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The Role of Profitability Intervening Variables in Stock Return Model

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ABSTRACT

This research aims to explore the impact of the Loan to Deposit Ratio (LDR) and Interest Rates (IR) on the profitability indicators, specifically Return on Assets (ROA) and Stock Return (SR). The motivation for this investigation arises from observed differences in various research findings and real-world events, prompting a reassessment by researchers. The study adopts a quantitative descriptive approach, employing panel data multiple regression analysis with 20 cross-sectional samples spanning a 6-year time series. The research formula is crafted to optimize Stock Return by including Return on Assets as an intervening variable, focusing particularly on companies within the banking sector listed on the Indonesia Stock Exchange. Two distinct research models are formulated and integrated into a unified model, subjected to rigorous model selection tests such as Chow Test, Hausman Test, and Lagrange Multiplier Test. The study's results suggest that LDR can only indirectly influence SR through the mediating role of ROA. Furthermore, IR has a direct impact on SR without the mediation of ROA. These findings are expected to offer valuable guidance for banking practitioners in Indonesia and market participants, aiding them in maximizing Stock Returns

INTRODUCTION

In relation to ROA, it functions as a measure to evaluate the effectiveness of management in generating profits with the assets at their disposal. The profitability of a bank is impacted by various factors, some within the direct control of management and others beyond their influence. Elements within management's control include the bank's policies and decisions, encompassing aspects like fundraising, capital and liquidity management, and cost control. Conversely, external factors beyond the reach of management comprise environmental elements and inherent characteristics of the bank. Environmental factors include the market structure, regulations, inflation, interest rates, and market growth.

As highlighted by Dendawijaya (2006), the interest rate is a conventional tool for managing inflation rates, and a substantial increase in inflation can adversely impact a company's profitability. Nominal interest rates, observable in market conditions, and real interest rates, calculated as nominal rates minus inflation, constitute two distinct meanings. The factors influencing interest rate determination encompass fund needs, time periods, profit targets, guarantee quality, government policies, company reputation, relations, and competitive product offerings.

In contrast, findings by Khotijah et al. (2020) and Kalengkongan G. (2013) align with those of Suarmi et al. (2014), Widiantari et al. (2014), Pranata et al. (2016), Novitasari (2018), and Sumawati N. K. A. (2019), which assert that interest rates have a significant and positive correlation with profitability, differing from the perspective that interest rates have no substantial impact on profitability.

Numerous studies have been conducted to identify the factors that impact the Return on Assets (ROA) in the banking sector. Scholars such as Almanaseer & Alsehat (2016), Pardede and Pangestuti (2016), Hendrayati (2013), Hidayati (2014), Wibowo and Syaichu (2013), Ali et al. (2012), Durraj & Moci (2015), Malik et al. (2015), Sahara (2013) have investigated various factors and found that elements such as inflation, interest rates, and financing risks influence profitability. However, Agung Gumelar (2016) diverged from this pattern, presenting findings that inflation, interest rates, exchange rates, Non-Performing Financing (NPF),

and Operational Costs (BOPO) had an insignificant effect on ROA.

Credit interest rates play a pivotal role in determining credit distribution from banks. An increase in credit interest rates tends to discourage borrowing, leading to reduced interest income and, consequently, decreased profitability in the banking sector. Additionally, rising credit interest rates may contribute to the occurrence of bad credit, creating difficulties for debt repayment. Saputra's (2012) research on Islamic banks found no significant impact of credit interest rates on profitability, while Wulandari's (2011) study on conventional banks indicated a negative effect of credit interest rates on profitability.

Empirical evidence concerning the impact of interest rates on stock returns reveals varied outcomes. Investigations by Oshaibat (2016), Quadir (2012), Olweny & Omondi (2011), Latha et al. (2016), Butt et al. (2010), Bilal et al. (2012), Kandir (2008), Sadikin (2010), Setyaningrum (2016), Oktiar (2014), Saputra & Dharmadiaksa (2016), Faoriko (2013), Nidianti (2013), and Adeputra & Wijaya (2016) suggest a significant and negative correlation between interest rates and stock returns. Conversely, Sudarsono & Sudiyanto (2016), Karim (2015), Buana (2014) indicate a positive effect of interest rates on stock returns. However, Kristanto (2016), Dwita & Rahmidani (2012), Suriyani and Sudiarta (2018) present findings that interest rates have an insignificant effect on stock returns.

