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Influence of Risk Management and Income Diversification on Bank Profitability in Indonesia

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Abstract

This study aims to examine the effect of risk management and income diversification on the profitability of conventional banks in Indonesia during the 2020–2024 period. Profitability is measured using indicators of operational efficiency and the bank's ability to generate margins through intermediation. The independent variables include credit risk, liquidity risk, bank capital, operational risk, and income diversification as a strategic factor. The research applies a quantitative method with secondary data obtained from the annual financial statements of conventional commercial banks listed on the Indonesia Stock Exchange. The banks were selected using purposive sampling based on data completeness and consistency throughout the observation period. The analysis results show that liquidity risk has a significant negative impact on profitability, while bank capital and operational risk have a significant positive effect. In contrast, credit risk and income diversification do not have a statistically significant influence on profitability. These findings provide an in-depth understanding of how each risk-related variable and income structure aspect contributes to the financial performance of banks. The study concludes that effective risk management and strategic capital utilization play a critical role in improving bank profitability, while income diversification alone may not be sufficient without aligned risk mitigation efforts. This research offers practical implications for bank management in strengthening risk-based decision-making, for investors in assessing financial resilience, and for regulators in formulating stability-focused policies in the national banking sector.

Introduction

The Indonesian banking sector holds a crucial role in supporting national economic growth and ensuring social welfare through its intermediation functions, including credit distribution and fund mobilization. In the wake of the COVID-19 pandemic, Indonesian banks have faced escalating challenges, such as rising non-performing loans (NPL), increasing operational inefficiencies, and intensifying liquidity pressures. These conditions are further exacerbated by global inflation trends and the rapid expansion of digital banking, which disrupt traditional revenue models and force banks to adapt quickly to changing market dynamics (Wewege et al., 2020; Matthews et al., 2023). According to the Financial Services Authority (OJK), as of 2022, more than 68% of Indonesian banks' revenue still derives from interest income, reflecting a heavy dependence that exposes banks to interest rate fluctuations and credit risks. This structural reliance not only threatens profitability but also undermines financial stability and public trust, thereby highlighting the urgency to strengthen risk management practices and explore alternative income sources (Bayrakçeken, 2024; Otegui, 2024; Francisca, 2025; Drennan et al., 2014). Addressing these systemic vulnerabilities is vital both academically and

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practically to ensure resilient and sustainable banking operations in Indonesia (Siraj et al., 2024; Prihandini & Safaria, 2025; Triggs et al., 2019; Jameaba, 2020).

Previous studies on bank profitability can be grouped into three main thematic categories. First, studies focusing on risk factors (e.g., credit risk, liquidity risk, capital adequacy, and operational efficiency) have consistently shown significant impacts on profitability. For instance, Swandewi & Purnawati (2021) and Ha Nguyen (2023) demonstrated that rising NPL ratios negatively affect ROA, while adequate capital levels improve financial stability (Ahmed & Ismail, 2023; Karki & Aryal, 2024). Second, research investigating income diversification has highlighted its potential to reduce earnings volatility and enhance profitability, especially during economic downturns (Bisrat et al., 2024; DeYoung & Roland, 2001; Adem, 2023; Choi, 2025; Li et al., 2021). However, evidence on its effectiveness remains mixed and context-dependent. Third, comparative studies exploring differences between large and small banks or national versus regional banks (Kansoy, 2025; Pham et al., 2024; Hakimi et al., 2025) suggest that bank scale and market positioning may moderate the relationship between risk factors and profitability. Despite these contributions, few studies comprehensively analyze the combined effect of multiple risk management dimensions and income diversification on bank profitability in Indonesia, particularly within the context of post-pandemic recovery and digital transformation. This gap in the literature limits practical guidance for banks seeking to optimize profitability while mitigating systemic risks.

In response to this research gap, this study aims to analyze the effects of credit risk, liquidity risk, bank capital, operational risk, and income diversification on the profitability of conventional banks in Indonesia during the period 2020–2024. By integrating various risk indicators and diversification strategies into a single analytical framework, this research seeks to provide updated empirical evidence relevant to current economic and technological dynamics. The study intends to offer insights that are not only theoretically valuable but also practically useful for managers, investors, and policymakers in formulating strategies to strengthen bank resilience and profitability in the face of ongoing market disruptions.

