IMPACT OF CAPITAL ADEQUACY AND CREDIT RISK ON BANK PROFITABILITY, WITH LIQUIDITY AS AN INTERVENING VARIABLE

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ABSTRACT

Purpose: This study aims to examine the effect of influencer credibility, product price, and brand image on purchase decisions on the Shopee platform.

Method: This research uses a quantitative approach with an associative research design. The sample consists of 180 respondents selected through purposive sampling, with the criteria of having made purchases on Shopee within the last six months. Data were collected using a structured questionnaire with a five-point Likert scale. The data analysis technique employed is multiple linear regression, supported by validity, reliability, and classical assumption tests.

Findings: The results indicate that influencer credibility, product price, and brand image have positive and significant effects on purchase decisions, both partially and simultaneously. Among these variables, brand image has the strongest influence. The model demonstrates good explanatory power in explaining consumer purchasing behavior in e-commerce.

Novelty: This study contributes to the literature by integrating influencer credibility, pricing strategy, and brand image within a single model in the context of e-commerce in Indonesia. It also highlights the dominant role of brand image in influencing purchase decisions, providing insights for developing effective digital marketing strategies.

INTRODUCTION

The banking industry plays a vital role in the economy through its intermediation function, namely collecting funds from the public and channeling them into loans. Strong banking performance is essential to maintain financial system stability, which is often reflected in profitability levels. Profitability, commonly measured by Return on Assets (ROA), indicates a bank's ability to generate earnings from its assets. A higher level of profitability reflects operational efficiency and effective management in utilizing available resources (Otoritas Jasa Keuangan, 2023).

One of the key factors influencing profitability is capital adequacy, which is measured using the Capital Adequacy Ratio (CAR). CAR reflects a bank's ability to absorb potential losses arising from its operational activities (Bank for International Settlements, 2022). Banks with higher capital adequacy tend to have greater stability and stronger capacity to expand lending activities, thereby potentially increasing profitability (Al-Homaidi et al., 2021). However, excessively high capital that is not efficiently allocated to productive assets may reduce efficiency and negatively impact profitability.

In addition to capital adequacy, credit risk is a crucial factor affecting bank performance. Credit risk, typically measured by the Non-Performing Loan (NPL) ratio, reflects the proportion of problematic loans within a bank's portfolio. A high NPL ratio indicates poor asset quality and may increase loan loss provisions, ultimately reducing profitability (Ozili, 2020). In periods of economic uncertainty, rising credit risk becomes a major challenge for banks in maintaining financial performance.

Furthermore, liquidity also plays an important role in determining bank profitability. Liquidity, commonly measured by the Loan to Deposit Ratio (LDR), reflects a bank's ability to meet its short-term obligations. Optimal liquidity enables banks to balance loan disbursement with available funding. Recent studies suggest that liquidity not only has a direct effect on profitability but also acts as an intervening variable linking capital adequacy and credit risk to profitability (Batten & Vo, 2019; Nguyen et al., 2022).

Empirical findings indicate that the relationship between capital adequacy, credit risk, and profitability remains inconsistent. Some studies report a positive effect of capital adequacy on profitability, while others find negative or insignificant relationships (Al-Homaidi et al., 2021). Similarly, credit risk is generally found to have a negative effect on profitability, although the magnitude and significance of this relationship may vary depending on economic conditions and bank risk management policies (Ozili, 2020). These inconsistencies suggest the presence of an intervening variable, with liquidity being a potential mediator.

Based on the above discussion, this study is important to examine the effect of capital adequacy and credit risk on banking profitability with liquidity as an intervening variable. This research is expected to contribute to the development of banking finance literature and provide practical insights for bank management in formulating strategies related to capital management, credit risk control, and liquidity management to enhance profitability.

THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Theoretical Framework

This study is grounded in several core theories in banking and financial management. First, the **trade-off theory of capital structure** suggests that firms, including banks, balance the benefits and costs of holding capital to optimize performance. Adequate capital enhances stability and reduces bankruptcy risk, but excessive capital may lower returns due to inefficiency.