In this study, the intervening variable Return on Assets (ROA) is employed to explore issues related to stock returns. While there are numerous determinants that can account for ROA, one of them explored in this research is the Loan to Deposit Ratio. Research findings on the Loan to Deposit Ratio (LDR) in studies by Sari et al. (2016), Avrita and Pangestuti (2016), and Sarifudin (2005) indicate an insignificant impact of the Loan To Deposit Ratio (LDR) on profitability. In contrast, Almilia and Hedyningtyas (2005), Yogiarta (2013), Kuncoro (2002), and Budi Ponco (2008) present different results, asserting a significant effect of the Loan To Deposit Ratio (LDR) on ROA with a positive correlation.

Additional research by Sambul S.H., et al. (2016) suggests that the Loan to Deposit Ratio (LDR) has a significant effect on stock returns. However, findings on the impact of the Loan To

Deposit Ratio (LDR) on stock returns vary, as evidenced by Rahmi (2004) and Asna (2006), highlighting its influence, while Suardana (2009) and Risky (2009) argue that the Loan To Deposit Ratio has an insignificant effect on stock returns.

Profitability, synonymous with rentability, signifies a company's capacity to generate profits over a specific period. It reflects the relationship between profits and the assets or capital responsible for generating them. Assessing a company's success often involves examining its profitability, serving as an indicator of the company's effectiveness in profit generation. Management utilizes profitability as a performance metric in asset management, as depicted by the profits generated. Studies by Haryetti (2012), Sambul S.H., et al. (2016), Alfianti D. and Andarini S., (2018), Lia Rosalina, J. Kuleh, and Maryam Nadir (2013), Watung and Ilat (2016) find a significant impact of profitability on share prices. Conversely, Nadeak (2011) presents differing results, suggesting an insignificant effect of profitability on Stock Return.

Given the inconsistent research outcomes discussed in the preceding paragraphs, these disparities motivated researchers to undertake the present study.

In the research conducted by Sari et al. (2016), Avrita and Pangestuti (2016), and Sarifudin (2005), the influence of the Loan To Deposit Ratio (LDR) on profitability was determined to lack statistical significance. Conversely, Almilia and Hedyningtyas (2005), Yogiarta (2013), Kuncoro (2002), and Budi Ponco (2008) presented contrasting results, indicating a notable impact of the Loan To Deposit Ratio (LDR) on Return on Assets (ROA) with a positive correlation.

H₁: There is an influence of Loan to Deposit Ratio (LDR) on Return on Assets (ROA).

In the investigations carried out by Khotijah et al. (2020) and Kalengkongan G. (2013), it was noted that interest rates do not wield a substantial influence on profitability. However, divergent outcomes surfaced in the studies conducted by Suarmi et al. (2014), Widiantari et al. (2014), Pranata et al. (2016),

Novitasari (2018), and Sumawati N. K. A. (2019), where interest rates were observed to exert a significant effect and exhibited a positive correlation with the profitability as measured by Return on Assets (ROA).

H₂: There is an influence of interest rates on Return on Assets (ROA).

In the research carried out by Sambul S.H., et al. (2016), Rahmi (2004), and Asna (2006), it was established that the Loan To Deposit Ratio (LDR) has a notable impact on stock returns. However, these results differ from the research conclusions of Suardana (2009) and Risky (2009), suggesting that the Loan To Deposit Ratio has no significant effect on stock returns.

H₃: There is an influence of the Loan To Deposit Ratio (LDR) on Stock Return.

In the investigations by Oshaibat (2016), Quadir (2012), Olweny & Omondi (2011), Latha et al. (2016), Butt et al. (2010), Bilal et al. (2012), Kandir (2008), Sadikin (2010), Setyaningrum (2016), Oktiar (2014), Saputra & Dharmadiaksa (2016), Faoriko (2013), Nidianti (2013), and Adeputra & Wijaya (2016), it is noted that interest rates have a significant impact and are negatively correlated with Stock Returns. However, there is a substantial variation in findings in the research conducted by Kristanto (2016), Dwita & Rahmidani (2012), Suriyani and Sudiarta (2018), suggesting that interest rates have an insignificant effect on Stock Returns.

