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THE IMPACT OF SIZE AND CAPITALIZATION ON BANK PERFORMANCE: EMPIRICAL EVIDENCE FROM SMALL BANKS IN INDONESIA

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ABSTRACT

This study examines the influence of capital adequacy (CAR) and bank size (SIZE) on the profitability of small banks in Indonesia, using Return on Assets (ROA) as the performance indicator. The research employs panel data regression with 405 observations from small banks and applies model selection tests, including the Chow and Hausman tests, to determine the most appropriate model. The Random Effect Model (REM) is identified as the best fit for the data. The findings reveal that both CAR and SIZE have a positive and statistically significant effect on bank profitability. These results suggest that adequate capitalization and optimal bank scale are essential factors in enhancing the financial performance of small banks. The study provides empirical insights to support policy formulation and strategic management aimed at improving the resilience and competitiveness of small banks in Indonesia.

KEYWORDS: - Bank Profitability, Capital Adequacy, Bank Size, Small Banks.

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1.0 INTRODUCTION

The stability and performance of the banking sector play a crucial role in supporting economic growth, particularly in developing countries like Indonesia, which has a heterogeneous banking structure. In recent years, Indonesia's banking industry has demonstrated considerable resilience despite global uncertainties. As of October 2024, banking intermediation remained strong, as reflected in the 10.92 percent year-on-year (yoy) growth in commercial bank lending, an increase from 8.99 percent yoy in the previous year. This growth was largely driven by increased credit demand from the corporate segment, supported by robust sales performance and sound debt servicing capacity.

Additionally, lending to Micro, Small, and Medium Enterprises (MSMEs) also recorded a 4.76 percent yoy growth, mainly driven by the wholesale and retail trade sectors as well as agriculture. Indonesia's banking liquidity remained healthy, as shown by the AL/NCD and AL/DPK ratios, which stood at 113.64 percent and 25.58 percent, respectively—well above the minimum thresholds. On the capital side, the Capital Adequacy Ratio (CAR) remained solid at 27.02 percent, although it experienced a slight decline due to a 9.44 percent yoy increase in Risk-Weighted Assets (RWA), in line with the rise in credit disbursement. Asset quality also improved, reflected in the decline of gross Non-Performing Loans (NPL) to 2.20 percent and the stability of net NPL at 0.77 percent.

Positive performance was also observed in Islamic banks, which recorded 12.50 percent yoy growth in assets, higher than the previous year. Financing disbursement increased by 13.24 percent, while Third Party Funds (DPK) grew by 10.43 percent. Capital strength remained strong with a CAR of 25.59 percent. Meanwhile, Regional Development Banks (BPD) posted a 7.55 percent growth in lending and 4.35 percent growth in DPK, with a capital ratio of 24.86 percent. However, attention to internal bank structure, such as size and capitalization, is becoming increasingly important, especially for small banks that face greater structural challenges.

Small banks, which tend to have limited assets, narrow market share, and low access to liquidity, face greater efficiency and sustainability risks compared to larger banks. Nevertheless, they continue to play a strategic role in expanding financial access and supporting regional economic development. Given these conditions, it is essential to examine how bank size and capital adequacy affect profitability, particularly within the context of small banks in Indonesia. This research seeks to provide empirical insights into the role of these two variables in supporting bank performance. Capital Adequacy Ratio (CAR) is a key indicator in the banking system that reflects the proportion of a bank's capital to its risk-weighted assets (OJK, 2016). Banks with higher capital have better capacity to absorb risks and invest in profitable activities. Studies by Coccorese & Girardone (2021) and Bitar et al. (2018) indicate that high capital adequacy contributes positively to profitability, especially in advanced economies. However, different results were found by Ha (2020), who argued that high capital can reduce profitability if not managed efficiently.

In the Indonesian context, research by Pranowo et al. (2020) found that capital adequacy had no significant effect on profitability. This highlights the need to revisit this relationship within the unique structure of Indonesia's banking sector. Therefore, the first hypothesis proposed in this study is that capital adequacy positively affects bank profitability, with particular attention to the characteristics of small banks in Indonesia.

