

Impact of CAR and NPL on ROA: A Study of ASEAN Banking Sector

Rosyida Sachin Dzihniya^{1*}, Meliza², and Didha Putri Citradika³

¹ Universitas Pekalongan

² Universitas Pekalongan

³ Universitas Pekalongan

*Corresponding Author – Email Address : rosyidasachin@gmail.com

ABSTRACT

This study explores the impact of Capital Adequacy Ratio (CAR) and Non-Performing Loan (NPL) on Return on Assets (ROA) within ASEAN banking institutions. The banking is pivotal to ASEAN's economic stability, yet inconsistencies in prior findings regarding the impact of CAR and NPL on ROA, highlight the need for further research. This research offers a regional-level analysis by examining the combined performance of banks across ASEAN. It contributes to the literature by focusing on the relationship between CAR, NPL, and ROA, focusing on the relationship between insights into their interactions within ASEAN banking as a unified sector. This study uses secondary data from ASEAN banks for the period 2021-2023, employing a quantitative methodology. Analytical techniques include descriptive statistics, classical assumption test, and multiple linear regression to better understand these financial interactions. The findings indicate that CAR has a significant positive impact on ROA, while NPL has a significant negative impact on ROA. Effective capital management and credit risk control are essential for improving bank profitability. This guides ASEAN policymakers and banking institutions in enhancing financial resilience.

ARTICLE INFO

Keywords:
Capital Adequacy Ratio,
Non-Performing Loan,
Return on Assets,
ASEAN Banking

1. Introduction

The economy encompasses all activities related to the flow of resources and wealth within an organized economic system. A country's economic conditions significantly influence the performance of vital sectors, including banking, which serves as a cornerstone of stability and economic growth. According to Dao and Nguyen (2020), the banking sector plays a strategic role as the primary provider of credit, with its stability and health forming the foundation of economic development. During periods of economic instability, central banks, through monetary policies, effectively manage inflation, deflation, and other risks to support economic recovery, thereby maintaining economic stability.

As a critical pillar of the economy, the banking sector provides liquidity, oversight, and essential financial information. This strategic role necessitates strict supervision and regulation to ensure financial stability and fiduciary accountability. Additionally, profitability is vital measure of bank's operational health and sustainability, indicating its ability to generate income and maintain operational success over time (Ayuningrum, 2021). High profitability strengthens the broader banking system, supporting economic growth and resilience. Return on Assets (ROA) is commonly employed

as a measure of profitability, assessing the efficiency with which a bank utilizes its assets to generate earnings. Higher ROA values signify strong resource management and operational efficiency, while lower ROA highlight potential inefficiencies (Lan & Nguyen, 2020). ROA reflects the overall health and effectiveness of banking institutions, making it a critical dependent variable in this study.

In Southeast Asia, financial stability and banking integration have been focal points since the 1997 financial crisis. Initiatives such as the ASEAN Financial Integration Framework (AFIF) and the ASEAN Banking Integration (ABIF) were introduced to enhance operational efficiency and banking oversight across the region. However, interbank dependencies present systemic risks, necessitating effective risk mitigation to maintain financial stability (Vuong et al., 2024). In the era of globalization, with the expansion of global trade and rapid advancements in information technology, the banking sector is increasingly influenced by global dynamics, requiring swift and efficient adaptation (Sunaryo, 2020).

In 2023, the ASEAN banking sector faced significant challenges stemming from global economic instability, impacting credit performance and capital adequacy ratios. Capital Adequacy Ratio (CAR) indicates a bank's capacity to withstand potential financial hazard. While high CAR levels in some ASEAN countries indicate strong financial resilience, although variations exist due to differing economic conditions. However, overly large reserves may reduce profitability if not effectively managed (Quoc Trung, 2021). On the other hand, Non-Performing Loan (NPL), represent problematic loans, signify declining credit quality and heightened financial risk when levels are high. Both variables are crucial in assessing a bank's financial health and performance.

This research examines the impact of Capital Adequacy Ratio and Non-Performing Loan on Return on Assets in banking institutions across ASEAN. This study resolves inconsistencies in earlier findings regarding the relationship between these variables and contributes to the literature by offering an integrated analysis of banking profitability in the ASEAN region through the use of secondary data and a quantitative approach. Furthermore, it provides strategic recommendations for enhancing financial resilience in the face of ongoing global economic dynamics.