H₄: There is an influence of interest rates on stock returns.

The outcomes of research in Haryetti (2012), Sambul S.H., et al. (2016), Alfianti D. and Andarini S., (2018), Lia Rosalina, J. Kuleh, and Maryam Nadir (2013), Watung and Ilat (2016) indicate a noteworthy impact of profitability on share prices. In contrast, Nadeak (2011) presents dissimilar findings, asserting that profitability has no significant effect on Stock Return.

H₅: There is an influence of profitability (ROA) on Stock Return.

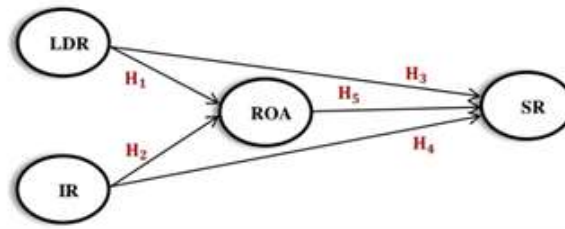


Figure 1. Research Framework Model

METHODS

This study adopts a descriptive qualitative and quantitative methodology, employing the panel data multiple regression analysis technique that integrates information from a 6-year time series (2014 to 2019) and cross-section. The research is centred on banking firms listed on the Indonesia Stock Exchange. To choose samples from the population, the study employs purposive sampling based on the following criteria:

1. Inclusion of banking companies listed on the Indonesia Stock Exchange during the 2014-2019 period.

2. Exclusion of banking companies that have been delisted or suspended.
3. Selection of banking companies with complete and published financial reports.
4. Inclusion of conventional banking companies, excluding Sharia-compliant ones.
5. Exclusion of banking companies owned by local governments.

Applying the outlined criteria, a research sample of 20 companies has been identified.

Operational Variables:

Table 1. Operational Variables

No	Variables	Notation	Formulas
1	Loan to Deposit Ratio	LDR _{it}	$\frac{\text{Amount of credit disbursed}}{\text{Total Capital} + \text{Third party funds}}$
2	Interest Rate	IR _{it}	BI Rate
3	Return On Assets	ROA _{it}	$\frac{\text{Earnings After Tax}}{\text{Total Assets}}$
4	Stock Return	SR _{it}	$\frac{\text{Market Price}_{it} - \text{Market Price}_{i(t-1)}}{\text{Market Price}_{i(t-1)}}$

Panel Data Multiple Regression Estimation

When conducting multiple regression analysis on panel data, it is imperative to ensure a blend of time series and cross-sectional data. The methods employed for analyzing the relationship between time series and cross-sectional data include:

1. Common Effect Model (CEM)
2. Fixed Effect Model (FEM)
3. Random Effect Model (REM)

Model Selection Test

After the three basic analyzes mentioned above are used, you can further carry out three model suitability testing procedures to select the best panel data multiple regression model as follows:

Chow Test

This analysis utilises F-statistics to choose between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). The determination of whether to accept or reject the hypothesis depends on a significance level of $\alpha = 5\%$ for both the null hypothesis () and the alternative hypothesis (). In technical terms, the choice between these two models relies on the probability level of the test results. If the probability level is $>5\%$, the null hypothesis () is accepted, and conversely, the alternative hypothesis () is rejected. This implies that the appropriate model to adopt is the Common Effect Model (CEM). Conversely, if the test result has a probability level of $<5\%$, the null hypothesis

() is rejected, and the alternative hypothesis () is accepted. This suggests that the suitable model to utilise is the Fixed Effect Model (FEM).

Test Criteria:

Probability level test results >5% = be accepted (CEM)

Probability level test results <5% = rejected (FEM)

Hausman Test

Hausman testing serves the crucial purpose of determining the preferable model between the Fixed Effect Model (FEM) and the Random Effect Model (REM). This statistical examination involves applying the Chi-Square distribution with degrees of freedom denoted as 'k,' which corresponds to the number of exogenous variables in the model. Alternatively, the test can utilize a significance level based on $\alpha = 5\%$. This process enables researchers to make an informed choice regarding the model that best captures the underlying dynamics of the data. By considering both the statistical significance and the number of exogenous variables, the Hausman test adds a nuanced layer to the decision-making process, contributing to a more refined and accurate selection of the most appropriate econometric model.