Second, **risk-return trade-off theory** explains that higher risk is generally associated with higher expected returns. However, in banking, excessive credit risk may instead reduce profitability due to loan defaults and provisioning costs.

Third, **financial intermediation theory** emphasizes the role of banks in efficiently allocating funds between surplus and deficit units. In this context, liquidity becomes crucial in ensuring smooth intermediation while maintaining profitability.

These theoretical perspectives support the assumption that capital adequacy and credit risk influence profitability both directly and indirectly through liquidity.

Profitability in Banking

Profitability reflects a bank's ability to generate earnings from its assets and operations. It is commonly measured using Return on Assets (ROA), which captures management efficiency in utilizing total assets. Higher profitability indicates better financial performance and sustainability.

Previous studies have shown that profitability is influenced by internal factors such as capital structure, asset quality, and liquidity management (Batten & Vo, 2019). Therefore, understanding these determinants is essential for improving banking performance.

Capital Adequacy and Profitability

Capital adequacy, measured by the Capital Adequacy Ratio (CAR), reflects a bank's financial strength in absorbing losses. According to Bank for International Settlements (2022), maintaining sufficient capital is a key regulatory requirement to ensure financial stability. Empirical findings suggest that capital adequacy positively influences profitability, as well-capitalized banks are more capable of expanding lending and absorbing shocks (Al-Homaidi et al., 2021). However, some studies argue that excessive capital may lead to inefficiency and reduce returns.

Hypothesis 1 (H1): Capital adequacy has a positive effect on profitability.

Credit Risk and Profitability

Credit risk, typically measured by the Non-Performing Loan (NPL) ratio, reflects the likelihood of borrower default. High credit risk reduces income and increases provisioning costs, thereby negatively affecting profitability (Ozili, 2020). Most empirical studies confirm a negative relationship between credit risk and profitability. Poor asset quality weakens bank performance and increases financial vulnerability.

Hypothesis 2 (H2): Credit risk has a negative effect on profitability.

Capital Adequacy and Liquidity

Capital adequacy also influences liquidity, as well-capitalized banks have greater flexibility in managing funding and meeting obligations. Strong capital positions enhance market confidence and improve access to funding sources. Studies indicate that higher capital adequacy leads to better liquidity management, as banks can allocate funds more effectively while maintaining financial stability (Nguyen et al., 2022).

Hypothesis 3 (H3): Capital adequacy has a positive effect on liquidity.

Credit Risk and Liquidity

Credit risk can significantly affect liquidity. High levels of non-performing loans disrupt cash inflows from loan repayments, thereby reducing liquidity. This condition forces banks to rely on external funding, which may increase costs. Empirical evidence shows that increased credit risk negatively impacts liquidity (Ozili, 2020).

Hypothesis 4 (H4):

Credit risk has a negative effect on liquidity.

Liquidity and Profitability

Liquidity plays a dual role in banking performance. Adequate liquidity ensures smooth operations and enhances customer confidence. However, excessive liquidity may indicate inefficient use of funds. Liquidity, commonly measured using Loan to Deposit Ratio (LDR), has been found to positively influence profitability when managed optimally (Batten & Vo, 2019).

Hypothesis 5 (H5):

Liquidity has a positive effect on profitability.

The Mediating Role of Liquidity

Liquidity is expected to mediate the relationship between capital adequacy, credit risk, and profitability. Adequate capital improves liquidity, which in turn enhances profitability. Conversely, high credit risk reduces liquidity, leading to lower profitability. Recent studies highlight that liquidity acts as an important transmission mechanism in banking performance (Nguyen et al., 2022).

Hypothesis 6 (H6):

Liquidity mediates the relationship between capital adequacy and profitability.

Hypothesis 7 (H7):

Liquidity mediates the relationship between credit risk and profitability.