2. Literature Review

Signaling Theory

Signaling theory, introduced by Spence (1973), explains how companies convey financial information to stakeholders, including creditors and investors. Through financial reports, stakeholders can determine whether the bank is sending good news or bad news. Effective financial management by banks sends out positive signals that increase investor and customer confidence. Negative signals can turn positive if banks improve their financial control and profitability (Setyaningsih et al., 2023). Changes in financial management and stability reflect a bank's ability to maintain economic resilience during unexpected conditions.

Research Variable

Capital Adequacy Ratio

Capital Adequacy Ratio (CAR) measures a bank's capacity to absorb financial risks, especially those arising from its operational activities, by assessing how internal funds support risky assets such as loans, investments, and interbank receivables (Quoc Trung, 2021; Sutrisno et al., 2022). According to Bank Indonesia Regulation No. 14/18/PBI/2012, a minimum CAR of 8% is required to ensure that banks maintain adequate reserves to withstand potential losses.

Non-Performing Loan

Non-Performing Loan (NPL) compares unpaid loans to the total loans, serving as a measure of credit risk management (Do et al., 2020). NPL indicates a bank's ability to handle risks associated with loan repayment failures, with high NPL signals poor credit performance, while low NPL reflects

effective risk management and financial health. Furthermore, excessive NPL levels signal poor credit management and a lack of professionalism in handling loan portfolios (Tangngisalu et al., 2020).

Return on Assets

Return on Assets (ROA) serving as one important metric. ROA which is determined by dividing net income after taxes by total assets, measures management efficiency in utilizing resources to generate profitability (Mcgowan & Andrew, 1969). Better asset utilization and profitability are indicated by higher ROA, whereas inefficiencies or decreased customer interest are suggested by lower ROA (Rostami et al., 2016; Lan & Nguyen, 2020).

Research Variable

Signaling theory, introduced by Spence (1973), explains how companies convey financial information to stakeholders, including creditors and investors. Through financial reports, stakeholders can determine whether the bank is sending good news or bad news. Effective financial management by banks sends out positive signals that increase investor and customer confidence. Negative signals can turn positive if banks improve their financial control and profitability (Setyaningsih et al., 2023). Changes in financial management and stability reflect a bank's ability to maintain economic resilience during unexpected conditions.

Hypothesis

The Influence of Capital Adequacy Ratio (CAR) on Return on Assets (ROA)

The Capital Adequacy Ratio (CAR) reflects a bank's ability to absorb operational losses and support productive activities through its financial reserves (Kalifa & Bektas, 2017). Higher CAR indicates a stronger financial position, enabling banks to fund operations and enhance profitability. Conversely, insufficient capital reserves limit a bank's capacity to generate returns, adversely affecting its profitability (Al-Harbi, 2019; Lan & Nguyen, 2020). The relationship between CAR and profitability aligns with resource-based theory, which emphasizes that financial resources are critical for sustaining competitive advantage and achieving higher performance. CAR also serves a buffer for financial risks, ensuring operational continuity even during economic instability. Empirical evidence supports the significant positive impact of CAR on ROA, as highlighted by Astohar (2017) and Aswini et al. (2021). Based on the explanation above, the following hypothesis is proposed :

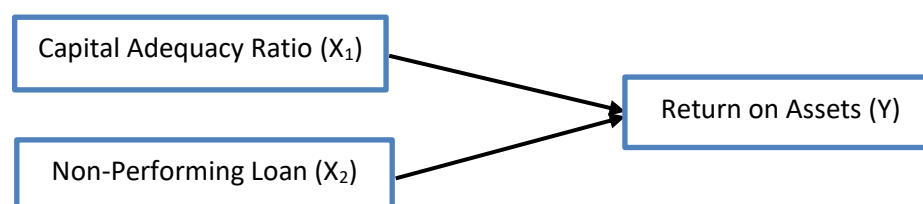
H1 : CAR has a positive and significant influence on ROA.

The Influence of Non-Performing Loan (NPL) on Return on Assets (ROA)

Non-Performing Loan (NPL) represent credit risk level within a bank, serving as a key indicator of financial health (Yrigoy, 2018). The signaling theory suggests that high NPL ratios send negative signals to stake holders, highlighting inefficiencies in credit risk management. These inefficiencies hinder a bank's ability to generate returns, adversely affecting ROA. Consistent with empirical research by Tangngisalu et al. (2020) and Erwanda et al. (2024), NPL negatively and significantly impacts ROA. Based on the explanation above, the following hypothesis is proposed :

H2 : NPL has a negative and significant influence on ROA.

