

Ability to Obtain Low-Interest Rate Funding as Limit to Growth Factor in Indonesian Banking Performance

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— *Review of* —
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ABSTRACT

This research delves into the critical factors driving the sustainability of the positive performance of banking institutions in Indonesia and examines key determinant factors such as asset growth rate, high-interest funding, interbank loans, efficiency, and non-performing loan. Purposive sampling for this research was carried out on 325 financial multi-years performance data (2015-2021) from 7 banks that were under intensive supervision by the banking authority in 2020. Employing a combination of multiple regression and logistic regression analyses, the research uncovers that efficiency hinges significantly on a bank's adeptness at managing asset growth rates, securing cost-efficient funding, and managing non-performing loans. Banks that can manage asset growth in balance with their ability to obtain low-interest funding and manage non-performing loans exhibit a sustainable positive performance. These insights provide valuable guidance to banking executives in formulating strategic plans, especially in refining asset growth strategies which contributes to the banking industry and strategic management in general.

Keywords: Sustainability, Profitability, Cost-to-Income Ratio, Non-Performing Loan.

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1. INTRODUCTION

The financial services industry, especially banking, has an intermediary function that carries out business activities to collect funds from the public in the form of deposits and channel them back in the form of credit or financing and other business activities related to bank business activities.

The banking industry in Indonesia is dominated by the traditional business model that implementing the intermediary function, with fee-based business model come afterward. Most of the bank's income is still very much dominated by loan interest income, with non-interest income of around 20-30% or even less. Banks that can collect funds in the most efficient way will get bigger chances to win the competition.

The banking industry in Indonesia remains profitable in 2020 despite the challenges posed by the COVID-19 pandemic. The banking industry's average return on assets (ROA) was 1.59%, and the average net interest margin (NIM) was 4.45%. The banking industry in Indonesia remains liquid, with an average loan-to-deposit ratio (LDR) of the banking industry

of 82.54%. Despite the slowing down, there was still growth in third-party funds (TPF) and lending as of December 2020. Working Capital Loans dominated the composition of the purpose of lending by 45%, and around 42% of TPF was in the form of deposits. The non-performing loans (NPL) rate for the banking industry in Indonesia increased slightly in 2020, with the average NPL ratio for the banking industry at 3.3%, still below the regulatory limit of 5%. Overall, the banking industry in Indonesia has performed well in 2020.

Nevertheless, despite the positive performance of the overall banking industry, it turned out that there were banks recorded as underperformance that experienced a drastic decline in performance following their positive growth in the years beforehand. Those banks were included in the Bank Under Intensive Supervision (BDPI) by the Indonesian Financial Service Authority (OJK).

Competition between banks can occur because of the struggle for resources, for example, deposits, savings, and loans, which are a source of income. Limited resources in the form of low-interest third-party funds for the bank to support its asset (primarily loan) growth due to limited access to sources of cheap funding and high dependence on wholesale deposits and commercial interbank borrowings may impact bank profitability (limit to growth). IMF published a working paper No. WP/19/5 regarding Bank Profitability and Financial Stability that suggested the right balance between cost efficiency and a competitive and stable banking environment is an important consideration for financial stability (Xu, Hu, & Das, 2019). This report highlighted the need to evaluate the sustainability of bank profitability. An over-reliance on leverage and wholesale funding is associated with a higher idiosyncratic contribution to systemic risks and, thereby, lower financial stability.

This research aligns with the IMF's recommendations to achieve balanced concentration during strategic planning in the banking industry. While it draws on cases from the Indonesian banking sector, its contributions extend beyond Indonesia, offering valuable insights for the global banking industry. Bank management should meticulously consider asset growth rates and speeds in their strategic planning processes. Furthermore, the model developed from this research will enhance strategic financial management by providing simulations that help planners mitigate human bias during the development of strategic plans.