RESEARCH METHODOLOGY

Population and Sample

The population of this study consists of all banking companies listed on the Indonesia Stock Exchange (IDX) during the period 2019–2024. The banking sector is selected due to its significant role in financial intermediation and economic stability. The sampling technique used in this study is **purposive sampling**, where samples are selected based on specific criteria to ensure the availability and relevance of data. The criteria for sample selection are as follows:

1. Banks listed on the IDX consistently during the period 2019–2024.
2. Banks that publish complete annual financial statements for the study period.
3. Banks that provide complete data related to Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), Loan to Deposit Ratio (LDR), and Return on Assets (ROA).

4. Banks that do not experience extreme financial distress or delisting during the observation period.

Type and Source of Data

This study uses **secondary data** obtained from publicly available sources. The data are collected from:

- Annual reports and financial statements of banking companies
- Official publications from the Indonesia Stock Exchange
- Reports from Otoritas Jasa Keuangan

The data collected are quantitative in nature and presented in numerical form, allowing statistical analysis. The data collection method used in this study is **documentation**. Financial data are obtained by reviewing and recording relevant information from annual reports and financial statements of the sampled banks for the period 2019–2024.

3.4 Operational Definition of Variables

This study involves four main variables: two independent variables, one intervening variable, and one dependent variable.

1. Dependent Variable

$$ROA = \frac{Laba\ Bersih}{Total\ Aktiva}\ x\ 100\%$$

2. Independent Variables

- **Capital Adequacy (CAR)**

$$CAR = \frac{Total\ Modal}{ATMR}\ x\ 100\%$$

- **Credit Risk (NPL)**

$$NPL = \frac{Kredit\ Bermasalah}{Total\ Kredit}\ x\ 100\%$$

3. Intervening Variable

- **Liquidity (LDR)**

$$LDR = \frac{Total\ Kredit\ yang\ Diberikan}{Total\ DPK}\ x\ 100\%$$

Data Analysis Technique

Before performing regression analysis, classical assumption tests are conducted to ensure the validity of the model:

1. **Normality Test** – to examine whether the data are normally distributed
2. **Multicollinearity Test** – to ensure no high correlation among independent variables
3. **Heteroscedasticity Test** – to check variance consistency of residuals
4. **Autocorrelation Test** – to detect correlation among residuals

Multiple Linear Regression Model

This study uses two regression models:

Model 1 (Determinants of Liquidity):

$$LDR = \beta_1\ CAR + \beta_2\ NPL + e_1$$

Model 2 (Determinants of Profitability):

$$ROA = \beta_3 CAR + \beta_4 NPL + \beta_5 LDR + e_2$$

Mediation Test

To examine the role of liquidity as an intervening variable, a **mediation test** is conducted using **Sobel test.** This test determines whether liquidity significantly mediates the relationship between capital adequacy, credit risk, and profitability.

RESULTS AND DISCUSSION

Descriptive Statistics

Descriptive statistics provide an overview of the distribution and characteristics of the research variables. Profitability is proxied by Return on Assets (ROA), while liquidity is measured using Loan to Deposit Ratio (LDR).

Table 1. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
ROA (%)	120	0.15	3.25	1.45	0.72
CAR (%)	120	12.50	35.80	22.10	5.40
NPL (%)	120	0.80	6.90	2.80	1.30
LDR (%)	120	65.20	105.40	88.30	9.10

The descriptive statistics reveal several important insights into the financial condition of banking companies during the 2019–2024 period. The average ROA of 1.45% indicates that banks are able to generate profits from their assets, although the level remains moderate compared to optimal banking performance benchmarks. The relatively wide range between the minimum (0.15%) and maximum (3.25%) values suggests variability in profitability across banks, indicating differences in managerial efficiency and asset utilization.

The average CAR of 22.10% is significantly above the regulatory minimum, reflecting strong capital buffers across the banking sector. This implies that most banks are well-capitalized and capable of absorbing potential financial shocks. However, the relatively high standard deviation (5.40) indicates heterogeneity in capital management strategies among banks.

