

**AN EMPIRICAL STUDY ON THE DETERMINANTS OF BANK  
FINANCIAL STABILITY: THE MODERATING ROLE OF BANK SIZE  
IN THE RELATIONSHIP BETWEEN FINANCIAL PERFORMANCE**



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**Abstract**

This study aims to measure the determinants of bank financial stability in Indonesia, with a focus on the effect of financial performance measured using the Z-Score ratio as a proxy for financial stability, Return on Assets (ROA) as a proxy for profitability, Capital Adequacy Ratio (CAR) for liquidity, and Loan to Deposit Ratio (LDR) as a proxy for solvency, along with the natural logarithm of total assets to measure the moderating variable of Bank Size. The sample was selected using purposive sampling from the population of banking companies listed on the Indonesia Stock Exchange (IDX) that fall under the KBMI 4, 3, and 2 bank categories in 2025, with time series data from 2020 to 2024. The analysis was conducted using the Moderated Regression Analysis (MRA) method. The results of this study show that CAR has a significant effect on bank financial stability from 2020 to 2024, and that Bank Size significantly moderates the effect of LDR. The findings are expected to provide valuable insights for regulators, bank management, and investors in maintaining and enhancing the stability of the financial system in Indonesia. The results of this study show that between Return on Asset (ROA), Loan to deposit Ratio (LDR) and Capital Adequacy Ratio (CAR), CAR has a significant effect on bank financial stability during the period 2020–2024, and that the Bank Size variable is able to significantly moderate the effect of the LDR variable. This research implies that bank management must have regulations are designed to be able to minimize risks and avoid defaults so that the profitability of banks increases in Indonesia.

**Keywords:** Financial Stability, Liquidity, Profitability, Solvency, Bank, Z-score, ROA, LDR, CAR

## INTRODUCTION

The stability of the banking sector is a fundamental and irreplaceable basis for the health and resilience of a well-functioning national economic system. The central role of banks in the architecture of modern finance lies in their ability to connect economic units with surplus funds such as households and corporations generating excess cash flows with those in need of capital for investment. This strategic function enables the optimal allocation of resources, promotes investment, creates employment, and ultimately facilitates sustainable economic growth. Therefore, the integrity, efficiency, and performance of the banking sector not only reflect but also directly influence the dynamics and overall stability of the economy.

Historical lessons from global economic developments show that instability in the banking sector can have a domino effect on various other critical areas. The instability of one or several banks can spread across the entire financial system. One example is the monetary crisis of 1998, which stemmed from a systemic failure in the financial sector. This highlights the undeniable urgency to thoroughly and comprehensively understand the factors that determine the stability of the banking sector.

In several financial literature sources, one of which is described by Agus D.W Martowardojo in his book *Stabilitas Sistem Keuangan di Indonesia* (Bank Indonesia Institute), financial system stability is defined as a condition in which all elements of the financial system financial institutions, financial markets, and financial infrastructure-function properly in channeling funds, performing intermediation, managing risks, and absorbing both internal and external shocks.

According to Rivai and Veithzal (2007), a bank's financial performance reflects the management's ability to effectively and efficiently manage the bank's resources to achieve its primary objectives, namely profitability and financial stability. The assessment of financial performance is important not only for internal management but also for regulators, investors, and customers. Numerous studies have been conducted on banking financial stability, producing varying results. These differences are likely due to several factors such as variations in the time series used in the research, differences in sample and population, as well as differences in the analytical methods applied.

We can observe from several previous studies that Nurhasfi Hasnani (2022), in her research on Indonesian Islamic banks from 2010 to 2019, found that Non-Performing Financing (NPF) had a negative effect, while BOPO (Operational Efficiency Ratio) and SIZE had no effect. On the other hand, Financing to Deposit Ratio (FDR) and the proportion of financing had a positive effect. A-similar result for BOPO was found in the study by Eka Violeta Ketaren and Antonius Mulyo Haryanto (2020) on conventional banks from 2014 to 2018, which stated that CAR (Capital Adequacy Ratio) and NPL (Non-Performing Loan) had a positive effect, NIM (Net Interest Margin) had a significant negative effect, and both BOPO and LDR (Loan to Deposit Ratio) had no effect. Another study by Fellasufah Diniyah (2023) showed that simultaneously, NPF, FDR, and BOPO had an effect. However, partially, NPF had a significant negative effect on Islamic banks, while it had a significant positive effect on conventional banks BOPO was found to have no effect on either Islamic or conventional banks. In another study by Wienma Meidy Utami, Anas Iswanto, and Mirzalina Zaenal (2025), it was revealed that NIM, BOPO, CAR, and Liquidity simultaneously had an effect of 91%, while partially, NIM and Liquidity had a significant effect, BOPO had a significant negative effect, and CAR had no effect.