2. LITERATURE REVIEW

Limit to Growth and Sustainability

Limitation is often considered as a balancing factor of growth. There is a limit to the growth humans can achieve on this planet. The Limit to Growth theory is a theory coined by (Forrester, 1961). Subsequently, Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, and William W. Behrens III (Meadows et al., 1972) concluded that if the current growth pattern continued unchanged, there was the potential for a significant future crisis involving resource shortages, environmental destruction, and the collapse of the economic system. Meadows and his team use complex mathematical models to understand how unlimited growth on a finite planet will impact the future of humanity. The model of the limitation to growth is known as the Limit to Growth archetype.

Competitiveness and rapid changes in markets, and the business environment require

companies to be more adaptive and maintain their presence with all of the limitations. Rita Gunther McGrath argues that competitive advantage is no longer sustainable but more temporary or transient (McGrath, 2013). She stated that the era in which companies could create competitive advantages that lasted for years was over. McGrath calls this a "transient advantage," which only lasts until competition or changing conditions displace it. Sustainable Competitive Advantage (SCA) is common to use to analyze a sustainable potential of a company or institution in any field. In doing the analysis and its comparison, SCA uses indicators or parameter called Valuable, Rare, Imitated to Cost, and Organized (Barney, 2012 as cited in Tresna & Nurmalasari, 2018).

In competitive environment that changes frequently, companies are required to have the ability to adjust strategies and adapt quickly in the face of limitation of resources that can support the long-term growth. This can mean rapid response to new competition, market changes, product innovation, and regulatory changes. Organizations with high "Competitive Strategic Maneuverability" can better survive and develop in a dynamic market. This ability is called "Competitive Strategic Maneuverability" (Kornelius et al., 2005). The problem is that the environment in which the company is located is complex, where the company is part of an environment that is bound and influenced by each other, like the concept of a system.

Banking asset growth has been a central focus of academic inquiry, given its implications for financial stability, profitability, and systemic risk. Scholars have examined the determinants and consequences of asset expansion, seeking to elucidate its drivers and impacts on banking performance. Beck et al. (2015) assert that asset growth is influenced by macroeconomic conditions, bank-specific factors, and regulatory environments. They argue that rapid asset expansion may signal aggressive risk-taking behavior, potentially exposing banks to heightened vulnerabilities during economic downturns. Conversely, Berger et al. (2016) contend that prudent asset growth strategies can enhance banks' market competitiveness and profitability, provided they are accompanied by effective risk management practices. Their study emphasizes the importance of balanced asset growth in maximizing shareholder value while mitigating risk exposure. Furthermore, Claessens and van Horen (2018) highlight the role of regulatory frameworks in shaping banks' asset growth dynamics, suggesting that stringent capital adequacy requirements and risk-based regulations can influence banks' lending behavior and asset portfolio composition. These findings underscore the multifaceted nature of banking asset growth and the need for comprehensive regulatory oversight to safeguard financial stability.

Recent research has also explored the relationship between asset growth and financial performance, shedding light on its implications for banks' operational efficiency and profitability. Demirgüç-Kunt et al. (2017) investigate the impact of asset growth on banks' cost efficiency and risk-taking behavior, finding that excessive asset expansion can erode cost efficiency and undermine financial stability. They argue that banks must strike a balance between asset growth and operational efficiency to sustain long-term profitability and resilience. Moreover, Anginer et al. (2020) examine the effects of asset growth on banks' return on assets (ROA), highlighting the trade-offs between growth and profitability objectives. Their study suggests that moderate asset growth levels are associated with optimal financial performance, while excessive growth may lead to diminishing returns and increased

risk exposure. These insights underscore the importance of prudent asset growth strategies in enhancing banks' financial health and sustainability.

In order to prove that there are limited resources to support sustainability, resources are sought that support the growth of banking assets. Two distinctive factors were chosen, namely wholesale deposits and interbank borrowings/loans. These two factors are actually high-interest funding which are generally an alternative for banks that are unable to obtain cheaper funding from savings and other retail accounts. Banks as in other type of companies, need to follow the changes in interest rate as a macroeconomic determinant (Susan et al., 2022), given that interest rates contribute more intense in banking's efficiency and competitiveness.