Firm size and capitalization are two critical determinants of bank performance and stability. Abbas et al. (2024) find that strong capitalization improves profitability, particularly when moderated by economic freedom. Similarly, studies by Ayaydin and Karakaya (2014) and Haris et al. (2020) emphasize the role of bank capital in reducing risk and enhancing returns. Siddik et al. (2017) also confirm that capital structure significantly influences bank performance in developing economies. In emerging markets, Defung and Yudaruddin (2022) and Sufian and Habibullah (2010) highlight how economic freedom strengthens the capital-stability link. Firm size also matters, as Hashmi et

al. (2020) show that larger firms tend to achieve greater efficiency and market access. Tan and Floros (2018) and Ding et al. (2023) demonstrate that large banks are more resilient and efficient during crises. Moreover, Oyetade et al. (2023) underscore the importance of Basel IV compliance in enhancing bank performance across African countries. Collectively, these findings underscore the significant roles of capitalization and firm size in driving bank profitability and stability in diverse economic contexts.

Bank size is also a critical determinant of financial performance. Larger banks typically have greater access to resources, the ability to achieve economies of scale, and higher operational efficiency. Coccoresse & Girardone (2021) and Mahmood et al. (2023) found that bank size positively influences profitability, particularly for large banks that can diversify their income sources. In contrast, Meiryani et al. (2020) reported a negative impact of bank size on profitability, indicating the risk of diseconomies of scale.

However, these studies emphasize the importance of institutional context and banking industry structure in shaping the direction of the relationship. In Indonesia, Damayanti & Mawardi (2022) found that bank size had a positive but insignificant effect on profitability. Accordingly, the second hypothesis of this study is that bank size positively affects bank profitability. These two hypotheses form the basis for evaluating how small banks can enhance their performance through capital management and optimal scale utilization. Therefore, the main objective of this study is to empirically analyze the effect of capital adequacy (CAR) and bank size on the profitability of small banks in Indonesia, thereby offering strategic insights for strengthening the resilience and competitiveness of small banks within the national financial system.

2.0 METHOD

This study focuses on analyzing the determinants of profitability in small banks in Indonesia by examining the effects of capital adequacy and bank size. A total of 78 small banks were selected as the research sample, classified based on their core capital in accordance with the criteria set by the Indonesian Financial Services Authority (Otoritas Jasa Keuangan/OJK). The research covers a five-year period from 2019 to 2023, which allows the study to capture recent developments in the banking sector, particularly in the context of global economic uncertainty and post-pandemic recovery. This period is considered appropriate to assess both structural and performance-related changes in small banks across Indonesia.

The data used in this study are quantitative in nature, obtained in a systematic and measurable manner to support objective analysis. Secondary data were used as the main source of information, which were collected from the official website of the OJK (www.ojk.go.id). As a trusted and authoritative institution in the Indonesian financial sector, the OJK provides comprehensive banking data, including total assets, Capital Adequacy Ratio (CAR), and Return on Assets (ROA). The data collection method employed in this study was documentation. Researchers obtained financial statements and annual reports of all small banks listed by the OJK during the 2019–2023 period. These documents provided detailed quantitative information relevant to bank size, capital adequacy, and profitability. This documentation method ensured data reliability, consistency, and relevance to the research objectives.

Two primary analytical tools were applied in this study: descriptive statistical analysis and panel data regression. The following is the regression equation used:

$$ROA_{i,t} = \alpha_{i,t} + \beta_1 SIZE_{i,t} + \beta_2 CAR_{i,t} + \beta_3 INT_{i,t} + e_{i,t}$$

Where:

α_{it}	: Constant
i	: 1,2,3,...,N
t	: 1,2,3,...,T
ROA_{it}	: Return on assets of bank i for period t
$\beta_1 - \beta_3$	: Regression coefficient
CAR_{it}	: Capital adequacy ratio of bank i for period t
$SIZE_{it}$	: Firm size of bank i for period t
INT_{it}	: The interaction variable of Firm Size and CAR at bank i for period t
e_{it}	: error

Descriptive statistics were used to summarize and explain the distribution patterns, trends, and characteristics of the variables related to small banks during the observation period. Panel data regression analysis was employed to estimate the impact of bank size and capital adequacy on profitability. The regression was conducted using three common approaches: the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). To determine the most appropriate model, several statistical tests were conducted, including the Chow Test, Hausman Test, and Lagrange Multiplier (LM) Test, as suggested by Yudaruddin (2021).