Grounded in agency theory and revenue structure theory, this study hypothesizes that higher credit and liquidity risks will negatively impact profitability due to increased potential losses and constrained lending capacity (Mabandla, 2023; Haddad et al., 2020; Mugilwa, 2024). Conversely, adequate bank capital and strong operational efficiency are expected to have positive effects, supporting stability and enhancing profit margins. The role of income diversification is explored as a potential buffer, although its effectiveness remains uncertain given the mixed evidence in existing studies. These hypotheses serve as a preliminary answer to the research problem and will be empirically tested using panel data regression analysis to validate their applicability in the Indonesian banking context.

The study by Daniul et al. (2022) clearly demonstrates that credit risk has a significantly positive effect on bank profitability, as measured by both Return on Assets (ROA) and Net Interest Margin (NIM). Furthermore, the research by Ma'aji et al. (2025), reinforced by Sari and Nurdiawansyah (2024), finds that liquidity risk also has a significantly positive influence on both ROA and NIM. In terms of capital structure, Ismail & Ahmed (2023) along with Pham et al. (2024) conclude that bank capital significantly enhances profitability on both indicators.

Operational efficiency also plays a crucial role. Ismail & Ahmed (2023) and Sanjaya & Badjuri (2024) confirm that operational risk significantly affects ROA and NIM, indicating that well-managed operational costs can lead to better financial outcomes. Lastly, Bisrat et al. (2024) reveal that income diversification has a significant impact on bank profitability, both in terms

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of ROA and NIM. However, the degree of this influence depends on the bank's capability to manage and implement its diversification strategy effectively.

Based on the relationships among these variables, the conceptual framework of this study is illustrated as follows:

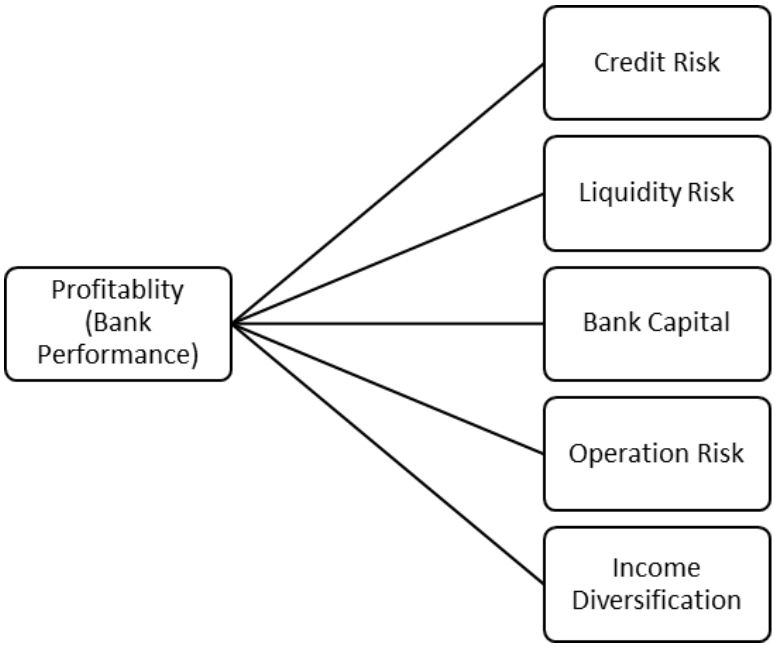

Figure 1. Conceptual Framework

Methods

This study employs a purposive sampling method, which is a sampling technique based on specific considerations aligned with the research objectives. In other words, the samples are selected from banks that meet predefined criteria relevant to the focus of the study. The criteria for selecting data as the research sample are: (1) conventional commercial banks listed on the Indonesia Stock Exchange (IDX) during the 2020–2024 period, and (2) banks that provide complete data for all variables used in this study. Based on these criteria, a total of 47 banks were listed on the IDX during the specified period; however, 4 Islamic banks were excluded from the sample due to incompatibility with the research criteria. As a result, the number of analysis units used in this study consists of 43 conventional commercial banks. Multiplied by the five-year observation period, the total number of observations analyzed in this study amounts to 215.