The NPL ratio averages 2.80%, which is below the commonly accepted threshold of 5%, suggesting that credit risk is generally well managed. Nevertheless, the maximum value of 6.90% indicates that some banks experience higher levels of credit risk, which may pose a threat to financial stability if not properly controlled.

Meanwhile, the average LDR of 88.30% indicates that banks maintain a relatively balanced liquidity position. This suggests that banks are effectively channeling funds into loans while still maintaining sufficient liquidity to meet short-term obligations. However, the maximum LDR exceeding 100% indicates that some banks may be aggressively lending, potentially increasing liquidity risk.

Overall, these findings suggest that the banking sector demonstrates relatively strong capital adequacy and stable liquidity, but variations in profitability and credit risk highlight differences in operational efficiency and risk management practices.

Classical Assumption Tests

Table 2. Normality Test

Variable	Asymp. Sig (2-tailed)
Residual	0.200

The Kolmogorov-Smirnov test shows a significance value of 0.200, which is greater than the 0.05 threshold. This indicates that the residuals are normally distributed. The normality assumption is crucial because it ensures the validity of statistical inference in regression analysis,

particularly for hypothesis testing. A normally distributed residual implies that the model does not suffer from systematic bias and that the estimated coefficients are reliable and unbiased.

Table 3. Multicollinearity Test

Variable	Tolerance	VIF
CAR	0.72	1.38
NPL	0.68	1.47
LDR	0.75	1.33

The multicollinearity test results indicate that all variables have tolerance values above 0.10 and VIF values below 10. This confirms the absence of multicollinearity among the independent variables. This condition is important because multicollinearity can distort the estimation of regression coefficients, making it difficult to assess the individual effect of each variable. The low VIF values suggest that CAR, NPL, and LDR provide distinct and independent information in explaining profitability.

Table 4. Glejser Test

Variable	Sig.
CAR	0.412
NPL	0.528
LDR	0.367

All significance values exceed 0.05, indicating that heteroscedasticity is not present in the model. This means that the variance of the residuals is constant across all levels of the independent variables. Homoscedasticity is essential for ensuring efficient and unbiased parameter estimates. The absence of heteroscedasticity strengthens the reliability of the regression results.

Table 5. Durbin-Watson Test

Model	Durbin-Watson
Regression	1.89

The Durbin-Watson value of 1.89 falls within the acceptable range (1.5–2.5), indicating no autocorrelation among residuals. This suggests that the residuals are independent across observations, which is particularly important in panel or time-series data. The absence of autocorrelation ensures that the regression model does not violate key assumptions, thereby enhancing its validity.

Regression Analysis

Table 6. Regression Results (Model 1)

Variable	Coefficient (β)	t-value	Sig.
Constant	45.210	4.321	0.000
CAR	0.350	3.980	0.000
NPL	-0.280	-2.540	0.013

Table 7. Model Summary (Model 1)

R	R^2	Adjusted R^2
0.542	0.294	0.280

The regression results show that capital adequacy has a positive and statistically significant effect on liquidity. This implies that banks with higher capital levels tend to maintain better liquidity positions. Strong capital buffers increase confidence among depositors and investors, enabling banks to access funding more easily and manage liquidity effectively. On the other hand, credit risk has a negative and significant effect on liquidity. This indicates that higher levels of non-

performing loans reduce cash inflows from loan repayments, thereby weakening liquidity. This finding highlights the importance of credit risk management in maintaining liquidity stability.

The R^2 value of 0.294 suggests that approximately 29.4% of the variation in liquidity can be explained by capital adequacy and credit risk. While this indicates moderate explanatory power, it also suggests that other factors, such as macroeconomic conditions or bank size, may influence liquidity.

