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Effects of Liquidity, Leverage, and Operational Efficiency on the Profitability of Banks Listed on the Indonesia Stock Exchange, 2021–2024

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Abstract

This study aims to analyze the effect of liquidity, leverage, and operational efficiency on profitability in conventional banks in the banking subsector listed on the Indonesia Stock Exchange (IDX) for the 2021–2024 period. The analysis method is multiple regression analysis within a quantitative research design. The data are secondary data taken from the financial statements and annual reports published on the IDX for 2021–2024. The study population comprises 42 conventional banks, from which a sample of 34 banks was selected through purposive sampling based on the criteria set for the period, yielding 136 observations over four years. Hypotheses were tested using SPSS version 22. The results show that, partially, liquidity (X1) has no effect on profitability ($t\text{-value } 1.405 < t\text{-table } 1.978$), leverage (X2) has a negative effect on profitability ($t\text{-value } -7.831$; absolute value greater than $t\text{-table } 1.978$), and operational efficiency (X3) has no effect on profitability

($t\text{-value } 0.628 < t\text{-table } 1.978$). Simultaneously, liquidity, leverage, and operational efficiency affect profitability ($F\text{-value } 33.867 > F\text{-table } 2.67$). It is concluded that liquidity and operational efficiency have no effect on profitability, leverage has a negative effect on profitability, and the three variables together have a simultaneous effect on profitability in the banking subsector on the IDX for 2021–2024.

Keywords – *Liquidity; Leverage; Operational Efficiency; Profitability*

I. INTRODUCTION

Many sectors can contribute to improving a country's economy, and one of the most effective is the banking sector (Wibowo et al., 2024). Banking plays a very important role: banks are financial institutions that offer a high level of security for managing financial activities such as savings, current accounts, and time deposits, which are protected by the deposit insurance agency (LPS) in accordance with applicable regulations (Pramayuda et al., 2024).

Article 16 of Law No. 10 of 1998 on Banking states that any party engaged in collecting funds from the public in the form of deposits must first obtain a business license as a Commercial Bank or Rural Bank from the leadership of Bank Indonesia, unless the collection of funds from the public is regulated by a specific law.

The profitability of banking companies, generally assessed through the Return on Assets (ROA) indicator, serves as a measure of the success of operational activities and of a bank's ability to face external challenges (Wibowo et al., 2024).

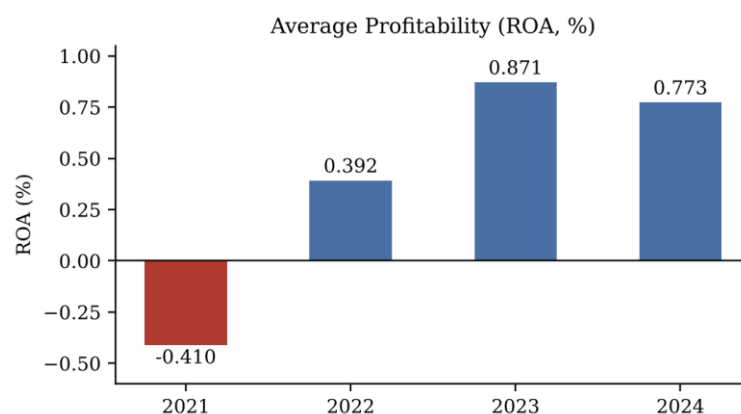


Fig. 1. **Average Profitability (ROA) of the Banking Subsector, 2021–2024**

As shown in Fig. 1, the average profitability of the banking subsector in 2021–2024 started at an ROA of -0.410% in 2021, still negative, which indicates that the banking subsector had not yet managed to optimize its asset management to generate profit. This condition was most likely caused by economic fluctuations and rising credit risk. From 2022 to 2024, however, the average ROA rose and fell: it was 0.392% in 2022, increased by 0.479 percentage points to 0.871% in 2023, and then declined again to 0.773% in 2024. These fluctuations over four consecutive years call for in-depth research to identify their causes. Factors that influence Return on Assets (ROA) include liquidity, leverage, and operational efficiency.

II. METHOD

This study uses a quantitative approach with a survey method. The quantitative approach is used because the study aims to test the relationship and effect of the independent variables, namely liquidity (X1), leverage (X2), and operational efficiency (X3), on the dependent variable, namely profitability (Y). The data are secondary data obtained from the financial statements and annual reports published by companies listed on the Indonesia Stock Exchange (IDX), accessed through the official IDX website.