This study aims to examine the influence of Credit Risk, Liquidity Risk, Bank Capital, Operational Risk, and Income Diversification on bank profitability, which is measured using Return on Assets (ROA) and Net Interest Margin (NIM). The research employs a quantitative approach, utilizing secondary data. The data sources include the official website of the Indonesia Stock Exchange (https://www.idx.co.id/) and the respective websites of the companies observed. Table 1 presents a summary of variable and the measurement used in the study.

Table 1. Variables and Measurement

Variable Name	Symbol	Measurement
Return on Assets	ROA_{IT}	Net income divided by total assets

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Net Interest Margin	NIM_{IT}	(Net interest income – Interest expense) divided by total assets.
Credit Risk	CRM	Loan loss provisions divided by total loans.
Liquidity Risk	LRM	Liquid assets divided by total assets.
Bank Capital	CAR	Equity divided by total assets.
Operational Risk	ORM	Operating income divided by operating expenses.
Income Diversification	DIV	Non interest income divided by total income

The data analysis method used in this study is panel data regression, which aims to measure and test the influence of independent variables, namely Credit Risk, Liquidity Risk, Bank Capital, Operational Risk, and Income Diversification, on the dependent variable Profitability, measured by Return on Assets (ROA) and Net Interest Margin (NIM). The available data will be measured and tested using EViews 10 software.

There are three models commonly used in panel data regression analysis: the Common Effect Model, the Fixed Effect Model, and the Random Effect Model. To determine the most appropriate model, this study applies a three-step testing process: the Chow Test (comparing Common and Fixed Effect models), the Hausman Test (choosing between Fixed and Random Effect models), and the Lagrange Multiplier (LM) Test (deciding between Common and Random Effect models). The results show that the Fixed Effect Model is more appropriate for both ROA and NIM based on the Chow Test. However, the Hausman Test further indicates that the Fixed Effect Model is the best choice for ROA (p-value 0.0044), while the Random Effect Model is more suitable for NIM (p-value 0.9563). Although the LM Test supports the Random Effect Model for both, the final selection combines Chow and Hausman results, concluding that the ROA model uses the Fixed Effect Model and the NIM model uses the Random Effect Model to ensure consistent and efficient estimation.

The Goodness of Fit Test, particularly assessed using the adjusted R-squared value, aims to evaluate how well the independent variables collectively explain the variation in the dependent variable. In this study, the adjusted R-squared value for the ROA model is 0.0687, indicating that the independent variables explain approximately 6.87% of the variation in ROA. This relatively low value suggests that other external or internal factors not included in the model may also influence ROA. Conversely, the adjusted R-squared value for the NIM model is 0.8077, indicating that around 80.77% of the variation in NIM is explained by the independent variables included in the model. This high value demonstrates a strong explanatory power and suggests that the model fits the NIM data well.

The F-Test (Simultaneous Test) is conducted to determine whether all independent variables included in the regression model jointly have a significant effect on the dependent variable. For the ROA model, the F-statistic is 4.156 with a p-value of 0.0013, which is less than 0.05, indicating that the variables together have a statistically significant effect on ROA. Similarly, for the NIM model, the F-statistic is 20.039 with a p-value of 0.0000, confirming that the independent variables simultaneously have a significant influence on NIM. These results indicate that, despite the relatively low goodness of fit for ROA, the model is still statistically valid and feasible for analyzing the collective impact of the independent variables.

In this study, the data analysis method used is multiple panel data regression analysis. This method describes the relationship between Credit Risk, Liquidity Risk, Bank Capital, Operational Risk, and Income Diversification as independent variables, while the dependent

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variable is Profitability, which is measured by Return on Assets (ROA) and Net Interest Margin (NIM). The regression equations could be expressed as follows:

Model 1:

$$ROA_{IT} = B_0 + B_1 CRM + B_2 LRM + B_3 CAR + B_4 ORM + B_5 DIV + e$$

Model 2:

$$NIM_{IT} = B_0 + B_1 CRM + B_2 LRM + B_3 CAR + B_4 ORM + B_5 DIV + e,$$

where :

ROAIT = Return on Assets;

NIM_{IT} = Net Interest Margin;

CRM = Credit Risk Management;

LRM = Liquidity Risk Management;

CAR = Bank Capital;

ORM = Operational Risk Management;

DIV = Income Diversification;

B_0 = Constant;

B_1 B_2 B_3 = Regression coefficients;

E = Standard error.

