Higher interest rates generally increase equivalent rates, which may reduce customer demand for financing. A high equivalent rate can alleviate the burden on debtors in repaying interest and principal, thereby reducing financing risk (Suprayitno & Hardiani, 2021). Regulators need to consider the impact of interest rates on customer demand and financing risk and evaluate policies related to interest rates to ensure the stability of the Islamic banking sector.

Implications

The findings highlight the necessity for a nuanced and multifaceted approach to managing financing risk in Islamic banking. The lack of significant impact from financing diversification and income diversification on financing risk suggests that regulators and banks should focus on targeted diversification

strategies. This entails prioritizing stable and measurable contracts while exercising caution with income diversification to mitigate potential long-term inefficiencies and increased risks.

The significant effect of asset quality on financing risk underscores the importance of balancing provisioning with productive lending and implementing robust monitoring systems to maintain stability. Conversely, the absence of a significant impact from capital adequacy indicates that regulators should extend their focus beyond capital ratios to emphasize comprehensive risk management frameworks.

Operational efficiency demonstrates mixed effects, highlighting the need for the adoption of technology, management training, and periodic audits to ensure that efficiency gains translate into effective risk reduction. Additionally, while diversification offers short-term benefits, it poses long-term risks, necessitating prudent practices and regulatory oversight to prevent excessive risk exposure from non-core activities. The lack of a significant relationship between bank size and financing risk suggests that operational factors such as efficiency and asset quality should take precedence over size when designing risk mitigation strategies. It is also essential to support smaller banks in enhancing their capabilities.

Macroeconomic factors, particularly inflation and interest rates, play a critical role, with inflation contributing to increased financing risk and interest rates having a mitigating effect. This underscores the importance of inflation control, proactive risk forecasting, and careful adjustment of profit rate benchmarks to ensure sector stability. The results offer actionable insights for policymakers, regulators, and banks aimed at strengthening the resilience of Islamic banking and contributing to sustainable economic growth.

CONCLUSION

This study examines the impact of financing and income diversification, bank-specific factors, and macroeconomic factors on financing risk in Indonesian Islamic banking from 2016 to 2024. Utilizing the ARDL approach, the findings indicate that neither financing diversification nor income diversification significantly affects non-performing financing (NPF). However, higher asset quality is correlated with increased NPF, potentially due to a reduction in productive assets. While capital and efficiency ratios do not have a significant impact on NPF, diversification through non-interest income raises financing

risk. Among macroeconomic factors, inflation increases NPF by diminishing borrowers' repayment capacity, whereas the Bank Indonesia (BI) Rate decreases NPF, suggesting that higher interest rates can mitigate financing risk.

The primary implication of this study is the necessity for Islamic banks to adopt more effective financing diversification strategies. While traditional financing diversification does not significantly impact NPF, a well-structured approach is essential for mitigating financing risk. Islamic banks should prioritize maintaining robust capital ratios, enhancing asset quality, improving operational efficiency, and considering macroeconomic factors affecting financial stability. Additionally, increasing transparency and effective communication is crucial for building credibility and public trust. Collaborative efforts among Islamic financial institutions and market participants are vital for addressing biases and reinforcing the role of Islamic banking as a financial intermediary. Financing strategies should also include a diverse range of products and contract types tailored to current market conditions and customer needs.

While this research provides a comprehensive review of the literature pertaining to NPF and diversification, it is important to acknowledge certain limitations. The study focuses on a general sample of Islamic banks without differentiating between individual bank characteristics, which may restrict the depth of its findings. Future research should expand the sample size to encompass a broader range of Islamic banks and incorporate individual bank-level analyses to gain a deeper understanding of the unique factors influencing financing risk. Furthermore, exploring alternative methodologies beyond the Autoregressive Distributed Lag (ARDL) approach would enhance insights into the complex interactions between diversification strategies, macroeconomic variables, and financing risk.

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