In the banking industry, sources of funding can be classified based on the interest rates they typically carry, as outlined in financial literature (Madura, 2020; Rose & Hudgins, 2013). Low-interest sources include deposits such as savings accounts, checking accounts, and certificates of deposit (CDs), which generally offer low returns to depositors. Interbank loans like federal funds and central bank loans from the discount window also fall into this category due to their relatively low rates. High-interest sources of funding comprise borrowings such as commercial paper and corporate bonds, which require higher interest to attract investors, as well as securities like subordinated debt, which involves greater risk and thus higher interest rates. Additionally, wholesale funding methods like repurchase agreements (repos) can vary but often come with higher interest rates compared to interbank loans. This classification highlights the diverse strategies banks use to manage their funding costs while maintaining liquidity and stability in their financial operations (Mishkin, 2019).

Hypothesis 1 (H1): There is a positive correlation between the Asset Growth and the high composition of Wholesale Deposits and Interbank Borrowings.

Profitability (Return-on-Asset)

Banking profitability has been a focal point of scholarly inquiry, particularly in light of its implications for financial stability and economic growth. Researchers have delved into various determinants and dynamics shaping banking profitability, seeking to unravel the underlying factors driving sustainable financial performance. A study by Berger and Bouwman (2013) investigates the impact of bank risk-taking behavior on profitability, suggesting that while risk-taking can enhance short-term profitability, excessive risk exposure may jeopardize long-term financial sustainability. This underscores the delicate balance banks must strike between risk and return to optimize profitability while safeguarding solvency. Moreover, Joysula (2024) showed how changes in capital adequacy requirements, liquidity standards, and risk management practices influence net interest margins, return on assets, and return on equity. The study also considers the role of regulatory compliance costs and the potential trade-offs between increased stability and reduced profitability. Profitability has a significant effect on business growth (Raharja & Kostini, 2021). Retrospectively, institution size also has a positive and significant effect on profitability with ROA. There is a positive influence between institution size and ROA (Bhavish et al., 2017 as cited in Martaningtiyas & Siwi, 2019). Profitability is influenced by earnings management, which can take the form of opportunistic and efficient practices. Opportunistic earnings management involves

managers manipulating earnings solely to fulfill their personal interests (Wardani & Kusuma, 2012; Tabassum, Kaleem & Nazir, 2015 as cited in Brahmono & Purwaningsih, 2022). Opportunistic earnings management has a positive impact on the company's short-term performance but a negative impact in the long term, such as decreasing company value and future performance (Roychowdhury, 2006; Amin, Lukviarman & Setiany, 2018 as cited in Brahmono & Purwaningsih, 2022).

Cost-to-Income Ratio

The banking cost-to-income ratio has emerged as a vital metric in assessing operational efficiency and profitability within the banking sector. Researchers have extensively investigated the determinants and implications of this ratio, aiming to understand its drivers and significance in bank performance evaluation. According to Berger and DeYoung (1997), the cost-to-income ratio reflects the operational efficiency of banks, wherein lower ratios signify higher efficiency and cost control. They argue that banks with lower cost-to-income ratios are better positioned to generate sustainable profits and withstand competitive pressures. Moreover, Beck et al. (2013) emphasizes the role of technological innovation in influencing the cost-to-income ratio, asserting that banks embracing digitalization and automation can achieve cost savings and enhance operational efficiency. This underscores the importance of strategic investments in technology and process optimization to mitigate cost pressures and improve profitability within the banking industry.

Non-Performing Loan

Non-performing loans (NPLs) have garnered significant attention in the realm of banking research due to their profound impact on financial stability and economic growth. Scholars have extensively explored the determinants and consequences of NPLs, aiming to devise effective strategies for their management and mitigation. According to Acharya and Mora (2015), NPLs arise from various factors including economic downturns, inadequate risk management practices, and lax regulatory oversight. They argue that the persistence of NPLs can lead to capital erosion, credit crunches, and systemic risks within the banking sector, posing formidable challenges to financial stability. Moreover, Barth et al. (2016) highlights the adverse effects of NPLs on credit provision, asserting that elevated NPL levels constrain banks' lending capacity, thereby impeding economic growth. This underscores the urgency for banks and policymakers to implement robust measures to address NPLs and safeguard financial resilience.