Data were analyzed using panel data regression methods with three model approaches: Common Effect Model, Fixed Effect Model, and Random Effect Model. The best model was selected based on the results of the Chow Test, Hausman Test, and Lagrange Multiplier (LM) Test. Two models were developed: Model 1 for ROA and Model 2 for NIM. A t-test (partial test) was used to examine the individual effect of each independent variable on the dependent variables, while the F-test (simultaneous test) and Adjusted R^2 were used to assess the overall goodness-of-fit of the regression model. The regression results showed that liquidity risk and credit risk significantly influence profitability, while income diversification had no statistically significant effect.

Result and Discussion

Descriptive statistics provide a general overview of the data characteristics for each variable used in this study. Based on data processing for 43 conventional commercial banks in Indonesia during the 2020–2024 period (a total of 215 observations), the following results were obtained:

Table 2. Descriptive Statistics Result

Variable	Mean	Maximum	Minimum	Std. Dev.
CRM	0.04715	0.27678	0.00014	0.03833
LRM	0.17211	0.48325	0.00007	0.10092
CAR	0.21787	0.92508	0.05533	0.15243
ORM	3.11324	56.3750	-0.387079	7.35563
DIV	1.57938	53.7350	-0.948648	5.34411
DIV	0.00769	0.09778	-0.180577	0.02350
NIM	0.01140	0.22503	-0.139033	0.03953

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Source: Processed data using E-views.

Based on the descriptive statistical results, it can be concluded that:

Credit Risk had a maximum value of 0.27678, achieved by Bank Pembangunan Daerah Banten in 2021, and a minimum value of 0.00014, achieved by Bank IBK Indonesia in 2020. The average value of Credit Risk was 0.04715, which is smaller than the standard deviation of 0.03833, indicating that Credit Risk data is heterogeneous with considerable data dispersion.

Liquidity Risk had a maximum value of 0.48325, achieved by Bank Raya Indonesia in 2024, and a minimum value of 0.00007, achieved by Bank KB Bukopin in 2020. The average value of Liquidity Risk was 0.17211, which is greater than the standard deviation of 0.10092, suggesting the data is relatively homogeneous with moderate dispersion.

Bank Capital had a maximum value of 0.92508, achieved by Krom Bank Indonesia in 2022, and a minimum value of 0.05533, achieved by Bank Tabungan Negara (BTN) in 2020. The average value of Bank Capital was 0.21787, higher than the standard deviation of 0.15243, indicating relatively low variation.

Operational Risk had a maximum value of 56.3750, achieved by Krom Bank Indonesia in 2023, and a minimum value of -0.38708, achieved by Bank Capital Indonesia in 2022. The average value of Operational Risk was 3.11324, lower than the standard deviation of 7.35563, indicating heterogeneity.

Income Diversification had a maximum value of 53.7350, achieved by Bank Raya Indonesia in 2022, and a minimum value of -0.94865, achieved by Bank Amar Indonesia in 2022. The average value of Income Diversification was 1.57938, lower than the standard deviation of 5.34411, indicating heterogeneity.

ROA had a maximum value of 0.09778, achieved by Bank KB Bukopin in 2024, and a minimum value of -0.18058, achieved by Bank Raya Indonesia in 2021. The average ROA was 0.00769, lower than the standard deviation of 0.02350, indicating heterogeneity.

NIM had a maximum value of 0.22503, achieved by Bank Amar Indonesia in 2024, and a minimum value of -0.13903, achieved by Bank Capital Indonesia in 2021. The average NIM was 0.01140, lower than the standard deviation of 0.03953, indicating heterogeneity.