Table 8. Regression Results (Model 2)

Variable	Coefficient (β)	t-value	Sig.
Constant	-0.520	-1.120	0.265
CAR	0.300	3.210	0.002
NPL	-0.400	-4.150	0.000
LDR	0.250	2.480	0.015

Table 9. Model Summary (Model 2)

R	R^2	Adjusted R^2
0.787	0.620	0.608

The results indicate that capital adequacy positively affects profitability, confirming that well-capitalized banks are more capable of generating income. This supports the argument that strong capital enhances operational stability and allows banks to expand their lending activities.

Credit risk is found to have a negative and significant effect on profitability. This suggests that an increase in non-performing loans directly reduces bank earnings due to higher provisioning costs and lower interest income. This finding emphasizes the critical role of credit risk management in sustaining profitability.

Liquidity also shows a positive effect on profitability. This indicates that banks that effectively manage their liquidity are better positioned to optimize their lending and funding strategies. Efficient liquidity management enables banks to balance risk and return, thereby enhancing profitability.

The R^2 value of 0.620 indicates that 62% of the variation in profitability is explained by the model, demonstrating strong explanatory power. This suggests that capital adequacy, credit risk, and liquidity are key determinants of bank profitability.

Hypothesis Testing

Table 10. Hypothesis Testing Results

Hypothesis	Relationship	Result
H1	CAR → ROA	Supported
H2	NPL → ROA	Supported
H3	CAR → LDR	Supported
H4	NPL → LDR	Supported
H5	LDR → ROA	Supported
H6	CAR → LDR → ROA	Supported
H7	NPL → LDR → ROA	Supported

All proposed hypotheses are supported, indicating strong empirical evidence for the relationships among variables. This confirms that both direct and indirect effects play a significant role in explaining profitability.

Mediation Test (Sobel Test)

Table 11. Mediation Test Results

Relationship	Sobel Z	Sig.	Conclusion
CAR → LDR → ROA	2.45	0.014	Significant
NPL → LDR → ROA	2.12	0.034	Significant

The Sobel test results confirm that liquidity significantly mediates the relationship between capital adequacy and profitability, as well as between credit risk and profitability. This indicates that liquidity acts as a transmission channel through which capital strength and credit risk influence profitability. The presence of partial mediation suggests that both direct and indirect effects are important in explaining bank performance.

Discussion

The findings of this study provide robust empirical evidence regarding the determinants of bank profitability, particularly the roles of capital adequacy, credit risk, and liquidity. More importantly, the results highlight the strategic position of liquidity as an intervening variable that connects financial strength and risk exposure to overall performance.

First, the positive and significant effect of capital adequacy on profitability confirms that well-capitalized banks are better positioned to generate higher returns. From a theoretical perspective, this supports the **trade-off theory**, which suggests that an optimal level of capital enhances firm value by balancing risk and return. In the banking context, higher capital adequacy strengthens the bank's resilience against financial shocks, increases stakeholder confidence, and improves access to funding sources. Consequently, banks with strong capital buffers can expand their lending activities more aggressively while maintaining stability, which ultimately leads to higher profitability. However, it is also important to interpret this finding critically. Excessively high capital levels may indicate underutilization of funds, where banks are overly conservative in lending activities. In such cases, the opportunity cost of idle capital could reduce efficiency. Therefore, the positive relationship found in this study suggests that Indonesian banks, during the 2019–2024 period, are likely operating within an optimal capital range rather than holding excessive idle capital.

Second, the negative effect of credit risk on profitability reinforces the fundamental principle of the **risk-return trade-off theory**, but with an important nuance. While higher risk is typically associated with higher expected returns, excessive credit risk in banking leads to deteriorating asset quality, increased loan loss provisions, and reduced interest income. The findings indicate that non-performing loans significantly erode profitability, highlighting the critical importance of credit risk management. This result becomes particularly relevant in the context of economic fluctuations, such as those experienced during and after the COVID-19 period. During such times, borrowers' repayment capacity tends to weaken, leading to increased NPL ratios. The negative impact of credit risk on profitability observed in this study suggests that banks that fail to manage credit quality effectively will experience significant financial pressure. Thus, strengthening credit assessment, monitoring, and recovery strategies is essential for maintaining financial performance.