Recent studies have also examined the efficacy of NPL resolution mechanisms in restoring banking health and fostering economic recovery. Soedarmono et al. (2021) investigate the impact of loan restructuring programs on NPL reduction in Indonesian banks, emphasizing the importance of proactive measures in mitigating NPL risks. They find that timely intervention through debt restructuring and asset quality improvements can alleviate NPL burdens and enhance banks' profitability. Similarly, Boubaker et al. (2020) explore the role of credit risk management in NPL resolution, suggesting that banks play a crucial role in facilitating distressed asset disposal and debt recovery, thus expediting the resolution process. These findings underscore the significance of proactive NPL management strategies in

fortifying banking resilience and fostering economic stability.

Hypothesis 2 (H2). There is a positive association between Profitability with Cost Income Ratio and Non-Performing Loan. Both Cost-to-Income Ratio and Non-Performing Loan can be a good predictor to Profitability.

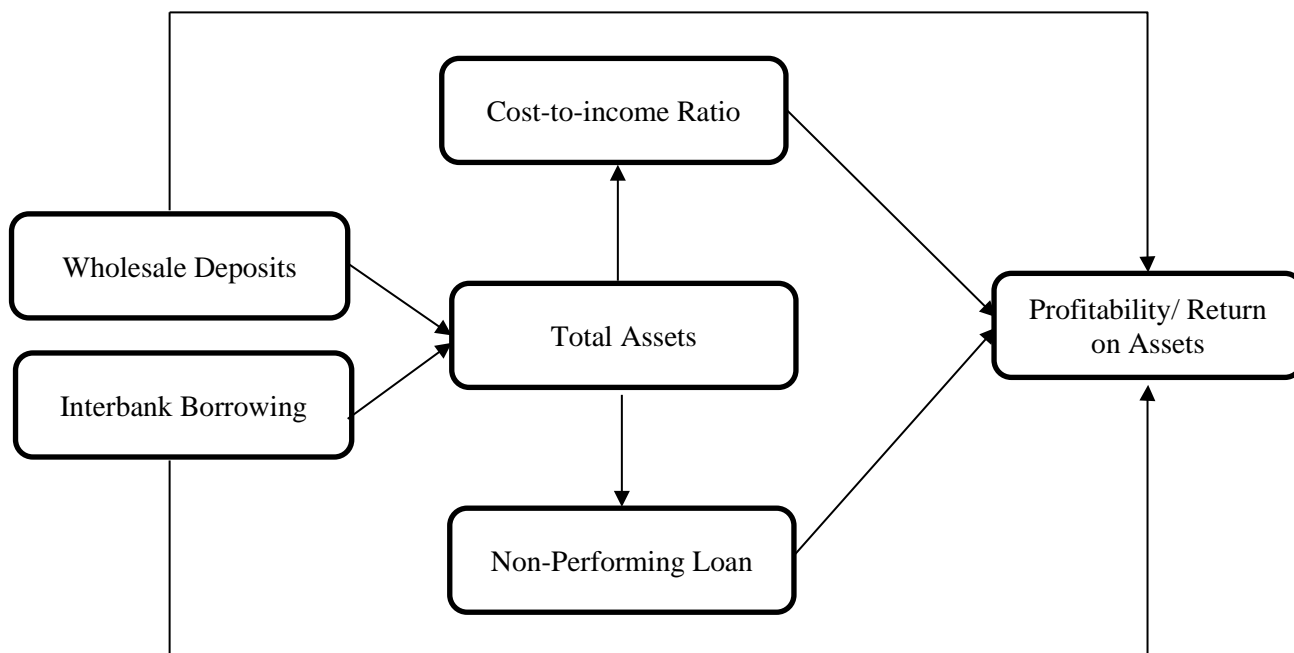


Figure 1. Conceptual Framework Scheme

Table 1. Descriptive Statistic Results

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Wholesale Deposits (Deposito)	325	1,772,506	186,580,956	28,327,963.19	32,381,004.42
Interbank Borrowings (Pdit)	325	0	14,635,891	1,928,668.34	2,687,226.64
Total Asstes (Tasset)	325	2,572,048	380,513,594	66,578,251.63	76,121,236.92
Non-Performing Loan Ratio (NPL)	325	0.08	28.09	5.98	5.03
Cost-to-income Ratio (CIR)	325	42.75	240.69	112.97	56.98
Return-on-Assets (ROA)	325	-52.033	4.37	-1.73	7.56206