Given the wide range of findings in studies related to banking financial stability, it becomes increasingly important and interesting to explore further and gain a more comprehensive understanding, especially when the research conditions vary. This study aims to measure the determinants of banking financial stability by focusing on the profitability, liquidity, and solvency of companies in the banking sector, with bank size as a moderating variable. The financial performance of banks will be measured through Capital Adequacy Ratio (CAR), Loan to Deposit Ratio (LDR), and Return on Assets (ROA) as independent variables, and Z-Score of Return on Assets (ROA) as a proxy for Banking Financial Stability, with Bank Size measured using the natural logarithm of total assets as the moderating variable.

## REVIEW OF LITERATURE

It is generally known that the fundamental function of banks is to act as intermediaries, channeling funds from the public in the form of deposits to other parties in the form of loans or financing. This main function is often referred to as the intermediation function, in which banks connect economic units with a surplus of funds to those experiencing a deficit.

The bank intermediation theory explains the vital role of banks as intermediaries between parties with excess funds (savers/investors) and those in need of funds (borrowers/debtors). Banks are not merely "places to store money" but institutions that actively facilitate the flow of capital in the economy. This concept is elaborated in books such as *Financial Markets and Institutions* by Frederic S. Mishkin, *The Economics of Money, Banking, and Financial Markets* by Frederic S. Mishkin, and *Bank Management & Financial Services* by Peter S. Rose and Sylvia C. Hudgins.

The intermediation function is crucial because it promotes the efficient allocation of financial resources within an economy. When this function operates effectively, banks are able to channel credit appropriately, maintain asset quality, and ensure smooth payment functions. This has a direct impact on the stability of the financial system, as the stability of fund flows between economic actors is the foundation of a sound and shock-resistant financial system. Siamat (2005) also explains that "Financial institutions, particularly banks, serve as intermediaries between parties with surplus funds and those lacking funds for productive investment."

In the global context, Freixas and Rochet (2008) emphasize that bank intermediation is necessary to overcome transaction costs and information asymmetries, which often hinder the efficiency of financial markets. With expertise in credit risk screening and information gathering, banks enable safer and more sustainable financing processes. Mishkin (2015) adds that the role of banks as financial intermediaries goes beyond fund allocation, it also includes support for the transmission of monetary policy and overall economic stability. When the intermediation function is disrupted due to rising non-performing loans or a liquidity crisis, financial stability is at risk.

A healthy intermediation function is typically measured by indicators such as the Loan to Deposit Ratio (LDR) or Financing to Deposit Ratio (FDR), as well as the NonPerforming Loan (NPL) ratio as an indicator of credit risk resulting from failed intermediation. Therefore, in this study, intermediation theory serves as the theoretical,

foundation to explain how the effectiveness of bank intermediation performance can influence banking financial stability, both individually and systemically

### **The Effect of Capital Adequacy Ratio (CAR) on Banking Financial Stability**

The Risk Absorption Theory states that capital serves as the primary defense against risk. When a bank faces economic shocks or significant losses, a strong CAR allows the bank to withstand those challenges without destabilizing the financial system. Therefore, CAR is considered a key variable in maintaining banking stability and, from a theoretical perspective, can be used as a determining factor in studies related to banking financial stability.

The Risk-Absorption Theory explains that bank capital functions as the primary buffer to absorb unexpected losses resulting from various risks inherent in banking activities—particularly credit risk, market risk, liquidity risk, and operational risk. In this context, the Capital Adequacy Ratio (CAR) serves as the main measure of a bank's ability to absorb such risks. "Capital plays a central role in absorbing losses that arise from credit risk and in allowing a bank to continue its operations without disrupting its solvency (Saunders & Allen, 2020).