Third, the positive relationship between liquidity and profitability indicates that effective liquidity management contributes to better financial outcomes. This finding supports the **financial intermediation theory**, which emphasizes the role of banks in efficiently allocating funds. Adequate liquidity allows banks to meet short-term obligations while simultaneously supporting lending activities. From a practical standpoint, this result suggests that banks in Indonesia are able to maintain an optimal level of liquidity, where funds are neither excessively idle nor overly constrained. However, this relationship should also be interpreted carefully. Extremely high liquidity may indicate inefficiency due to unproductive assets, while excessively low liquidity increases the risk of financial distress. Therefore, the positive effect observed in this study reflects efficient liquidity management rather than excess liquidity.

Fourth, the mediation analysis provides a deeper understanding of the indirect mechanisms through which capital adequacy and credit risk influence profitability. The results show that liquidity partially mediates both relationships, indicating that liquidity acts as a transmission channel. In the case of capital adequacy, higher capital improves liquidity by enhancing the bank's ability to manage funding and absorb shocks. Improved liquidity, in turn, supports lending activities and income generation, thereby increasing profitability. This finding suggests that the impact of capital on profitability is not only direct but also operates through improved financial flexibility.

Conversely, credit risk negatively affects liquidity, which subsequently reduces profitability. When credit risk increases, cash inflows from loan repayments decline, leading to tighter liquidity conditions. This forces banks to rely on more expensive external funding or reduce lending activities, both of which negatively affect profitability. This indirect effect amplifies the overall negative impact of credit risk on bank performance.

Furthermore, the presence of **partial mediation** indicates that liquidity does not fully explain the relationship between the independent variables and profitability. This implies that other factors—such as operational efficiency, bank size, macroeconomic conditions, and technological adoption—may also play important roles. Therefore, future research could incorporate these variables to develop a more comprehensive model.

From a broader perspective, the findings of this study have important implications for banking strategy and policy. The results suggest that profitability cannot be achieved by focusing on a single factor. Instead, banks must adopt an integrated approach that simultaneously considers capital management, risk control, and liquidity optimization.

In the Indonesian banking context, where regulatory frameworks are relatively strict and financial markets are still developing, maintaining this balance becomes even more critical. Banks must ensure compliance with capital requirements set by Otoritas Jasa Keuangan while also managing credit risk prudently and maintaining sufficient liquidity to support growth.

Finally, this study contributes to the existing literature by providing empirical evidence on the mediating role of liquidity in emerging market banking systems. While previous studies have often examined direct relationships, this research highlights the importance of indirect effects and interaction mechanisms. This enriches the understanding of how internal financial factors jointly influence bank profitability.

CONCLUSION AND RECOMMENDATIONS

This study examines the impact of capital adequacy and credit risk on bank profitability, with liquidity as an intervening variable, using data from banks listed on the Indonesia Stock Exchange during 2019–2024. The results indicate that capital adequacy positively affects profitability, while credit risk negatively affects profitability.

Furthermore, capital adequacy improves liquidity, whereas credit risk weakens it. Liquidity, measured by the Loan to Deposit Ratio (LDR), is found to have a positive effect on profitability and serves as a partial mediator in the relationships between capital adequacy, credit risk, and profitability. These findings highlight that bank profitability is driven not only by capital strength and risk management but also by effective liquidity management, which acts as a key transmission mechanism in enhancing financial performance

DECLARATION OF ARTIFICIAL INTELLIGENCE USAGE

The authors declare that artificial intelligence (AI) tools were used in a limited capacity to assist in language refinement, grammar checking, and improving the clarity of the manuscript. All intellectual contributions, including research design, data collection, analysis, and interpretation, were conducted solely by the authors. The authors take full responsibility for the content and integrity of this manuscript

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper. This research was conducted independently without any commercial or financial relationships that could be construed as a potential conflict of interest

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