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THE EFFECT OF INTEREST RATE VOLATILITY, FINANCIAL TECHNOLOGY, AND OPERATIONAL EFFICIENCY ON THE PROFITABILITY OF BANKING SECTOR COMPANIES LISTED ON THE INDONESIA STOCK EXCHANGE IN 2021-2024

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ABSTRACT

This study aims to examine and analyze the effect of interest rate volatility, financial technology, and operational efficiency on the profitability of banking sector companies listed on the Indonesia Stock Exchange (IDX). The sampling technique used in this study is purposive sampling. The population consists of 48 banking companies, of which 21 companies were selected as samples. The data were obtained from companies listed on the Indonesia Stock Exchange through the official website www.idx.co.id. This research employs a quantitative approach with multiple linear regression analysis as the data analysis method. The results show that partially, interest rate volatility has a negative and insignificant effect on profitability. Financial technology has a positive and significant effect on profitability, while operational efficiency has a negative and insignificant effect on profitability. Simultaneously, interest rate volatility, financial technology, and operational efficiency have a significant effect on profitability. The coefficient of determination indicates that interest rate volatility, financial technology, and operational efficiency are able to explain 10.1% of the variation in profitability, while the remaining 89.9% is explained by other variables not included in the regression model.

Keyword: Profitability, Interest rate volatility, Financial technology, Operasional efficiency

1. INTRODUCTION

Banking sector companies listed on the Indonesia Stock Exchange (IDX) are part of the financial sector that has an important role in the national economy. This company is a bank that has *gone public* whose shares are publicly traded in the Indonesian capital market, as a financial institution the bank has the main function of collecting funds from the public in the form of deposits, redistributing them in the form of credit, and providing various other financial services such as transfers, investments, to *digital banking services*.

A bank's financial performance is usually measured through various financial ratios such as *Return on Assets (ROA), Return on Equity (ROE). Capital Adequacy Ratio (CAR), and Non-Performing Loan (NPL).* These ratios provide an overview of the level of profitability, efficiency, and the ability of banks to manage risks. In addition, the banking sector has special characteristics compared to other sectors due to its high level of regulation and dependence on macroeconomic conditions.

Profitability is the ability of a company to generate profits over a period where the company is often required to

maintain and maintain profits and improve financial performance to look attractive to investors. The profitability of the company is one of the important factors for investing in a company. The profitability ratio assesses the company's ability to seek profits and the effectiveness of management Fadilah et al (2024).

Interest rates are one of the components that affect the volatility of the JCI, the fluctuations of interest rates can reduce the desire to invest in the stock market, so that they can reduce the movement of the JCI. On the other hand, falling interest rates can increase investors' desire to invest their money in the stock market, so that it can have a positive impact on the movement of the JCI.

Financial technology is the result of the development of innovations in the field of information technology applied in the financial sector to improve the efficiency, accessibility, and quality of financial services. Financial technology is a user of technological innovations in the financial system that produce new products, services, technologies, and business models that can have an impact on monetary stability, financial system stability, as well as the efficiency, smoothness, security, and reliability of the payment system (Bank Indonesia., 2020). easy and affordable.

Operational efficiency is one of the important aspects in assessing the performance of a company, especially in the banking industry and other business sectors. Operational efficiency is also an important indicator to assess the extent to which management is able to carry out operational activities effectively and cost-effectively.

ll. LITERATURE REVIEW

Signaling Theory

In a company, the most important thing is information. Information is the most important thing that concerns the events that have happened, and even what will happen. Where this information will connect the company with parties interested in the company's business continuity. Therefore, it is important for all parties to know this information, including investors and business people.

Agency Theory

Agency Theory is a theory that explains the contractual relationship between the company owner *(principal)* and the company's management *(agent)*. This theory departs from the assumption that pricipal and agent have different interests, so that agency conflicts can arise. In the context of banking, this theory explains that bank management is required to work efficiently and optimally in managing public funds. When management is inefficient, operational costs increase so that the bank's profitability decreases. Therefore, *Agency Theory* is often used to explain the relationship between operational efficiency and profitability. In recent developments, agency theory is seen as a framework to understand how company management, especially the banking sector, is affected by moral hazard, efficiency and governance issues.

Profitability

Profitability is the ability of the company to obtain profits or profits, where the higher the level of profit obtained by the company, the better the assessment of management in managing the company. Profitability is one of the things that investors pay attention to to entrust their shares in the company. Good profitability conditions will encourage investors to invest in the company. Thus, long-term investors will be very interested in this profitability analysis, for example, for shareholders will see the profits that will actually be received in the form of dividends.