3. RESEARCH METHOD

$$Y = a + b_1.X_1 + b_2.X_2 + \epsilon \text{ (1st Hypothesis)}$$

$$Z_1 = a + b_3.Y + \epsilon$$

$$Z_2 = a + b_4.Y + \epsilon$$

$$P = a + b_5.Z_1 + b_6.Z_2 + \epsilon \text{ (2nd Hypothesis)}$$

Where:

Y	= Total Assets
X ₁	= Wholesale Deposits
X ₂	= Interbank Borrowings
Z ₁	= Cost-to-Income Ratio
Z ₂	= Non-Performing Loan
P	= Profitability (Return-on-Asset)
a	= Intercept
b ₁ , b ₂ , b ₃ , b ₄ , b ₅ , b ₆	= Coefficients

The sample for this research contains financial performance data of 7 sample banks over the period 2015–2021. In 2020, all of these banks were included in the list of banks under intensive supervision by the authority. This study utilized the purposive sampling method, which involves selecting elements of a population that meet the criteria set by the researcher (Sekaran & Bougie, 2016).

The cumulative historical changes of their key financial performance indicators can be summarized as follows:

Table 2. Historical Behaviors (Reference Mode)

Year	Before 2015		2015-2021				2021	
Bank	Assets Change	Interbank Borrowings Change	Assets Change (Highest)	Deposit Portion to 3rd Party Fund Average	Interbank Borrowings Change (Highest)	Cost to Income Ratio Change (Highest)	Net Interest Margin Average	Return on Asset
Bank A (local bank)	51%	4174%	49.6%	76.5%	979.9%	231.4%	-6.7%	-2,59
Bank B (private bank)	N/D	N/D	12.6%	72.0%	602.5%	403.5%	-0.6%	-1,18
Bank C (private bank)	N/D	N/D	145.1%	74.5%	54991.2%	19.1%	1.2%	0,05
Bank D (islamic bank)	38%	398%	-8.9%	74.5%	21.3%	2.1%	0.2%	0,02
Bank E (foreign bank)	698%	11272%	-14.1%	74.5%	-99.8%	157.8%	-3.9%	-8,50
Bank F (state-owned bank)	N/D	N/D	118.7%	72.7%	92.0%	15.7%	1.3%	-0,45
Bank G (exim bank)	N/D	N/D	41.3%	N/D	27.7%	181.3%	-1.7%	0,00

The total number of records to be calculated is 325. The first hypothesis will be modeled using linear regression analysis, and the second hypothesis will be modeled using logistic regression analysis (K-Nearest Neighbour). Both regression analyses are programmed using Posit-Cloud/R-Language as the modelling and calculation tool. The significance of the model will be assessed using the R-Squared value for Linear Regression and the Confusion Matrix for K-Nearest Neighbour.

The VIF function from the car package in R-Language is also executed. The VIF of a predictor is a measure for how easily it is predicted from a linear regression using the other predictors. Taking the square root of the VIF tells you how much larger the standard error of the estimated coefficient is respect to the case when that predictor is independent of the other predictors.