Figure 1. Research Framework



3. Method, Data, and Analysis

This research is quantitative causal, employing secondary data from annual reports of banking institutions in Southeast Asia for the 2021-2023 period. A total of 234 sample from 78 banks were analyzed. The dependent variable, Return on Assets (ROA), measure profitability, while independent variables include the Capital Adequacy Ratio (CAR) and Non-performing Loan (NPL). Data analysis employs multiple linear regression to assess the effect of CAR and NPL on ROA. The equation used is as follows:

Multiple Linear Regression Analysis:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + e$$

Where:

Y = Return on Assets (ROA)

a = Constanta

β = Regression coefficient

X_1 = Capital Adequacy Ratio (CAR)

X_2 = Non-Performing Loan (NPL)

e = Error Term

4. Result and Discussion

Multiple Linear Regression Analysis

Multiple linear regression analysis is a statistical model used to ascertain the partial and simultaneous effects of independent variables on a dependent variable (Nurhayati, 2019). This method was applied to examine the effects of Capital Adequacy Ratio (CAR) and Non-Performing Loan (NPL) on Return on Assets (ROA). The results of the multiple linear regression analysis in this study using the SPSS program are as follows:

Table 1 Multiple Linear Regression

		Coefficients ^a				t	Sig.
		Unstandardized Coefficients		Standardized Coefficients	Beta		
Model		B	Std. Error				
1	(Constant)	.020	.000			128.623	.000
	CAR	.000	.000	.209		15.946	.000
	NPL	-.107	.001	-.941		-71.685	.000

Dependent Variable: ROA

Source: SPSS output data processed 2025

From the table, the multiple regression model between the independent variables (X) and the dependent variable (Y) is expressed as:

$$Y = 0,020 + 0,000 X_1 - 0,107 X_2$$

Based on the above equation, a constant value is 0,020 indicates that if all independent variables are 0, the dependent variable (ROA) will be 0,020. The CAR variable has a coefficient of 0,000, meaning that a 1% increase in CAR leads to a 0% increase in ROA, assuming the other variables remain constant. Similarly, the NPL variable has a coefficient of -0,107, indicating that a 1% increase in NPL results in a 10,7% decrease in ROA, under the same assumption.

Discussion

The Influence of Capital Adequacy Ratio (CAR) on Return on Assets (ROA)

Capital Adequacy Ratio (CAR) reflects a bank's ability to absorb financial losses and manage risks associated with operational activities. The results of hypothesis testing (H1) revealed that H0 is rejected and H_a is accepted. This finding supports the initial hypothesis, which posited a positive and significant influence of Capital Adequacy Ratio and Return on Assets. According to signaling theory proposed by Spence (1973), companies can send signals through financial indicators to reflect their quality and stability. In this case, a high CAR serves as a "good news" signal to investors and stakeholders, suggesting that the bank is financially healthy and capable of managing risks effectively. A higher CAR implies that the bank has more capital available to support income-generating activities, thereby increasing its profitability (Al-Harbi, 2019; Lan & Nguyen, 2020). On the other hand, a low CAR limits productive operations, reducing profitability. A higher CAR also shows stronger financial resilience, helping maintain market confidence. These findings align with previous studies by Astohar (2017) and Aswini et al. (2021), which also confirmed its positive and significant impact on ROA.

The Influence of Non-Performing Loan (NPL) on Return on Assets (ROA)

Non-Performing Loan (NPL) reflect a bank's ability to handle credit repayment risks from borrowers who fail or struggle to meet their obligations. The result of hypothesis testing (H2) indicate that H0 is rejected and H_a is accepted, demonstrating a significant negative relationship between Non-Performing Loan and Return on Assets. This finding suggests that lower NPL levels correlate with reduced credit risk for the bank. Conversely, high NPL ratios reflect poor credit quality, an increase in problematic loans, and heightened financial risks for the bank (Selling & Stickney, 1989). Elevated NPL levels indicate the bank's limited ability to extend credit due to operational losses stemming from these problematic loans. This scenario adversely impacts profitability (ROA) and increases the likelihood of financial losses (Endri, 2020; Sutrisno et al., 2022). The risks associated with high NPL ratios can escalate due to poor credit quality, especially when loans are issued without adherence to prudential principles or during uncontrolled credit expansion (Tangngisalu et al., 2020). Thus, higher NPL levels result in lower ROA, while lower NPL levels provide a positive signal (good news), reflecting effective credit quality and risk management. This improves the confidence of investors and creditors in the bank. These findings are consistent with research by Tangngisalu et al. (2020) and Erwanda et al. (2024), both of which concluded that NPL has a significant negative effect on ROA.