In conducting the hypothesis test using the Hausman test, accepting the null hypothesis () and rejecting the alternative hypothesis () results in the adoption of the Random Effect Model (REM) as the appropriate model. Conversely, if the results indicate the rejection of the null hypothesis () and the acceptance of the alternative hypothesis (), the suitable model to utilise is the Fixed Effect Model (FEM).

Test Criteria:

Probability level test results >5% = be accepted (REM)

Probability level test results <5% = rejected (FEM)

Lagrange Multiplier Test (LM)

The utilization of the Lagrange Multiplier (LM) test is crucial for assessing the suitability of either the Common Effect Model (CEM) or Random

Effect Model (REM) in effectively fitting the model. In this evaluation, the LM test relies on the Chi-Squares distribution, where the degrees of freedom are determined by the number of exogenous variables in the model. This testing approach becomes particularly necessary when discrepancies arise between the results obtained from the Chow Test and the Hausman Test. The LM test thus plays a vital role in determining the most appropriate model specification, especially in situations where different diagnostic tests yield conflicting conclusions. This enhances the robustness and reliability of the model selection process, ensuring a more accurate representation of the underlying relationships within the data.

If the LM statistical value exceeds the critical value of the Chi-Squares statistic, the null hypothesis () is rejected, and the alternative hypothesis () is accepted. This outcome indicates that the fitting estimate aligns with the Random Effect Model. Conversely, if the LM statistical value is lower than the critical value of the Chi-Squares statistic, the null hypothesis () is accepted, and the alternative hypothesis () is rejected. In this scenario, the use of the Common Effect Model is deemed more suitable. The significance level for this test is based on a probability level $\alpha = 5\%$.

Test Criteria:

Probability level test results >5% = be accepted (CEM)

Probability level test results <5% = rejected (REM)

Panel Data Regression Model.

First Research Model Structural Equation,

$$ROA_{it} = \alpha + \beta_1 LDR_{it} + \beta_2 IR_{it} + \epsilon_{it}; \dots\dots\dots(1)$$

$$i = 1,2,\dots,N; \quad t = 1,2,\dots,T$$

Second Research Model Structural Equation,

$$= \alpha + \beta_1 LDR_{it} + \beta_2 IR_{it} + \beta_3 ROA_{it} + \epsilon_{it}; \dots\dots(2)$$

$$i = 1,2,\dots,N; \quad t = 1,2,\dots,T$$

Where:

Table 2. Panel Data

LDR	=	Loan to Deposit Ratio	β	=	Slope
IR	=	Interest Rate	α	=	Intercept
ROA	=	Return on Assets	N	=	Number of Observations
SR	=	Stock Return	T	=	Lots of time
ε	=	Error component	NxT	=	Number of Panel Data

Descriptive Statistics

RESULTS

Table 3. Statistics Descriptive

	LDR	IR	ROA	SR
Mean	0.040567	0.106883	0.345958	0.706467
Median	0.038000	0.056500	0.216000	0.842000
Maximum	0.076000	1.426000	1.203000	1.135000
Minimum	0.012000	0.011000	0.132000	0.020000
Std. Dev.	0.015079	0.195600	0.273441	0.327610
Observations	120	120	120	120

Source: Data Processed

A. Return on Assets and Stock Return as Endogenous Variables in Testing the Suitability of Research Models

Table 4. Research Model 1 Chow Test & Hausman Test

Research Model 1 Chow Test: Common Effect Vs Fixed Effect <i>Endogenous Variable: ROA</i>				Research Model 1 Hausman Test: Fixed Effect Vs Random Effect <i>Endogenous Variable: ROA</i>			
Effects Test	Statistic	d.f.	Prob.	Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.647880	(19,98)	0.0595	Cross-section Random	9.621045	2	0.0081

Source: Data Processed

The results of testing the Chow-Test and Hausman Test in Research Model-1 produce different statistical hypotheses:

- In the Chow Test outcomes, the null hypothesis () is accepted while the alternative hypothesis (Ha) is rejected at a significance level of $\alpha = 5\%$. This implies that, based on Table-3, the Common Effect Model (CEM) is considered more suitable than the Fixed Effect Model (FEM).
- On the other hand, in the Hausman Test results, the null hypothesis () is rejected, and the

alternative hypothesis (Ha) is accepted at a significance level of $\alpha = 5\%$. Accordingly, as indicated in Table-3, it can be interpreted that the Fixed Effect Model (FEM) is more appropriate to use compared to the Common Effect Model (CEM).