A general guideline is that a VIF larger than 5 or 10 is considered large, indicating that the model may have problems estimating the coefficients. However, in general, this does not necessarily degrade the quality of predictions. If the VIF is larger than $1/(1-R^2)$, where R^2

is the Multiple R-squared of the regression, then that predictor is more related to the other predictors than it is to the response. The regression model and its correlating algorithms will be programmed using the following rules:

Table 3. Regression Model and Correlating Algorithms

Regression Model	Algorithm Functions
$Y = a + b_1.X_1 + b_2.X_2 + \epsilon$ <i>(1st Hypothesis)</i>	Function/Algorithm: Multiple Linear Regression
$Z_1 = a + b_3.Y + \epsilon$ $Z_2 = a + b_4.Y + \epsilon$	Function/Algorithm: Linear Regression
$P = a + b_5.Z_1 + b_6.Z_2 + \epsilon$ <i>(2nd Hypothesis)</i>	Function/Algorithm: K-Nearest Neighbour

Splitting the data into 2 groups using Supervised Machine. Learning approach (training data and testing data), before processing the logistic regression analysis using K-Nearest Neighbour algorithm.

4. RESULTS AND DISCUSSIONS

The first model shows that both Wholesale Deposits and Interbank Borrowings are good predictor to Total Assets, which VIF scores are 1.1654 (less than 5), meaning no multicollinearity detected in the first model. Herewith the result of analysis for first model:

The first model is $Y = a + b_1.X_1 + b_2.X_2 + \epsilon$, whereby Independent Variables are Wholesale Deposits (Deposito) and Interbank Borrowings (Pdit), and Dependent Variable is Total Assets (Tasset). This model produces an R-Squared of 0.940 and Adjusted R-Squared of 0.939. There is no multicollinearity between the independent variables because the variance inflation factor (VIF) of each of independent variabls (Pdit, Deposito) is less than 1.5 and tolerance is greater than 0.1. The following is table of multicollinearity and correlation matrix image between Dependent Variables and Independent Variables in the model.

Table 4. Multicollinearity of Model 1

Multicollinearity	Tolerance	VIF
Pdit	0.858	1.165
Depostio	0.858	1.165

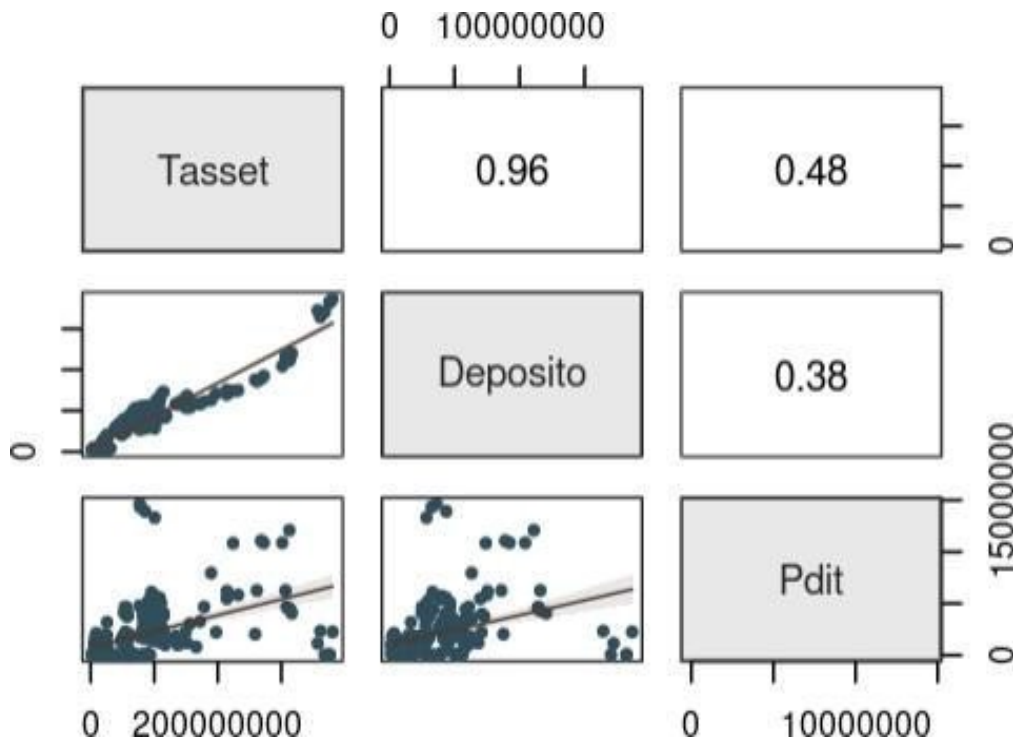


Figure 2. Correlation Matrix of Model 1

The first model confirms the first hypothesis (H1) that the asset growth is significantly influenced by the total of Wholesale Deposits and Interbank Borrowings of banks as the major source of funding for loan disbursement. Both independent variables have positive correlations to asset growth with 0.96 and 0.48 correlation respectively.