According to this theory, a sufficiently high level of capital allows a bank to continue operating even in the face of losses due to defaults. This capital protects the interests of depositors and other stakeholders by ensuring that such losses do not immediately disrupt the bank's primary obligations (such as deposit payments). When losses exceed the loan loss allowance, capital acts as the last line of defense. A study by Eka Violeta Ketaren and Antonius Mulyo Haryanto (2020) also found that CAR has a positive effect. Based on this explanation, the following hypothesis can be proposed:

**H1: Capital Adequacy Ratio (CAR) has a positive effect on banking stability.**

### **The Effect of Return on Assets (ROA) on Banking Financial Stability**

Profitability theory states that the primary goal of a company, including banks, is to maximize profit. Profitability reflects the efficiency of management in utilizing assets and resources to generate income. ROA is used as a key indicator to measure a bank's level of efficiency in managing total assets to produce net income. "Profitability ratios are used to assess a company's ability to generate profit. These ratios also provide a measure of the effectiveness of a company's management, as shown by the profits generated from sales and investments." "ROA is used to measure how efficiently a company utilizes all of its assets to earn profit." (Kasmir, 2014)

In a study conducted by Sri Wahyuni Asnaini, Siti Maesaroh, Fatrilia Rasyi Radita, and Oktavia Marpaung, ROA was found to have a significant influence. Based on this, the following hypothesis can be drawn. According to Kasmir (2014), financial ratio analysis is a key tool in evaluating the condition and performance of a bank. These ratios are used to measure the efficiency, profitability, and capital strength of financial institutions. Financial ratios such as Return on Assets (ROA), Return on Equity (ROE), and Capital Adequacy Ratio (CAR) function to assess a company's ability to generate profits and evaluate its overall financial health. "The analysis of financial ratios such as ROA, ROE, and CAR aims to assess the extent of a company's (bank's) efficiency and ability to generate profits, while also evaluating the company's overall financial health." (Kasmir, 2014)

The ROA ratio reflects management's efficiency in utilizing total assets to generate profit, whereas ROE assesses the company's ability to deliver returns to shareholders. Meanwhile, the CAR ratio indicates the bank's capacity to absorb unexpected losses and

serves as a key measure of the bank's capital strength. These ratios not only reflect the bank's internal performance, but also serve as key indicators used by supervisory authorities such as Bank Indonesia and the Financial Services Authority (OJK), as they are directly related to the potential systemic risks that can affect national financial stability

**H2: Return on Assets (ROA) has a positive effect on banking stability.**

**The Effect of Loan to Deposit Ratio (LDR) on Banking Financial Stability**

In financial intermediation theory, it is explained that one of the roles of banks is to act as a bridge between parties with a surplus of funds and those with a deficit. Banks collect funds in the form of deposits and distribute them as credit to productive sectors of the economy. Therefore, in determining banking financial stability, the effectiveness of the bank's intermediation function is reflected in its ability to efficiently manage public funds through credit distribution, which directly affects profitability and ultimately impacts the bank's financial stability in the face of various risks, including systemic risk.

In a prior study conducted by Eka Violeta Ketaren and Antonius Mulyo Haryanto, it was found that LDR did not have a significant effect on ROA as an indicator of banking financial stability. Based on that, the following hypothesis is proposed.

**H3: Loan-to-Deposit Ratio (LDR) does not have a significant effect on banking stability.**

The Moderating Role of Bank Size on the Relationship Between ROA, CAR, and LDR Toward Banking Financial Stability. Larger banks tend to have more complex access to liquidity, better portfolio diversification, and stronger risk management capabilities. As a result, the larger the bank size, the greater its capacity to absorb financial shocks. As stated by Boyd & Runkle (1993), "Larger banks tend to be better able to absorb financial shocks because they have greater diversification, broader access to external financing, and more sophisticated risk management infrastructure."