The population of the study is the banks listed on the Indonesia Stock Exchange, totaling 42 banking companies. The sample comprises 34 banking companies, selected using the purposive sampling technique according to criteria set in the study, which yields 136 observations over the four-year period.

The data were analyzed using IBM SPSS. The analysis stages comprised descriptive statistical analysis, classical assumption tests, multiple linear regression analysis, the t-test, the F-test, and the coefficient of determination. The validity test is used to ensure that the items are able to measure the variables studied, while the reliability test is used to examine the consistency of the instrument. The classical assumption tests cover normality, multicollinearity, and heteroscedasticity. Hypothesis testing was carried out at the 5% significance level ($\alpha = 0.05$).

The multiple linear regression model used is $Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + e$, where Y is profitability, α is the constant, X1 is liquidity, X2 is leverage, X3 is operational efficiency, and e is the error term. The t-test is used to determine the partial effect of each independent variable, the F-test is used to determine the simultaneous effect of the three variables, and the coefficient of determination is used to determine the model's ability to explain variation in profitability.

III. RESULTS AND DISCUSSION

A. Descriptive Statistics

Table I presents the descriptive statistics. The dependent variable, profitability, proxied by return on assets (ROA), has a mean of 0.8784 and a standard deviation of 1.0493, which exceeds the mean. Liquidity (X1, LDR) has a mean of 0.8731 and a standard deviation of 0.2647, showing fairly wide variation among banks; a mean close to 1 indicates that banks in general have been fairly optimal in this respect. Leverage (X2, DER) has a mean of 1.8792 and a standard deviation of 0.0858, indicating that leverage levels across the banks in the sample do not differ significantly. Operational efficiency (X3, BOPO) has a mean of 0.8454 and a standard deviation of 0.1909, indicating fairly high variation in operational efficiency among banks.

TABLE I. DESCRIPTIVE STATISTICS

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Profitability (ROA)	136	-0.83920	2.75876	0.8783518	1.04927051
Liquidity (LDR)	136	-0.01949	1.35585	0.8731247	0.26472377
Leverage (DER)	136	1.29721	1.94888	1.8791900	0.08584505
Operational Efficiency (BOPO)	136	0.26513	1.11680	0.8454057	0.19087763
Valid N (listwise)	136				

Source: SPSS version 22 output (data processed by the researcher, 2026).

B. Classical Assumption Tests

The classical assumption tests show that the regression model meets the requirements for analysis. The Kolmogorov-Smirnov normality test initially yielded an Asymp. Sig. of 0.000 (< 0.05), so the residuals were not normally distributed. The test was then repeated after a rank-cases transformation, which raised the significance probability to 0.200 (> 0.05). The normality assumption of the regression model is thus met, and the residuals can be concluded to be normally distributed.

The multicollinearity test (Table II) shows a tolerance of 0.751 and a VIF of 1.331 for liquidity, a tolerance of 0.705 and a VIF of 1.418 for leverage, and a tolerance of 0.921 and a VIF of 1.086 for operational efficiency. The regression model therefore meets the classical assumption requirements, because there is no strong linear correlation among the independent variables.

The heteroscedasticity test using the Glejser method gives significance values of 0.450 (> 0.05) for liquidity (LDR), 0.251 (> 0.05) for leverage (DER), and 0.099 (> 0.05) for operational efficiency (BOPO). It can therefore be concluded that none of the three independent variables shows symptoms of heteroscedasticity in the regression model.

The autocorrelation test used the Durbin–Watson statistic, which yielded 1.881. The criterion to be met is $du < dw < 4 - du$ ($N = 136$, $k = 3$, $du = 1.732$). The comparison shows that $1.732 < 1.881 < 2.268$ ($4 - du$). It can therefore be concluded that the regression model meets the autocorrelation assumption, so the estimates obtained are reliable and not biased by autocorrelation.

C. Multiple Linear Regression Analysis

The multiple linear regression analysis yields the constant and the coefficients of each variable shown in Table II. Based on the table, the regression equation obtained is $ROA = -0.177 + 0.203 \text{ LDR} - 0.283 \text{ DER} + 0.508 \text{ BOPO}$.