Before conducting hypothesis testing, the study also performed classical assumption tests to ensure the validity and robustness of the regression model. These included tests for multicollinearity, heteroskedasticity, and autocorrelation. By fulfilling these assumptions, the study ensured that the empirical findings were not only statistically reliable but also interpretable within the context of Indonesia's banking industry. Overall, the methodological approach provides a comprehensive framework for examining how capital adequacy and bank size affect the profitability of small banks in a developing economy.

3.0 ANALYSIS

This study employs panel data regression to analyze the relationships between the variables under investigation. Panel data regression consists of three model approaches: the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). To determine the most appropriate model for the dataset, this study utilizes two model selection tests. First, the Chow Test is conducted to compare the CEM and FEM. Second, the Hausman Test is used to compare the FEM and REM. Through these testing mechanisms, the most suitable and reliable model for explaining the relationships between the variables can be identified and applied. The following section presents the results of these model tests:

Table 1. Chow Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	3.752013	-87,314	0.000
Cross-section Chi-square	288.6594	87	0.000

Table 2. Hausman Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.897141	3	0.037

Based on the output of the Chow Test using EViews version 13, the significance values of the F-test and Chi-square are both less than 0.05, specifically at 0.0000. This indicates that the null hypothesis is rejected, and thus, the Fixed Effect Model (FEM) is considered a better fit than the Common Effect Model (CEM). Following this, the Hausman Test is conducted, which is applied when the Chow Test results are significant. According to the Hausman Test output, the probability value of the Cross-section Random is 0.0037, which is lower than 0.05. Therefore, the null hypothesis is accepted, indicating that the Fixed Effect Model (FEM) is more appropriate for this study than the Random Effect Model (REM).

Table 3. Statistics Description (N = 405)

Variables	Mean	Stdv	Min	Max
ROA	0.852	2.948	-15.89	15.08
CAR	41.92	56.57	10.01	820.9
SIZE	16.58	0.915	13.48	18.99

Table 4. Correlation matrix

Variables	CAR	SIZE
CAR	1.000	0.397
SIZE		1.000

Table 3 presents the descriptive statistics of 405 observations covering the variables Return on Assets (ROA), Capital Adequacy Ratio (CAR), and bank size (SIZE). The average ROA is 0.852 with a standard deviation of 2.948, indicating substantial variation in profitability among small banks. CAR shows a mean value of 41.92 with a high standard deviation of 56.57 and a maximum value of 820.9, reflecting considerable disparities in capital adequacy levels. The SIZE variable has an average of 16.58 and a standard deviation of 0.915, suggesting relatively consistent bank sizes across the sample. Meanwhile, Table 4 displays the correlation matrix between CAR and SIZE, with a correlation coefficient of 0.397. This value is well below the commonly accepted multicollinearity threshold of 0.80, indicating that there is no multicollinearity problem between the independent variables in the regression model.

Table 5 displays the regression results that evaluate the influence of bank size (SIZE), capital adequacy ratio (CAR), and interest rates (INT) on the financial performance of small banks in Indonesia, measured using Return on Assets (ROA). The R-squared value is 0.519, indicating that

approximately 51.9% of the variation in ROA can be explained by the three independent variables included in the model. This suggests that the model has a moderate-to-strong explanatory power in explaining the determinants of bank performance during the 2019–2023 period.

The regression analysis reveals that SIZE has a positive and statistically significant effect on ROA. With a coefficient of 0.257 and a p-value of 0.0010, the results imply that larger small banks—measured by total assets—tend to exhibit higher profitability. This finding supports the view that bank size contributes to economies of scale and better resource management, which in turn enhances financial performance.