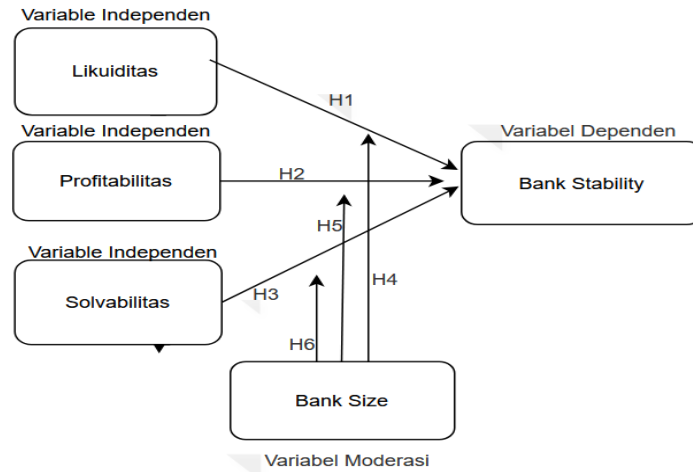
Thus, it can be said that bank size may influence banking financial stability. However, in contrast, a study by Nurhasfi Hasnani (2022) found that bank size had no significant effect on banking financial stability. Based on the theoretical perspectives of experts, the following hypotheses are proposed.

H4 : Bank Size significantly moderates the relationship between CAR and Z-Score (banking financial stability).

H5 : Bank Size significantly moderates the relationship between ROA and Z-Score (banking financial stability)

H6 : Bank Size significantly moderates the relationship between LDR and Z-Score (banking financial stability).

The conceptual framework used in this study is illustrated in the following figure:



**Figure 1.**  
**Theoretical Framework**

**RESEARCH METHOD**

**Dependent Variable**

The dependent variable in this study is banking financial stability, which is proxied using the Z-Score formula. This proxy has also been used by previous researchers such as Nurhasfi Hasnani (2022) and Fellasufah Diniyah (2023) The measurement of variable structure on this study as follow:

**Table 1.**  
**Variable Structure**

No	Variabel	Jenis Variabel	Definisi Operasional	Indikator / Rumus	Skala
1	Stabilitas Keuangan Bank	Variabel Dependen (Y)	Tingkat kemampuan bank dalam menjaga keberlanjutan usaha dan ketahanan terhadap risiko keuangan	$Z\text{-Score} = (ROA + CAR) / \sigma(ROA)$	Rasio
4	Kecukupan Modal (CAR)	Variabel Independen (X1)	Rasio yang mengukur kemampuan bank dalam menutup risiko kerugian terhadap aset tertimbang menurut risiko	$CAR = (\text{Modal} / \text{Aset Tertimbang Menurut Risiko}) \times 100\%$	Rasio
2	Kinerja Keuangan	Variabel Independen (X2)	Kemampuan bank dalam menghasilkan keuntungan dari aset dan ekuitasnya	$ROA = \text{Laba Bersih} / \text{Total Aset}$	Rasio
3	Likuiditas (LDR)	Variabel Independen (X3)	Rasio yang mengukur seberapa besar dana pihak ketiga yang disalurkan menjadi kredit	$LDR = (\text{Total Kredit} / \text{Dana Pihak Ketiga}) \times 100\%$	Rasio
5	Ukuran Bank (Bank Size)	Variabel Moderator (Z)	Besar kecilnya skala operasi bank yang menunjukkan kapasitas operasional dan eksposur risiko sistemik	Logaritma Natural dari Total Aset ( $\ln \text{Total Aset}$ )	Rasio

The independent variables used in this study are Return on Assets (ROA), Capital Adequacy Ratio (CAR), and Loan to Deposit Ratio (LDR). The moderating variable used is Bank Size.

### Population and Sample Determination

The population in this study consists of conventional and Islamic commercial banks that operate and are listed on the Indonesia Stock Exchange (IDX) during the period from 2020 to 2024.

This study uses a non-probability sampling method with a purposive sampling technique, where the sampling criteria include banks classified under KBMI (Kelompok Bank berdasarkan Modal Inti) categories 4, 3, and 2 as of the year 2025.

The type of data used is panel data, which combines time series data for the period 2020-2024 and cross-sectional data covering several commercial banks as units of analysis. The use of panel data is intended to capture the dynamic relationships among variables over five years and to accommodate the unique characteristics of each bank. This method is considered more robust than using time series or cross-sectional data alone.