TABLE II. MULTIPLE LINEAR REGRESSION AND COLLINEARITY STATISTICS

Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	-0.177	0.130		-1.359	0.176		
Liquidity (LDR)	0.203	0.144	0.106	1.405	0.162	0.751	1.331
Leverage (DER)	-0.283	0.036	-0.610	-7.831	0.000	0.705	1.418
Operational Efficiency (BOPO)	0.508	0.809	0.043	0.628	0.531	0.921	1.086

Dependent variable: ROA. Source: SPSS version 22 output (data processed by the researcher, 2026).

D. Effect of Liquidity on Profitability

The partial test (t-test) shows that liquidity (LDR) has a calculated t of 1.405, which is smaller than the t table value of 1.978, with a significance value of $0.162 > 0.05$. This indicates that liquidity has no effect on profitability, so the proposed hypothesis is rejected (H_a is rejected and H_0 is accepted).

Theoretically, liquidity that is too high may actually indicate idle cash that is not used optimally for productive activities, so it does not contribute to higher profitability. In other words, inefficient liquidity management can prevent profit potential from being maximized (Listiyawan et al., 2024). This result is in line with the studies by Syahira et al. (2024), Listiyawan et al. (2024), Anggraini et al. (2022), Husniar (2022), and Kurniawati et al. (2025), which state that liquidity has no effect on profitability in banking. It is not in line with the studies by Ariani and Prinoya (2021) and Maula and Pradita (2023), which state that liquidity affects banking profitability.

E. Effect of Leverage on Profitability

The partial test shows that leverage (DER) has a calculated t of -7.831, whose absolute value is greater than the t table value of 1.978, with a significance value of $0.000 < 0.05$. This indicates that leverage has a negative effect on profitability, so the proposed hypothesis is accepted (H_a is accepted and H_0 is rejected).

Theoretically, leverage can provide a gearing effect (financial leverage), but if it is not managed well, it can increase financial risk and depress profitability. The effectiveness of using debt therefore depends heavily on the company's ability to manage and use it optimally (Syahira et al., 2024). The result of this study is not in line with the studies by Syahira et al. (2024) and Kurniawati et al. (2025), which state that leverage has no

effect on profitability. It is in line with the study by Maula and Pradita (2023), which states that leverage has a negative and significant effect on profitability.

F. Effect of Operational Efficiency on Profitability

The partial test shows a calculated t of 0.628, which is smaller than the t table value of 1.978, with a significance value of $0.531 > 0.05$. This indicates that BOPO has no effect on profitability, so the proposed hypothesis is rejected (H_a is rejected and H_0 is accepted).

In a corporate context, operational efficiency is very important for maintaining financial performance. Controlling costs such as administrative, labor, and other operating costs is a key factor in increasing company profit. The result of this study is not in line with the studies by Maula and Pradita (2023), Fuadah et al. (2025), and Ridwan et al. (2021), which state that operational efficiency has a negative effect on profitability in banking, but it is in line with the studies by Listiyawan et al. (2024) and Fahriani (2022), which state that operational efficiency has no effect on profitability.

G. Simultaneous Effect of Liquidity, Leverage, and Operational Efficiency on Profitability

The F-test (Table III) gives a calculated F of 33.867 with a significance of $0.000 \leq \alpha$ (0.05). It can therefore be concluded that liquidity, leverage, and operational efficiency simultaneously affect profitability.

TABLE III. ANOVA (SIMULTANEOUS F-TEST)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	15.072	3	5.024	33.867	0.000
Residual	19.582	132	0.148		
Total	34.655	135			

Dependent variable: ROA. Predictors: (Constant), BOPO, LDR, DER. Source: SPSS version 22 output (data processed by the researcher, 2026).

H. Coefficient of Determination

Table IV shows an Adjusted R Square (R^2_{adj}) of 0.422. The variables liquidity, leverage, and operational efficiency together therefore affect profitability by 0.422, or 42.2%, while the remaining 57.8% is influenced by other factors outside the research model.

TABLE IV. MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.659	0.435	0.422	0.38516213	1.881

Predictors: (Constant), BOPO, LDR, DER. Dependent variable: ROA. Source: SPSS version 22 output (data processed by the researcher, 2026).

IV. CONCLUSIONS

This study shows that liquidity has no effect on profitability, leverage has a negative effect on profitability, and operational efficiency has no effect on profitability. Liquidity, leverage, and operational efficiency also have a simultaneous effect on profitability in the banking subsector listed on the Indonesia Stock Exchange for 2021–2024.

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