Table 3. Annual Trends of Key Variables (2020–2024)

Year	ROA	NIM	Credit Risk (CRM)	Liquidity Risk (LRM)	Bank Capital (CAR)	Operational Risk (ORM)	Income Diversification (DIV)
2020	0.005	0.010	0.061	0.185	0.210	2.98	1.40
2021	0.003	0.012	0.055	0.176	0.215	3.05	1.45
2022	0.007	0.011	0.046	0.168	0.220	3.12	1.60
2023	0.009	0.012	0.041	0.171	0.225	3.20	1.65
2024	0.012	0.013	0.033	0.160	0.225	3.20	1.78

Source: Authors' calculation, processed from IDX-listed banks' annual reports (2020–2024) using EViews 10.

The table shows the mean values of key research variables of the 43 conventional banks in Indonesia per annum. The results show that profitability has been regaining ground as of now, but it was recovering gradually after the COVID-19 pandemic. Return on Assets (ROA) grew by 0.005 in 2020 to 0.012 in 2024, and Net Interest Margin (NIM) grew by 0.010 to 0.013,

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which indicates the ability of the banks to recover profit margins at a gradual pace. There was also a continuous decrease in Credit Risk Management (CRM) which dropped to 0.033 in 2024 compared to 0.061 in 2020 and this may be attributed to the fact that the credit governance and restructuring procedures are now more effective and consequently, the quality of assets improves. The Liquidity Risk Management (LRM) was relatively high in 2020 (0.185) but showed a steady decrease to 0.160 in 2024 and this was the sign of strengthened liquidity stance among the banks. There was a slight increase in Capital Adequacy Ratio (CAR), which is an indication that prudential regulatory capital requirements are being met and a reasoned attempt to maintain financial strength.

Operational Risk Management (ORM) was stable, showing a small positive trend, which is the reflection of the gradual operational efficiency improvement through digitalization efforts and cost-cutting measures. At the same time, Income Diversification (DIV) recorded a slow increase with the same time having a small effect on the overall profitability that highlights the still persisting dependence of the Indonesian banks on interest income as compared to fee-based earnings.

Table 4. Comprehensive Regression Results

Independent Variable	ROA (Y1) – Fixed Effect	NIM (Y2) – Random Effect
Credit Risk (CRM)	Coeff = -0.1007t = -2.39p = 0.0172	Coeff = 0.1452t = 2.25p = 0.0257
Liquidity Risk (LRM)	Coeff = -0.0396t = -2.51p = 0.0132	Coeff = -0.0614t = -2.65p = 0.0098
Bank Capital (CAR)	Coeff = 0.0016t = 0.15p = 0.8788	Coeff = 0.0893t = 5.55p = 0.0000
Operational Risk (ORM)	Coeff = 0.00063t = 2.87p = 0.0041	Coeff = 0.0016t = 4.01p = 0.0001
Income Diversification (DIV)	Coeff = 0.00028t = 0.93p = 0.3556	Coeff = 0.00044t = 1.52p = 0.1294
Adjusted R^2	0.0687	0.8077
F-statistic	4.156 (p = 0.0013)	20.039 (p = 0.0000)

Source: Authors' regression output processed with EViews 10 (2025).

The results of the regression show that there exist distinguishable differences between the Return on Assets (ROA) and Net Interest Margin (NIM) models. Credit risk management (CRM) and liquidity risk management (LRM), as far as ROA is concerned, have a substantial negative effect, which proves the hypothesis that the increase in asset-based profitability is negatively affected by the level of non-performing loans and liquidity. Operational risk management (ORM) shows statistically significant positive effect, which implies that efficient operations produces better returns on assets. Conversely, the statistical significance of bank capital adequacy ratio (CAR) and income diversification (DIV) are not reached, which suggests that increased capital base and diversification policy have no direct effect on ROA.

In the case of NIM, the model is very explanatory (Adjusted R2 =80.77%). The positive and significant impact of credit risk management (CRM) is that the banks can increase the lending margins to offset the increased risk in the credit. Liquidity risk management (LRM) has a negative and material impact signifying the contraction of interest margins, which are subjected to the liquidity strain. The NIM is highly influenced by both bank capital adequacy ratio (CAR) and operational risk management (ORM) which highlights the major roles of capitalization and operational efficiency in the management of the margin. DIV is statistically insignificant,

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which supports the conclusion that non-interest income strategies are not yet able to demonstrate the improvement of profitability.