5. Conclusion and Suggestion

Based on multiple regression analysis, the following results were obtained. The first hypothesis (H1) states that Capital Adequacy Ratio (CAR) has a significant positive effect on Return on Assets (ROA), with results supporting this, leading to the rejection of H0 and the acceptance of H_a. This indicates that greater CAR enhances a bank's ability to support productive and income-generating activities, thereby increasing its ROA. The second hypothesis (H2) proposed a negative influence on Non-Performing Loan (NPL) on Return on Assets (ROA), is also confirmed. The rejection of H0 and acceptance of H_a indicate that a rise in NPL levels undermines bank profitability. High NPLs reflect deteriorating credit quality and heightened credit risk, which erode the bank's earnings and weaken its overall financial performance.

This study contributes theoretically by reinforcing the role of internal financial indicators, specifically CAR and NPL, as key determinants of bank profitability in the ASEAN banking sector. Practically, the findings underscore the importance of maintaining adequate capital reserves and implementing effective credit risk management to sustain profitability and strengthen financial stability. Future research should be consider extending the observation period, incorporating variables such as economic growth and interest rates, and exploring other economic sectors to provide a more comprehensive understanding and boarder applicability of the results.

6. Acknowledgement

The authors would like to express their sincere gratitude to Universitas Pekalongan and An Giang University for their invaluable support and facilitation in the conduct of this research. Special appreciation is extended to research institutions of both universities for granting the necessary permissions and providing the opportunity to undertake this study. The authors also extend their heartfelt thanks to all individual and organizations whose contributions have been instrumental in the successful completion of this research, though they cannot be named individually.

7. Reference

- Al-Harbi, A. (2019). The determinants of conventional banks profitability in developing and underdeveloped OIC countries. *Journal of Economics, Finance and Administrative Science*, 24(47), 4–28.
- Astohar, A. (2017). Pengaruh Capital Adequacy Ratio (CAR) dan Financing To Deposit Ratio Terhadap Profitabilitas Perbankan Syariah di Indonesia Dengan Inflasi Sebagai Variabel Pemoderasi. *Among Makarti*, 9(2). <https://doi.org/10.52353/ama.v9i2.138>
- Aswini, S., Gunawan, E., Chaniago, K., & Astuty, F. (2021). Pengaruh LDR, NPL, CAR dan DPK terhadap ROA pada Perusahaan Perbankan Periode 2015-2019. *Owner*, 5(1), 252–259. <https://doi.org/10.33395/owner.v5i1.384>
- Ayuningrum, A. P. (2021). The Effect Risk of Credit, Efficiency, and GCG of Bank Profitability (Study in Conventional Commercial Banks Registered on the Indonesia Stock Exchange Period 2012 - 2019). *Management Analysis Journal, Vol 10 No 2 (2021): Management Analysis Journal*, 139–145. <https://journal.unnes.ac.id/sju/index.php/maj/article/view/45940/19458>
- Dao, B. T. T., & Nguyen, D. P. (2020). Determinants of Profitability in Commercial Banks in Vietnam, Malaysia and Thailand. *The Journal of Asian Finance, Economics and Business*, 7(4), 133–143. <https://doi.org/10.13106/jafeb.2020.vol7.no4.133>
- Do, H., Xuan, N., & Phung, Q. (2020). The effect of non-performing loans on profitability of commercial banks: Case of Vietnam. *Accounting*, 6, 373–386. <https://doi.org/10.5267/j.ac.2020.1.001>
- Endri, E. (2020). Long-Term Analysis Banking Share Price: Application of Data Panel Regression Model. *SSRN Electronic Journal*, 2. <https://doi.org/10.2139/ssrn.3670225>
- Erwanda, A. P. N., Zuhroh, I., & Kurniawati, E. T. (2024). Comparative Analysis Of Financial Performance Of Conventional Banking In Asean. *EKOMBIS REVIEW: Jurnal Ilmiah Ekonomi Dan Bisnis*, 12(3). <https://doi.org/10.37676/ekombis.v12i3.5691>
- Kalifa, W., & Bektas, E. (2017). The impacts of bank-specific and macroeconomic variables on the capital adequacy ratio: evidence from Islamic banks. *Applied Economics Letters*, 1–5. <https://doi.org/10.1080/13504851.2017.1340559>
- Lan, T., & Nguyen, C. (2020). The Determinants of Profitability in Listed Enterprises: A Study from Vietnamese Stock Exchange. *Journal of Asian Finance Economics and Business*, 7, 47–58. <https://doi.org/10.13106/jafeb.2020.vol7.no1.47>
- Mcgowan, C., & Andrew, R. S. (1969). Using Disaggregated Return on Assets to Conduct a Financial Analysis of a Commercial Bank Using an Extension of the DuPont System of Financial Analysis. *Accounting and Finance Research*, 1, 1082. <https://doi.org/10.5430/afr.v1n1p152>
- Nurhayati, S. (2019). *Metodologi Penelitian Praktis (2nd ed.)*. UNIKAL PRESS.
- Quoc Trung, N. K. (2021). Determinants of bank performance in Vietnamese commercial banks: an application of the camels model. *Cogent Business & Management*, 8(1). <https://doi.org/10.1080/23311975.2021.1979443>
- Rostami, S., Rostami, Z., & Kohansal, S. (2016). The Effect of Corporate Governance Components on Return on Assets and Stock Return of Companies Listed in Tehran Stock Exchange. *Procedia Economics and Finance*, 36, 137–146. <https://doi.org/https://doi.org/10.1016/S2212->