As for the second model which is acting as bridging to the third model, we analyze the linear regression between Total Assets to both Cost to Income Ratio (CIR) and Non-Performing Loan Ratio (NPL). The judgement of this regression is that CIR is influenced by the cost control, which the most significant factor in the banking industry is cost of funding which is influenced by the interest rate. According to Berger and DeYoung (1997), the cost-to-income ratio reflects the operational efficiency of banks, wherein lower ratios signify higher efficiency and cost control. On the other hand, Total Assets will also influence to NPL which Banks tries to reduce the NPL by increasing their Loan thus increasing the Total Assets, According to Demirgüç-Kunt and Huizinga (2017) the adverse effects of NPLs on credit provision, asserting that elevated NPL levels constrain banks' lending capacity, and at the end, deteriorating asset quality can increase NPL burdens/provision and reduce banks' profitability.

The second model is $Z_1 = a + b_3.Y + \varepsilon$ and $Z_2 = a + b_4.Y + \varepsilon$, whereby Independent Variable is Total Assets (Tasset) and Dependent Variables are Cost-to-Income Ratio (BOPO) and Non-Performing Loan (NPL). These models produce an R-Squared of 0.032 and 0.026 respectively and Adjusted R-Squared of 0.029 and 0.023 respectively. These models are considered as bridging between Model 1 and Model 3. The following is a Correlation Matrix image between Dependent Variables and Independent Variables.

Table 5. Correlation Matrix of Model 2 (Bridging) Result

Correlation Matrix	BOPO	Tasset
BOPO	1.00	-0.18
Tasset	-0.18	1.00
Correlation Matrix	NPL	Tasset
NPL	1.00	-0.16
Tasset	-0.16	1.00

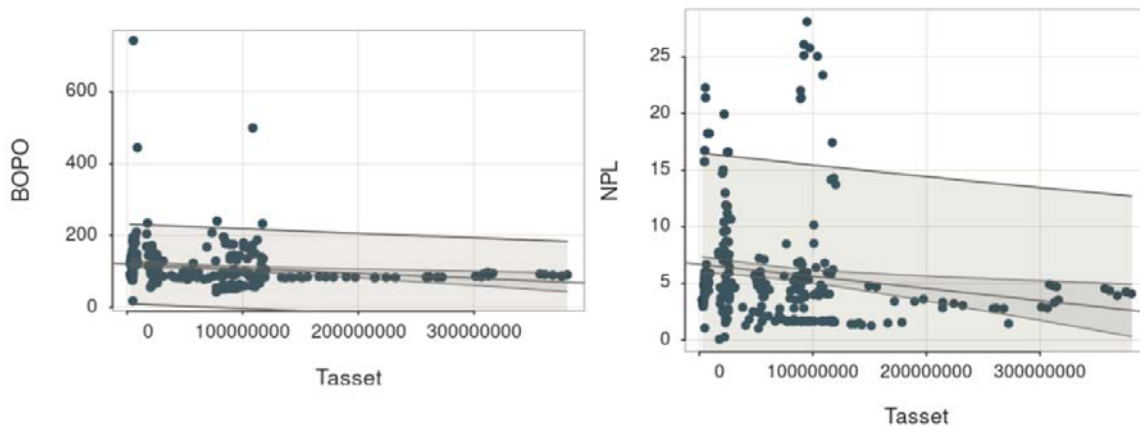


Figure 3. Correlation Matrix of Model 2

Using second model, we found that asset growth has non-significant negative correlation to both CIR and NPL, whereby the higher the Total Assets the lower the CIR and NPL ratio with -0.18 and -0.16 correlation score respectively. Stronger influence detected (0.32) in the correlation between asset growth to CIR than asset growth to NPL. This is supporting the first hypothesis that Asset Growth is creating more chances to reduce the NPL ratio and CIR ratio. However, the correlation is not significant enough to get favourable CIR ratio and NPL ratio.