All these findings highlight that risk management, more specifically credit and liquidity management, is the key determinant of profitability at banks in Indonesia, though income diversification is not well-developed compared to other countries in the world.

Table 5. Recommended Macroeconomic Variables for Future Research

Variable	Symbol	Relevance	Data Source
Inflation	INF	Affects funding costs, purchasing power, and loan demand.	BPS, BI
BI Policy Rate	BIR	Determines lending spreads and directly affects NIM.	Bank Indonesia
Exchange Rate (IDR/USD)	EXR	Influences foreign exchange risk, especially for international banks.	BI, OJK
GDP Growth	GDPG	Reflects macroeconomic conditions shaping credit demand and asset quality.	BPS
Digital Banking Adoption	DIG	Impacts operational efficiency and potential for fee-based income.	OJK, BI

Source: Authors' framework based on OJK, Bank Indonesia, and BPS publications (2020–2024).

This table outlines the suggestions of expanding the analytical framework with the macroeconomic and structural variables in future studies. Inflation (INF) has a direct effect on the cost of funding of the banks and the ability of borrowers to make their payments. BI policy rate (BIR) controls the interest spread, and forms an important force behind net interest margin (NIM). Of special relevance is the exchange rate (EXR) to the banks that have high foreign exchange exposure. Gross domestic product growth (GDPG) summarizes wider economic cycles defining loan demand and asset quality. Lastly, the shift to digital banking (DIG) is becoming more and more significant, with the transformation of technologies re-formating the revenue base and alleviating operational costs.

A combination of these would help future researches develop a more comprehensive model to combine both the internal bank-specific and external macroeconomic determinants, which would provide further information on what determines the profitability of the bank in Indonesia.

Determinants of Bank Profitability: Risk, Capital, and Strategic Implications

The empirical results of this study will give relevant information on what drives a bank to be more profitable but the following discussion must move beyond number reportage and focus more on the mechanisms that breed these results. The credit risk, liquidity, capitalization, operational efficiency, and income diversification nexus are not linear or homogenous; rather, these variables interact in complex ways varying in their degree of effect on profitability measurements including profit on assets and net interest margin. A careful analysis of such dynamics does not only explain the present findings but also highlights their practical and theoretical implications to the banking strategy and regulatory policy formulation.

An interesting result relates to the twofold impact of credit risk on profitability. High credit risk reduces the returns on assets since the value of net income is reduced against total assets by the provisions against the non-performing loans. At the same time, it increases net interest margins because banks will offset the risk exposure with increased interest spreads. This

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situation has become one of the basic trade-offs in banking practices; on the one hand, risk absorption policies that are conservative ensure stability, but on the other hand, they are bound to lower asset profitability; on the other hand, a defensive strategy supported by pricing adjustments can ensure intermediation margins. The presence of the mechanisms suggests that the results of profitability are not due to individual indicators, but rather to managerial choices that combine prudence and competitiveness in the context of uncertainty.

There is an added complexity of liquidity management. As liquidity pressures are exerted by banks, they are forced to hold high levels of less liquid assets with lower returns which reduces profitability especially in combinations with increasing costs of short term funding and the inability to increase the volume of lending. It is a typical trade-off of profitability versus risk the liquidity buffer increases the resiliency of the business in a volatile market, but at the same time limits its ability to make profits. In turn, these conflicting goals should be balanced through the effective asset-liability management. Also, by taking the initiative to anticipate liquidity shocks and diversify funding structures, banks are able to maintain sufficient safety margins and deter the decline in profitability.

The contribution of capital to profitability goes further to prove that financial power is capable of creating chances as well as limitations. Increased capitalization helps banks to better absorb risk, and to implement more flexible pricing policies that defend or increase margins. However, increased capital base also reduces leverage and can lead to a low its return on assets where the cost of capital is high. As a result, capital has different impacts on profitability in relation to the performance measure used. Stability caused by capital is an advantage to the net interest margin but might not be a strong short-term response with return on assets. This is a difference that must be understood by banks that have to adhere to regulatory capital requirements and be efficient in the way they use their assets.