The number of samples to be analyzed is as follows. The number of observation sampel 25 banks x 5 years 125 data panel's observation. Based on the research criteria, 25 banks were selected and deemed appropriate to be included as the research sample. Since the data used covers the years 2020 to 2024, a total of 5 years, this results in 125 data observations.

The analysis was conducted using data that had been cleansed of outliers. Outliers are unique data points that significantly differ from other observations, arising from extreme values in a single variable or a combination of variables (Ghozali, 2018). A total of 8 companies had to be removed from the sample because they were identified as outliers these data points had values that were extremely different compared to the rest of the dataset, thus having the potential to cause bias in the study. The details of the sample data collection are attached in the following table:

**Table 2.**  
**Observation Data**

Description	Total
Commercial Banks listed on the IDX and having a positive ROA, included in the criteria of KBMI Banks 4, 3, and 2 in 2025.	125
Outlier	40
Observation Data Total	85

Source Secondary data processed in 2025.

### Analysis Method

This study uses the Moderated Regression Analysis (MRA) method to test whether Bank Size acts as a moderating variable in the relationship between financial performance (measured through ROA, LDR, and CAR) and Banking Financial Stability (measured by the Z-Score). MRA is an advanced regression analysis technique used to identify the interaction effect between independent variables and a moderating variable, by including an interaction term (a product of multiplication) in the regression model.

The MRA regression model is carried out in two stages

1. Basic Regression Model (Without Moderation):

$$Z\text{-Score} = \beta_0 + \beta_1 \text{ROA} + \beta_2 \text{LDR} + \beta_3 \text{CAR} + \varepsilon$$

2. Regression Model with Moderating Variable:

$$Z\text{-Score} =$$

$$\beta_0 + \beta_1 ROA + \beta_2 LDR + \beta_3 CAR + \beta_4 (ROA \times Size) + \beta_5 (LDR \times Size) + \beta_6 (CAR \times Size) + \varepsilon$$

Where:

- $\beta_5, \beta_6, \beta_7$  represent the moderating effects
- $\varepsilon$  is the error term

If the interaction coefficients (ROA Size, LDR Size, CAR Size) are statistically significant, it can be concluded that Bank Size moderates the relationship between financial performance and financial stability.

According to Ghozali (2018) in his book "Application of Multivariate Analyats with IBM SPSS 25 Program", descriptive statistics provide an overview or description of the data viewed from the mean, standard deviation, variance, maximum, minimum, sum, range, kurtosis, and skewness (distribution asymmetry) Descriptive statistical analysis in the initial step before conducting further testing, including classical assumption testing and hypothesis testing.

If the interaction coefficients (ROA×Size, LDR×Size, CAR×Size) are statistically significant, it can be concluded that Bank Size moderates the relationship between financial performance and financial stability.

According to Ghozali (2018) in his book "Application of Multivariate Analysis with IBM SPSS 25 Program", descriptive statistics provide an overview or description of the data viewed from the mean, standard deviation, variance, maximum, minimum, sum, range, kurtosis, and skewness (distribution asymmetry). Descriptive statistical analysis is the initial step before conducting further testing, including classical assumption testing and hypothesis testing. The following is a descriptive statistics table based on the processed secondary data:

**Table 3.**  
**Descriptive Statistic**

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	85	,0036	,0378	,016593	,0074993
LDR	85	,3071	3,6997	,965916	,5894381
CAR	85	,1570	,3453	,235860	,0402426
BANK SIZE	85	17,9594	21,6100	19,506168	1,0054995
Z-SCORE	85	4,4895	14,1813	8,988037	2,3357211
Valid N (listwise)	85				

### Variable Description

In Table 2, based on the data processing results from 85 observations, a summary of the descriptive statistics for the research variables is presented, namely Return on Assets (ROA), Loan to Deposit Ratio (LDR), Capital Adequacy Ratio (CAR), Bank Size, and Banking Financial Stability (Z-Score), as shown in the following table:

1. Return on Assets (ROA) has a minimum value of 0.0036 and a maximum value of 0.0378, with an average of 0.0166 and a standard deviation of 0.0075. This indicates that, on average, banks in the sample are able to generate profits of 1.66% from their total assets, reflecting a moderate level of profitability performance. The relatively low variation among banks suggests that ROA performance is fairly stable.
2. Loan to Deposit Ratio (LDR) shows a minimum value of 0.3071 and a maximum of 3.6997, with an average of 0.9659 and a standard deviation of 0.5894. The average LDR

of 96.59% suggests that most banks are quite effective in channeling third-party funds into credit. However, the high maximum value indicates differences in strategies among banks and potential liquidity risk for those with very high LDRs.