Similarly, the CAR variable also shows a positive and significant impact on ROA. The coefficient of 1.913 and a p-value of 0.0004 indicate that higher capital adequacy strengthens a bank's ability to absorb financial shocks and increases stakeholder confidence, which positively affects profitability. On the other hand, the interest rate (INT) variable has a negative and significant relationship with ROA, with a coefficient of -0.017 and a p-value of 0.0009. This suggests that rising interest rates may raise funding costs or reduce lending activity, thereby lowering the bank's financial performance.

Table 5. Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-29.9987	8.769169	-3.420929	0.0007
SIZE	0.257183	0.077166	3.332865	0.0010
CAR	1.913664	0.53942	3.547631	0.0004
INT	-0.01729	0.005161	-3.350282	0.0009
R-squared	0.519723	Mean dependent var		0.851506
Adjusted R-squared	0.382064	S.D. dependent var		2.951344
S.E. of regression	2.32002	Akaike info criterion		4.715917
Sum squared resid	1690.103	Schwarz criterion		5.615556
Log likelihood	-863.9733	Hannan-Quinn criter.		5.072011
F-statistic	3.775432	Durbin-Watson stat		1.892471
Prob(F-statistic)	0.0000			

4.0 DISCUSSION

The findings of this study confirm that both capital adequacy (CAR) and bank size (SIZE) significantly and positively affect the financial performance of small banks in Indonesia, as measured by Return on Assets (ROA). The regression results show that an increase in CAR and SIZE is associated with an improvement in bank profitability, reinforcing the importance of strong capitalization and sufficient scale in enhancing financial outcomes. These results are consistent with the overall positive performance of the Indonesian banking sector in recent years, particularly the solid CAR levels and robust lending growth reported as of October 2024. In line with this, the increasing financial intermediation, especially in the MSME and corporate segments, underscores the relevance of capital strength and operational scale in navigating market demands and supporting sustainable profitability.

Empirically, the positive influence of CAR on ROA supports the findings of Coccoresse & Girardone (2021) and Bitar et al. (2018), who argue that strong capital positions allow banks to absorb potential losses and undertake profitable investments. Despite some prior research in Indonesia, such as Pranowo et al. (2020), indicating no significant effect of CAR on profitability, this study suggests that for small banks, higher capital buffers play a more crucial role in supporting performance, especially under conditions of limited market access and greater risk exposure. This discrepancy highlights the importance of bank-specific characteristics and suggests that capital adequacy may yield more significant benefits in smaller or structurally constrained banking institutions.

Similarly, the positive and significant relationship between bank size and ROA aligns with the findings of Coccoresse & Girardone (2021) and Mahmood et al. (2023), who emphasize the advantages of economies of scale and resource access. In the context of Indonesia, where small banks often operate with limited reach and infrastructure, achieving a certain level of scale can enhance efficiency, broaden service capacity, and reduce per-unit costs. This study extends the literature by showing that even within the small bank segment, size matters significantly. The result contradicts previous local findings by Damayanti & Mawardi (2022), who reported only an insignificant relationship, indicating that recent structural improvements and competitive pressures may have elevated the importance of bank size in driving performance. These findings underscore the strategic value of strengthening capital and optimizing operational scale to boost profitability and resilience among small banks in Indonesia.

5.0 CONCLUSION

This study aims to empirically examine the effect of capital adequacy (CAR) and bank size (SIZE) on the profitability of small banks in Indonesia, measured by Return on Assets (ROA). Utilizing panel data regression with 405 observations, the research applies a model selection process involving Chow and Hausman tests, which indicate that the Random Effect Model (REM) is the most appropriate. The regression results reveal that both CAR and SIZE have a positive and significant influence on bank profitability. These findings underscore the critical role of adequate capitalization and operational scale in enhancing the financial performance of small banks, particularly within Indonesia's diverse and competitive banking environment.

The findings offer important implications for policymakers and banking practitioners. Regulators, such as Bank Indonesia and the Financial Services Authority (OJK), should consider policies that strengthen the capital base of small banks, including incentives for capital injection and improved risk management frameworks. Additionally, encouraging consolidation or strategic partnerships may help small banks achieve greater scale and operational efficiency. For bank managers, these results suggest the need to prioritize capital adequacy and explore strategic growth to improve competitiveness. Strengthening governance, enhancing operational systems, and investing in digital infrastructure could further support profitability and long-term resilience.

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