The frequent underestimation of the operational risk in the traditional analyses is replaced by the consistent determination of the profitability. The level of effective management of operating cost by banks in relation to their revenue has the direct and quantifiable impact on their ability to produce sustainable margins. Banks investing in digitalization, simplification of processes and cost management enjoy the rewards of increased profitability since such gains minimize the friction in daily processes. What may seem expensive now in terms of technology and governance need to be considered as enablers of competitiveness and financial strength in the long term.

Income diversification is a topic that needs to be discussed in a more critical manner. These findings suggest that diversification did not have much significance in terms of profitability in the course of the study, but it should not be interpreted that this method is irrelevant. Practically, the income diversification of the Indonesian banks out of the interest activity is still a small-scale activity that is frequently disjointed. To a large extent, this diversification is based on the volatile level of trading income or small-level services based on fee. In addition, diversification plans usually require huge initial investment which might not yield an immediate pay off. Therefore, the lack of a statistically significant impact could just be a result of the young age of diversification in the Indonesian banking industry as opposed to its potential in the long run. It is not just about the proportion of non-interest revenue but about whether these revenue streams can be sustained, held steady and expanded.

Another valuable piece of information is the differences in the explanatory power of measures of profitability. Internal banking factors have a stronger relationship with net interest margins whilst the returns on assets seem to be influenced by more external factors like interest rate changes, inflation, economic growth. This implies that the managerial decisions only do not

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dictate the profitability but it is also greatly affected by the macro economic environment. This kind of discovery makes researchers and practitioners remember that the internal gains in efficiency and risk management have to be measured alongside the external forces that might either increase or limit their effects.

The practical and theoretical implications of these findings are both theoretical. To the bank managers, it is necessary to enhance their credit underwriting procedures, overseeing the non-performing loans and employing selective restructuring in order to guarantee quality of the assets even when credit growth needs to be maintained. The management of liquidity must go beyond just the reactive response to ratios and need to take pro-active measures (like liquidity stress testing and asset mix optimization). The form of diversification must be done selectively and basing on the products which are scalable and which are backed by digital platforms. To policymakers, the results represent the need to promote transparency in the reporting of non-interest income, financial innovation in regulatory sandboxes, and that capital and liquidity requirements do not compromise profitability.

Theoretically, the empirical results contribute to the ongoing argument between the agency theory and the theory of revenue structure. The scope of internal risk management is the limits within which the banks develop the pricing strategies and revenue models, as well as the level of capital sufficiency and efficiency of operations determines the limits to which strategies may be successfully implemented. The Indonesian background, where the rate of digital adoption is high, and the post-pandemic recovery measures are expected to be high, suggests that profitability drivers could vary significantly when compared to those reported in developed economies, thus suggesting that the global theories should be applied selectively to the local conditions and not necessarily generalized.

In perspective, future scholarship can continue to develop these lessons by breaking down non-interest income further into its smaller elements, e.g., fees, commissions and trading, to know which of these sources provide material contributions to profitability. The application of more advanced econometric approaches might alleviate the possible risk of endogeneity and dynamic intertemporal associations. The comparison across banks of different sizes or ownership setups can help reveal heterogeneity that the aggregate analysis will not be able to see. Alongside, the interrogation of the nexus between the digitalization and profitability may grant a more subtle understanding of the way technology restructures income arrangements. Lastly, there should be the consideration of non-linear or threshold effects that should be investigated to determine the possible optimum level of diversification or capitalization that would maximize profitability.

The premise of this discussion is that determinants of bank profitability are multidimensional and interrelated. Interdependence between credit risk, liquidity, capital, operational efficiency and income diversification is to express management decision-making as well as external environmental factors. Profitability is maintained not only through creation of greater returns but also through balancing of risk, stability and efficiency. In the case of the Indonesian banks, the challenge is to develop resilience and at the same time innovate in order to tap into new sources of revenue. To scholars and policymakers, the findings represent a warning and an opportunity, which reminds of the stakeholders that profitability depends not only on the contextual adjustment but also on the consistency with the universal prescriptions.