3. Capital Adequacy Ratio (CAR) has a minimum value of 15.70% and a maximum of 34.53%, with an average of 23.59% and a standard deviation of 0.0402. This average CAR shows that the banks in the sample have very good capital adequacy levels, far above the minimum requirement set by financial authorities, thus enabling them to better absorb potential operational losses.
4. Bank Size, measured by the natural logarithm of total assets, has a minimum value of 17.9594 and a maximum of 21.6100, with an average of 19.5061 and a standard deviation of 1.0055. This indicates that the banks included in the sample vary in scale, from small to large banks, but in general fall into the medium-to-large category.
5. Z-Score, as an indicator of banking financial stability, has a minimum value of 4.4895 and a maximum value of 14.1813, with an average of 8.9880 and a standard deviation of 2.3357. The relatively high average Z-Score reflects that, overall, the banks in the sample are in a stable condition and have a relatively low risk of bankruptcy. However, the considerable spread in the data also indicates disparities in financial stability levels among banks.

Overall, these descriptive statistical results show that the banks included in the study sample have relatively strong and stable financial performance, supported by adequate profitability, credit distribution, and capital adequacy, as well as robust financial stability. The variation across banks also serves as an important indicator for further analysis using regression testing to examine the effect of each variable on banking financial stability.

## RESULT AND DISCUSSION

The **t-test** aims to assess the extent to which each independent variable (**CAR, LDR, and ROA**) influences the **dependent variable (Z-Score)** by observing the **p-value** from the t-test results.

1. If the **p-value > 0.05**, it can be concluded that the independent variable **does not have a significant effect** on the dependent variable.
2. Conversely, if the **p-value < 0.05**, it indicates that the independent variable **has a significant effect** on the dependent variable.

### Basic Regression Model (Without Moderation):

$$\text{Z-Score} = \beta_0 + \beta_1 \text{ROA} + \beta_2 \text{LDR} + \beta_3 \text{CAR} + \varepsilon$$

**Table 3.**  
**Basic Regression Model**  
**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2,613	,976		-2,678	,009
	ROA	31,200	19,719	,100	1,582	,117
	LDR	-,020	,252	-,005	-,080	,937
	CAR	47,074	3,652	,811	12,889	<,001

a. Dependent Variable: Z-SCORE

Source: Secondary data processed in 2025

Based on the results of the multiple linear regression test in the table above, several points can be explained as follows:

**1. Hypothesis 1: Capital Adequacy Ratio (CAR) has a positive effect on banking stability**

The Capital Adequacy Ratio (CAR) output in Table 3 shows a coefficient value of 3.652, a t-value of 12.889, and a p-value of 0.001 ( $p < 0.05$ ). CAR has the strongest influence on the Z-Score as seen from the Standardized Coefficient Beta, which is 0.811.

This result is consistent with previous research by Eka Violeta Ketaren and Antonius Mulyo Haryanto (2020), which also found that CAR has a positive and significant effect on financial stability. Thus, an increase in CAR will also result in an increase in the Z-Score (i.e., banking financial stability).

A high CAR value improves a bank's performance in terms of increased profitability, and indicates that the bank is in a sound condition. This suggests that managers are able to manage bank capital effectively, which positively influences banking efficiency, particularly through interest costs paid to creditors.

Conclusion: CAR has a positive and significant effect on banking stability as measured by the Z-Score.

**2. Hypothesis 2: Return On Asset (ROA) has a positive effect on banking stability**

The Return on Assets (ROA) output in Table 3 shows a coefficient value of 19.719, a t-value of 1.582, and a p-value of 0.117 ( $p > 0.05$ ). The test result indicates that ROA does not have a significant effect on banking stability (Z-Score).