- Considering the disparate outcomes between the two models, namely the Common Effect Model (CEM) and Fixed Effect Model (FEM), a decisive test will be conducted as an analytical tool. This

determining test involves the use of the Lagrange Multiplier Test (LM Test).

Table 5. Research Model 2 Chow Test & Hausman Test

Research Model 2 Chow Test: Common Effect Vs Fixed Effect <i>Endogenous Variable: SR</i>				Research Model 2 Hausman Test: Fixed Effect Vs Random Effect <i>Endogenous Variable: SR</i>			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.	Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section F	2.521380	(19,97)	0.0017	Cross-section random	3.156383	3	0.3681

Source: Data Processed

The results of testing the Chow-Test and Hausman Test in Research Model-2 produce different statistical hypotheses:

- In the results of the Chow Test, the null hypothesis () is rejected, and the alternative hypothesis (Ha) is accepted with a significance level of $\alpha = 5\%$, suggesting that the preference leans towards utilizing the Fixed Effect Model (FEM) over the Common Effect Model (CEM) (see Table-4).
- Contrarily, the Hausman Test results, detailed in Table-4, indicate that the null hypothesis () is

accepted, and the alternative hypothesis (Ha) is rejected at the $\alpha = 5\%$ level. This interpretation suggests that the Random Effect Model (REM) is considered more suitable for application compared to the Fixed Effect Model (FEM).

- In light of the divergent outcomes between the two models, the Fixed Effect Model (FEM) and Random Effect Model (REM), a decisive test will be conducted as an analytical tool. This determining test involves the application of the Lagrange Multiplier Test (LM Test).

Table 6. Lagrange Multiplier Test (LM-Test)

Research Model 1 LM Test: Common Effect Vs Random Effect <i>Endogenous Variable: ROA</i>				Research Model 2 LM Test: Common Effect Vs Random Effect <i>Endogenous Variable: SR</i>			
Test Hypothesis				Test Hypothesis			
Cross-section	Time			Cross-section	Time	Both	
Both							
Breusch-Pagan	1.962348 (0.1613)	1.077548 (0.2992)	3.039896 (0.0812)	Breusch-Pagan	10.7600 9 (0.0010)	8.43107 1 (0.0037)	19.1911 6 (0.0000)

Source: Data Processed

The results of testing the Lagrange Multiplier Test (LM-Test) on Research Model 1 and Research Model 2 produce different statistical hypotheses:

- In the outcomes of Research Model 1, the Breusch-Pagan test generates a statistical hypothesis, accepting the null hypothesis (H_0) and rejecting the alternative hypothesis (Ha) with

a significance level of $\alpha = 5\%$. These findings suggest that, according to Table-5, the preference leans towards utilizing the Common Effect Model (CEM) over the Random Effect Model.

- In contrast, the results from Research Model 2 reveal that the Breusch-Pagan test formulates a statistical hypothesis, rejecting the null

hypothesis (H_0) and accepting the alternative hypothesis (H_a) at the $\alpha = 5\%$ level. These results, as interpreted from Table-5, indicate a preference for employing the Random Effect Model (REM) over the Common Effect Model (CEM).