5671(16)30025-9

- Selling, T. I., & and Stickney, C. P. (1989). The Effects of Business Environment and Strategy on a Firm's Rate of Return on Assets. *Financial Analysts Journal*, 45(1), 43–52. <https://doi.org/10.2469/faj.v45.n1.43>
- Setyaningsih, A., Maftukhin, M., & Ernitawati, Y. (2023). Pengaruh Biaya Operasional Pendapatan Operasional (BOPO), Loan to Deposit Ratio (LDR), dan Net Interest Margin (NIM) Terhadap Return On Asset (ROA) pada Perusahaan Perbankan yang Terdaftar di Bursa Efek Indonesia. *Jurnal Bina Akuntansi*, 10(2), 696–715. <https://doi.org/10.52859/jba.v10i2.467>
- Spence, M. (1973). Job Market Signaling. *The Quarterly Journal of Economics*, 87(3), 355–374. <https://doi.org/10.2307/1882010>
- Sunaryo, D. (2020). The Effect Of Capital Adequacy Ratio (CAR), Net Interest Margin (NIM), Non-Performing Loan (NPL), and Loan To Deposit Ratio (LDR) Against Return On Asset (ROA) In General Banks In Southeast Asia 2012-2018. *Ilomata International Journal of Management*, 1(4), 149–158. <https://doi.org/10.52728/ijjm.v1i4.110>
- Sutrisno, M. S., Laksana, B., & Djuwarsa, T. (2022). Pengaruh NPL dan CAR Terhadap ROA pada Bank Umum Milik Negara. *Indonesian Journal of Economics and Management*, 2(2), 429–440. <https://doi.org/10.35313/ijem.v2i2.3260>
- Tangngisalu, J., Hasanuddin, R., Hala, Y., Nurlina, N., & Syahrul, S. (2020). Effect of CAR and NPL on ROA: Empirical Study in Indonesia Banks. *The Journal of Asian Finance, Economics and Business*, 7(6), 9–18. <https://doi.org/10.13106/jafeb.2020.vol7.no6.009>
- Vuong, G. T. H., Nguyen, Y. D. H., Nguyen, M. H., & Wong, W.-K. (2024). Assessing the impact of macroeconomic uncertainties on bank stability: Insights from ASEAN-8 countries. *Heliyon*, 10(11), e31711. <https://doi.org/https://doi.org/10.1016/j.heliyon.2024.e31711>
- Yrigoy, I. (2018). Transforming non-performing loans into re-performing loans: Hotel assets as a post-crisis rentier frontier in Spain. *Geoforum*, 97, 169–176. <https://doi.org/https://doi.org/10.1016/j.geoforum.2018.11.001>