Conclusion

This study aims to analyze the effect of credit risk, liquidity risk, bank capital, operational risk, and income diversification on bank profitability as measured by Return on Assets (ROA) and

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Net Interest Margin (NIM) in conventional commercial banks in Indonesia during 2020–2024.The findings reveal that credit risk has a significant negative impact on both ROA and NIM, confirming that credit risk remains a major threat to bank profitability in Indonesia. This emphasizes the importance of strengthening credit risk management strategies, especially during periods of economic uncertainty. Liquidity risk shows a negative and significant effect on ROA but a positive and significant effect on NIM. This suggests that banks may maintain higher liquidity buffers, which can reduce overall asset returns (ROA), but at the same time allow them to adjust lending rates and improve their interest margin (NIM). Bank capital exhibits a negative and significant impact on ROA and a positive and significant effect on NIM. This indicates that while higher capital may reduce short-term profitability due to higher costs of maintaining capital adequacy, it can improve long-term interest-based profitability through better risk absorption capacity. Operational risk shows a negative but insignificant relationship with ROA and a positive but insignificant relationship with NIM. This highlights that operational inefficiencies have not yet become a major determinant of profitability, possibly due to improvements in operational digitalization and internal control in Indonesian banks. Interestingly, income diversification does not have a significant effect on either ROA or NIM. This suggests that despite being introduced as a strategic variable, non-interest income sources have not substantially contributed to profitability improvements. This could reflect the relatively conservative diversification strategies in Indonesian banking, or it might indicate that banks are still more reliant on traditional intermediation activities.

The study contributes to the literature by empirically validating previous theories on credit and liquidity risk, while also introducing income diversification as a strategic profitability driver in an emerging market context. Although income diversification was found to be insignificant, this finding provides valuable insight: it may contradict studies conducted in more developed markets, highlighting the unique structure and strategy of Indonesian banks. This result urges further exploration into the effectiveness and implementation of diversification in emerging economies. In summary, this research underscores the critical role of risk management particularly credit and liquidity risk in shaping bank profitability in Indonesia. It also raises important questions about the strategic value of income diversification and suggests that further policy and managerial focus should be placed on optimizing risk-return trade-offs in the Indonesian banking sector.

Limitation and Study Forward

This study has several limitations that should be noted. First, the number of independent variables included is still limited, thus not capturing all potential determinants that may affect bank profitability comprehensively. Other relevant variables, such as macroeconomic factors and technological development, were not included in the analytical model. Second, the observation period only covers five years (2020–2024), limiting this study's ability to capture long-term economic cycle dynamics, particularly the structural effects of crises or economic expansions.

For future research, it is recommended to add macroeconomic variables such as inflation, the BI reference rate, exchange rates, and Gross Domestic Product (GDP) growth, as these factors have been shown to significantly affect bank profitability (Sa'diyah & Nasrulloh, 2025). Additionally, the development of digital banking technology, such as mobile banking adoption rates and digital transaction volume, is also recommended as new variables, given that digital transformation has significantly changed banking cost and revenue structures (Daeli & Wedari, 2025). A comparative study between conventional and Islamic banks is also an interesting future research direction, considering differences in business models, risk structures, and

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income sources. Such studies would provide deeper insights into how profitability determinants differ across bank types (Kansoy, 2025).

Based on the findings, this study also offers several practical implications for financial managers, investors, and regulators. For financial managers, the results highlight the critical importance of effective liquidity risk management as a top priority, since liquidity imbalances have been shown to suppress profitability in terms of both ROA and NIM. Therefore, banks should strengthen fund management strategies and enhance short-term cash flow planning to maintain liquidity without compromising interest income. Additionally, improving operational efficiency is essential for boosting profitability, suggesting that banks need to continue optimizing operational costs, streamlining internal business processes, and leveraging digital technology to support greater efficiency and higher profit margins. For investors, the findings underscore the need to carefully monitor liquidity risk and operational efficiency when evaluating potential bank investments. Investors are encouraged to consider banks with strong liquidity management and high operational cost efficiency, as these factors are significant determinants of sustainable profitability and long-term financial performance.

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Authors Contribution

Author 1: Conceptualized the research idea, performed the literature review, and prepared the initial draft of the manuscript.

Author 2: Conducted data collection, statistical analysis, and interpreted the results.

Author 3: Supervised the overall research process, provided critical revisions, and ensured the final version met academic standards. All authors reviewed and approved the final manuscript.

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