Table 7. Endogenous Variable: ROA Total Pool (Balanced) Observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.365247	0.054791	6.666187	0.0000
LDR	-0.330952	0.045947	-7.202824	0.0000
IR	-0.605352	0.998271	-0.606400	0.5454
Adjusted R-squared	0.295952			
F-statistic	26.01126			
Prob(F-statistic)	0.000000			

Source: Data Processed

Table 8. Endogenous Variable: SR Total Pool (Balanced) Observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.011904	0.052333	19.33574	0.0000
LDR	0.591704	1.063417	0.556417	0.5790
IR	-0.498151	0.093253	-5.341909	0.0000
ROA	-0.798351	0.065307	-12.224510	0.0000
Adjusted R-squared	0.710545			
F-statistic	98.37232			
Prob(F-statistic)	0.000000			

Source: Data Processed

B. Testing the Intervening Variable ROA Function

Loan to Deposit Ratio (LDR) on Stock Return (SR) ($0.0 < 0.05$). (Table 8)

- At the $\alpha = 5\%$ level, the Intervening Variable ROA functions to mediate the influence of the



Figure 2. Indirect Effect of LDR on SR

Where:

- A : LDR Regression Coefficient on ROA
- B : ROA Regression Coefficient on SR
- : Std. LDR error against ROA
- : Std. ROA error against SR

- At the level of $\alpha = 5\%$, the Intervening Variable ROA cannot function to mediate the effect of Interest Rate (IR) on Stock Return (SR) ($0.54477739 > 0.05$). (Table 9)

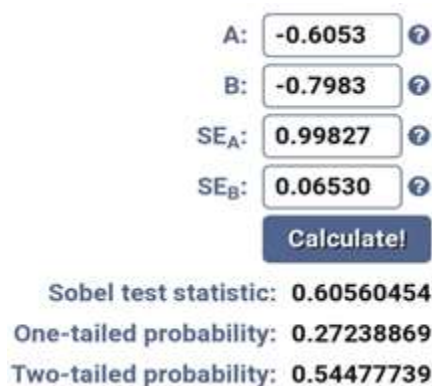


Figure 3. Indirect Effect of IR on SR

Where:

- A : IR Regression Coefficient on ROA
- B : ROA Regression Coefficient on SR
- : Std. IR error against ROA
- : Std. ROA error against SR

1. The Loan to Deposit Ratio (LDR) demonstrates a noteworthy impact and a negative correlation with Return On Assets (ROA) (table-6).
2. Interest Rate (IR) does not exhibit a significant effect on Return On Assets (ROA) (table-6).
3. Loan to Deposit Ratio (LDR) shows an insignificant effect on Stock Return (SR) (table-7).
4. Interest Rate (IR) reveals a significant and negative correlation with Stock Return (SR) (table-7).

5. Return on Assets (ROA) indicates a significant and negative correlation with Stock Return (SR) (table-7).
6. Return On Assets (ROA) functions as an intervening variable, mediating the indirect influence between LDR and SR (table-8), but not between IR and SR (table-9).

DISCUSSION

The extensive credit distribution by the banking sector was expected to enhance profitability levels. However, contrary to expectations, the research findings reveal the opposite effect. Increasing banking credit distribution is associated with a decline in Return on Assets (ROA) profitability. This decrease in profitability can be attributed to the elevated risk in the credit

distribution's quality, leading to higher levels of Non-Performing Loans. Consequently, a high Loan-to-Deposit Ratio (LDR) does not automatically translate into profits and, as a result, contributes to a reduction in ROA profitability.

Additionally, the research indicates that while high ROA profitability should elicit a positive response from capital market players, the actual market response is negative. This aligns with the earlier explanation, emphasizing the heightened risk associated with the substantial distribution of banking credit, overshadowing the attained profitability.

Furthermore, the research sheds light on interest rates, suggesting that they indirectly fail to explain Stock Returns through profitability. This indirect relationship is attributed to the impact of credit distribution's high-risk nature, indicating that banking management prioritizes quantity over quality. Notably, the research results also demonstrate that interest rates can directly explain their effect on Stock Returns. This finding is consistent with the established theory linking the capital market and prevailing money market theory, indicating that high market interest rates negatively impact the capital market.

CONCLUSION

This research determines that the Loan-to-Deposit Ratio (LDR) is capable of explaining its impact on Stock Returns (SR) only through an indirect pathway and lacks the ability to provide a direct explanation. Conversely, Interest Rate (IR) is found to directly elucidate its influence on SR, but it doesn't contribute to an indirect explanation. Consequently, Return on Assets (ROA) emerges as the dominant variable with the highest level of sensitivity. This underscores a noteworthy implication for future researchers and, particularly, banking practitioners, emphasizing the pivotal role of ROA as a key variable.

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