Furthermore, Banks with improper credit risk management will tend to be having a potential high NPL ratio following their asset growth due to the less quality of their assets which usually invested on existing debtors whose credit needs are no longer productive and mostly allocated to consumption than productive investment. Banks with higher NPL ratio tend to be end up with underperformance due to higher burden to provide NPL provisioning into their cost structure, thus increasing their CIR ratio (inefficient).

By having this bridging model confirmed, the logistic regression analysis using K-Nearest Neighbour (KNN) algorithm has been developed to use both CIR and NPL as a predictor to Profitability or Return on Asset (ROA).

In order to develop the third model, R-Language has been used to create a data splitting using Supervised Machine Learning approach, whereby some data will be used as Training/Model Creating purpose, and the remaining data for Testing the Model.

The Third model is $P = a + b_5.Z_1 + b_6.Z_2 + \varepsilon$ (*2nd Hypothesis*), whereby the Independent Variables is Profitability (ROA) that classified into 2 categories in the Logistic Regression of 0 or 1. The Dependent Variables are Cost-to-Income Ratio (BOPO) and Non-Performing Loan

(NPL). This model produces an accuracy of 0.9838

Profitability has been classified into 2 categories; Profit (1) or Loss (0) in the logistic regression analysis using K-Nearest Neighbour algorithm. There were only 3 errors from testing from the testing dataset of 185 records in the dataset sample. These 3 errors are considerably acceptable and confirms the 2nd hypothesis accordingly.

Table 6. Confusion Matrix of Model 3

Confusion Matrix		
M ₁ (Profit = 1 /Loss = 0)	0	1
0	105	2
1	1	77

Table 7. Accuracy of Logistic Regression

Accuracy	0.9838
95% CI	(0.9533, 0.9966)
No. Information Rate	0.573
Kappa	0.9668
Sensitivity	0.9906
Specificity	0.9747
Pos Pred Value	0.9813
Neg Pred Value	0.9872
Prevalence	0.5730
Detection Rate	0.5676
Detection Prevalence	0.5784
Balanced Accuracy	0.9826
Positive Class	0

Profitability can be predicted very well with an accuracy of **0.9838** using model generated from dataset in research samples, thus confirms the 2nd hypothesis that CIR and NPL can be used as a good predictor and asset growth has influence to Profitability (ROA).

5. CONCLUSION

The structure of the banking performance system is complex and dynamic, so determining a strategy can have a different impact between one bank entity and other banks.

In the banking performance system, the resources relevant to performance are the adequacy of funds and the ability to minimize costs (efficiency) and generate as much income as possible. Research samples showed significantly high asset growth between 2015-2021 or before 2015. Banks often carry out an aggressive credit expansion strategy or asset growth to achieve as much profit as possible.

Research concluded that asset growth with high-interest-rate funding would negatively impact profitability. Wholesale Deposits and Interbank Borrowings are among common high-interest rate funding sources that have been selected as sources of funds for expansive growth

in our research samples. CIR and NPL can be used as good predictors of Profitability.

The most significant finding in this research is the negative correlation between asset growth and profitability via CIR and NPL. This bias may have occurred during the creation of the strategic banking plan. Efficiency significantly hinges on a bank's ability to manage asset growth, secure cost-efficient funding, and manage non-performing loans. Banks that cannot manage asset growth in balance with their ability to obtain low-interest funding and manage non-performing loans will have less tendency to sustain their positive profitability performance in the longer term. This should be a critical factor in the development of banking strategic plan that supports the sustainability.

Furthermore, this study recommends further research on this biased perspective among the bank's management team during the development of strategic plan. This can also be another research opportunity to learn how the bank's management team tends to create expansive strategies with an inadequate understanding of their limitations to rapid and expansive growth.

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