Interest Rate Volatility

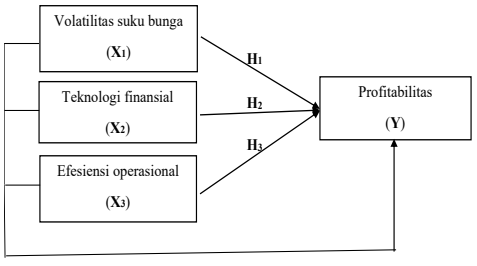
Mishkin & Eakins (2020:45) states that interest rate volatility is the rate of fluctuation or volatile changes in interest rates in a given period due to economic dynamics, monetary policy, and changes in financial market conditions. The higher the volatility of interest rates, the greater the uncertainty in the financial markets that can have an impact on a company's revenue, costs, and risks.

Financial Technology

Abdillah, Fazli (2024) stated that the number of digital transactions (electronic transaction volume) is one of the main indicators in measuring the development of financial technology. The increase in the number of transactions through *mobile banking, internet banking,* and e-wallets shows the high level of fintech adoption by the public and financial institutions.

Operational Efficiency

Periyadi, N Maulida (2025) stated that operational efficiency can be interpreted as a comparison between the output produced and the inputs used. The greater the output produced from a certain number of inputs, the higher the level of operational efficiency of a company. This efficiency not only measures the use of physical resources, but also encompasses the effectiveness of management in planning, controlling, and evaluating operational processes.



Gambar 1.1
Kerangka Berpikir

HIPOTESIS

1. **H1:** Interest Rate Volatility Has a Negative and Insignificant Effect on Profitability (ROE)
2. **H2:** Financial Technology has a positive and significant effect on Profitability (ROE)
3. **H3:** Operational Efficiency (BOPO) has a negative and insignificant effect on Profitability (ROE)
4. **H4:** Interest Rate Volatility, Financial Technology, Operational Efficiency Simultaneously Have a Significant Effect on Profitability (ROE)

III RESEARCH METHODS

Types of Research

Based on the formulation of the problem and the purpose of the research that has been explained in the previous chapter, this research is classified as a causative quantitative research because in this study it is necessary to have company financial data that will be tested and analyzed using statistical procedures. This type of research is also included in the research of casual studies where this research uses problem characteristics in the form of causal relationships between two or more variables. This study describes the variables of interest rate volatility (X1), Financial technology (X2), and Operational efficiency (X3) as independent variables, and Company profitability (Y) as dependent variables.

Population and Sample

Population is a systematic way to collect research data (Sugiyono, 2022). The population of this study is all banking sector companies listed on the Indonesia Stock Exchange (IDX) during the 2024 period as many as 21 companies. The sample is part of the population that is selected to represent the entire population that will be

analyzed in the study (Herman et al, 2025). The sample in this study is Banking Sector Companies Listed on the Indonesia Stock Exchange (IDX) that meet the criteria specified in researching, there are 10 companies that are sampled in this study.

The Sample Selection Technique in this study was taken using *the purposive sampling method*, which is a sample determination technique based on considerations that are in accordance with the research. This technique was chosen because not all Companies in the population meet the criteria of complete and relevant data, the criteria specified as follows:

Yes	Sample Explanation	JumlahSampel
1.	Banking Sector Companies Listed on the Indonesia Stock Exchange during the observation period from 2021-2024	48
2.	Banking Sector Companies that do not present complete Financial Statement Information in 2021-2024	8
3.	Banking Sector Companies that do not disclose Earnings Information in 2021-2024	19
Number of Companies in the sample		21
Number of years of observation		4
The amount of final data used in the study		84

Research Variables

Variable Dependency

Profitability

Sugiyono (2019:68) stated that often also called bound variables, bound variables are variables that are influenced or consequences caused by the existence of independent variables. The dependent variables used in this study are Company Profitability as measured by ROE are:

$$ROE = \frac{laba\ Tahun\ Berjalan}{Total\ Ekuitas} x100\%$$

Interest rate volatility

To measure interest rate volatility can be used Interest rate volatility which is high interest rate volatility increases the risk of declining bond prices and borrowing costs so it is important for companies to manage debt structures carefully (Fabozzi & Mann., 2020). The higher the standard deviation value, the greater the interest rate volatility that occurs (Putri and Kurniawan., 2020). The formula for interest rate volatility is as follows:

Interest Rate Volatility

$$= \sqrt{\frac{(rt-r)2}{n-1}}$$

Financial Technology (X2)

Financial technology The application of fintech helps companies reduce operational costs and transaction processing time through the automation of financial processes and the use of digital payment systems (Schueffel., 2020). Where the fintech ratio can compare the development of banking companies through increasingly sophisticated technology. According to Lee & Shin (2023), the following

formula is used to measure Financial Technology (TDF):

$$TDF = \frac{Jumlah\ Transaksi\ Digital}{Total\ Transaksi\ Bank} x100\%$$

Operational Efficiency (X3)

The BOPO method is used to assess the ability of banks to control operational costs against the operating income generated. The lower this ratio indicates the more efficient the management performance (Kasmir., 2020). Bank Indonesia & OJK, *Indonesian Banking Statistics,* 2023 The following formula is used to calculate BOPO:

$$BOPO = \frac{Biaya\ Operasional}{Pendapatan\ Operasional} x100\%$$

Research Results

Table 4.1
Descriptive Statistics before Outliers

Descriptive Statistics

	N	Minimum	Maximum	Mean	Hours of deviation
VSB	84	102,00	988,00	382,0036	220,05863
FINTECH	84	,13	523,00	10,2880	61,28307
BOPO	84	,18	4,84	1,5068	1,17391
ROE	84	,01	295706,07	3558,7677	32260,40044
Valid N (listwise)	84				

Source : Data Processed SPSS25, 2026

The output of the processed data shows the observational data (N) of 84 data. The smallest total ROE (*minimum)* obtained is 01, while the largest ROE *(maximum)* is 295706.07. The average ROE value is 3558.7677 and the standard deviation value is 32260.400444. Through the table above, an overview of research data is obtained Minimum, Maximum, Mean, Standard deviation there are variables Interest Rate Volatility, Financial Technology, Operational Efficiency have a standard deviation that is smaller than the *mean* which shows small data variants so that all data are homogeneous.

Data after *Outlier:*
Table 4.2
Uji Descriptive Statistics
Descriptive Statistics

	N	Minimum	Maximum	Mean	Hours of deviation
VSB	60	102,00	988,00	423,1384	206,76161
FINTECH	60	,13	2,76	1,0152	,68141
BOPO	60	,18	4,15	1,3967	1,00329
ROE	60	,03	3,41	,7601	,75389
Valid N (listwise)	60				

Source : SPSS25,2026 Processed Data

The data output was processed based on observation data (N) 60 data. The smallest total ROE obtained is 0.03 while *the maximum is* 3.41. The mean mean value is 7601 and *the standard deviation* is 75389. Through the table above, an overview of research data is obtained Minimum, Maximum, Mean, Standard deviation there are variables Interest Rate Volatility, Financial Technology, Operational Efficiency have a standard deviation that is smaller than *the mean* which shows small data variants so that all data are homogeneous.

Table 4.3

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		60
Normal Parametersa,b	Mean	-10,2330434
	Hours of deviation	35,27648869
Most Extreme Differences	Absolute	,069
	Positive	,069
	Negative	-,061
Test Statistic		,069
Asymp. Sig. (2-tailed)		,200c,d

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Source:D ata processed SPSS25,2026

Results of Multiple Linear Regression Analysis Test

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	T	Say.	Tolerance	LIVE
1	(Constant)	1,160	,296		3,912	,000		
	VSB	-,001	,000	-,213	-1,669	,101	,935	1,070
	FINTECH	,223	,149	,202	1,494	,141	,838	1,194
	BOPO	-,213	,098	-,283	-2,168	,034	,893	1,120

a. Dependent Variable: ROE

Source : SPSS25,2026 processed data

1. From the multiple linear regression equation above, it is known to have a positive sign constant of 1.160
2. The *variable Vsb* has a coefficient marked negative of -001
3. The Fintech *variable* has a positive coefficient of 223
4. The *BOPO* variable has a coefficient marked negative of -213

Partial Test Results (t-test)

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	T	Say.	Tolerance	LIVE
1	(Constant)	1,160	,296		3,912	,000		
	VSB	-,001	,000	-,213	-1,669	,101	,935	1,070
	FINTECH	,223	,149	,202	1,494	,141	,838	1,194
	BOPO	-,213	,098	-,283	-2,168	,034	,893	1,120

a. Dependent Variable: ROE

Source : SPSS25,2026 processed data

Based on table 4.12 above, the results of the partial significance test (t-test) can be concluded as follows:

1. Based on the results of the t test, the value of the regression coefficient *Vsb* was -0.001 and the significant value was 0.101. The value of the regression coefficient for the *Vsb* variable shows a negative value and the significance value shows 0.101>0.05. Thus, the *Vsb* variable has a negative and insignificant effect on the profitability of banking companies.
2. Based on the results of the t-test, the Fintech regression coefficient value was 0.223 and a significant value of 0.141. The value of the regression coefficient for the *Fintech* variable
3. shows a positive value and the significance value shows a value of 0.141>0.05. Thus, *Fintech variables* have a positive and insignificant effect.
4. Based on the results of the t-test, the BOPO regression coefficient value was -0.213 and the significant value was 0.034. The value of the regression coefficient for *the BOPO* variable shows a negative value and the significance value shows a value below the significance of 0.034<0.05. Thus, *the BOPO* variable has a negative and significant effect on the profitability of banking companies.

Simultaneous Test Results (F Test)

ANOVA

Model		Sum of Squares	df	Mean Square	F	Say.
1	Regression	4,918	3	1,639	3,208	,030b
	Residual	28,615	56	,511		
	Total	33,533	59			

a. Dependent Variable: ROE

b. Predictors: (Constant), BOPO, VSB, FINTECH

Based on table 4.13 above, it is known that the F value is calculated as 3.208 with a significance level of 0.030. This shows that the significance value is smaller than the significance level of 0.030 < 0.05.

Determination Coefficient Test Results (R2)

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,383a	,147	,101	,71484	1,461

a. Predictors: (Constant), BOPO, VSB, FINTECH

b. Dependent Variable: ROE

Source: SPSS25 processed data, 2026

Based on table 4.14 above, it can be seen that the value of the Adjusted R Square is 0.101 or equal to 10.1%. This figure means that the *variables Vsb, Fintech*, and *BOPO* are able to explain the Profitability variable of 10.1%. While the remaining 89.9% was influenced by other variables that were not included in the regression model.

Research Discussion

The Influence *of Vsb* on Profitability

Hypothesis 1 states that Vsb has a positive and insignificant effect on Profitability as measured by ROE (*Return On Equity).* It can be concluded that H1 is accepted.

The Influence of Fintech on Profitability

Hypothesis 2 states that Fintech has a positive and insignificant effect on profitability in banking companies. Then it can be inferred that H2 is accepted.

The Influence of BOPO on Profitability

Hypothesis 3 states that Bopo has a negative and significant effect on profitability. Therefore, it can be concluded that H3 is not accepted.

The Influence of Vsb, Fintech, Bopo on Profitability

In accordance with the results of the simultaneous test (F test), a significance value (sig.) of 0.030 was obtained greater than the alha value of 0.05 (0.030 < 0.05). Based on these test criteria, it can be concluded that Vsb, Fintech and Bopo simultaneously have a significant effect on Profitability as measured by Return on Equity in the banking sector listed on the Indonesia Stock Exchange.

Conclusion

1. Partially the variable Volatility of interest rates has a negative and insignificant effect on profitability so the hypothesis is rejected.
2. Partially the variable Financial technology has a positive and insignificant effect on profitability, so the second hypothesis is rejected.
3. Partially, the variable Operational efficiency has a negative effect of magnitude and significance so that the hypothesis is accepted.
4. Simultaneously, the variables of interest rate volatility, financial technology and operational efficiency have a simultaneous and significant effect on profitability so that the fourth hypothesis is accepted.

Suggestions

1. For Investors

   Investors are advised to not only pay attention to the volatility of interest rates but also consider the fundamental factors of their finances and financial Technology, in particular operational efficiency. The BOPO ratio can be an important indicator in assessing banking performance and risk, so that investment decisions taken become more precise and comprehensive.
2. For the Next Researcher

   Further research is suggested to add other variables that have the potential to affect banking profitability. This is based on research that shows that the ability of independent variables (ROE, *FINTECH,* BOPO) to explain banking profitability is only 10.0%. The remaining 90.0% was explained by other variables outside the research model, such as CAR and NPL, or other factors that were not studied. In addition, future research could use a longer research period or a more comprehensive analysis of the financial performance of banks.

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