Conclusion: ROA has no significant effect on banking stability as measured by the Z-Score.

ROA reflects the bank's efficiency in generating profits from its total assets. The higher the profit generated, the greater the bank's ability to absorb losses (as a buffer), ultimately increasing financial stability. However, in this study, the ROA test results showed no significant influence.

This insignificance may be due to various factors such as profit fluctuations or unstable asset structures. Another factor is that ROA reflects short-term profitability, while the Z-Score reflects long-term resilience. Profit does not always indicate stability if not accompanied by strong risk management. A bank may appear profitable due to non-operational income but remain structurally vulnerable.

**3. Hypothesis 3: Loan to Deposit Ratio (LDR) has a positive effect on banking stability**

The LDR output shows a coefficient value of 0.252, a t-value of -0.80, and a p-value of 0.937 ( $p > 0.05$ ).

Conclusion: LDR has no significant effect on banking stability as measured by the Z-Score, and its influence is negative and insignificant.

This indicates that the ratio of credit disbursement to third-party funds does not have a strong enough impact on bank financial stability in this study. LDR is an indicator of a bank's liquidity. A very high LDR may increase liquidity risk, as it could mean the bank lacks liquid funds due to excessive credit disbursement.

**Table 4.**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,830 <sup>a</sup>	,689	,677	1,3266503

a. Predictors: (Constant), CAR, ROA, LDR

Based on the output of the **moderated linear regression** in Table 4, the **R Square value is 0.689**, which indicates that the contribution of the variables **CAR, ROA, and LDR to banking financial stability**, as proxied by the **Z-Score**, is **68.9%**.

**The output result from the second equation is as follows:**

**Regression Model with Moderating Variables:**

$$Z\text{-Score} = \beta_0 + \beta_1ROA + \beta_2LDR + \beta_3CAR + \beta_4(ROA \times \text{Size}) + \beta_5(LDR \times \text{Size}) + \beta_6(CAR \times \text{Size}) + \varepsilon$$

**Table 5.**

**Regression Model with Moderating Variables**

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-51,406	25,878		-1,986	,051
	ROA	627,836	461,138	2,016	1,361	,177
	LDR	47,457	17,186	11,976	2,761	,007
	CAR	10,353	91,127	,178	,114	,910
	BANK SIZE	2,447	1,315	1,053	1,860	,067
	X1M	-30,705	23,435	-2,048	-1,310	,194
	X2M	-2,424	,877	-12,004	-2,764	,007
	X3M	2,102	4,712	,674	,446	,657

a. Dependent Variable: Z-SCORE

Based on the regression model output in Table 5, several conclusions can be drawn as follows:

Bank Size has a positive coefficient of 2.447 and a significance value of 0.067, which is approaching statistical significance. This indicates that the larger the bank, the higher its potential financial stability. Large banks generally have broader business diversification, more stable funding access, and stronger internal and external supervision. Although not

statistically significant, this relationship supports the theory that institutional size contributes to systemic resilience.

**4. Hypothesis 4: Bank Size significantly moderates the relationship between CAR and Z-Score (bank financial stability)**

The significance value for CAR in Table 5 is 0.910 ( $p > 0.05$ ), indicating that Bank Size does not significantly moderate the relationship between CAR and Z-Score. This contradicts the theory suggesting that higher CAR strengthens stability by reflecting capital resilience. The lack of significance may be due to the uniformity of CAR across banks, as minimum capital adequacy is regulated, making it less varied and less able to explain differences in Z-Scores.

The interaction variable  $CAR \times \text{Bank Size (X3M)}$  has a positive coefficient of 2.102 with a significance of 0.657, indicating it is not statistically significant. This suggests that bank size does not strengthen the impact of CAR on financial stability, possibly because CAR alone is already sufficient to indicate capital resilience, or its variation among banks is too limited.

**5. Hypothesis 5: Bank Size significantly moderates the relationship between ROA and Z-Score (bank financial stability)**

The significance value for ROA in Table 5 is 0.177 ( $p > 0.05$ ), indicating that Bank Size does not significantly moderate the relationship between ROA and Z-Score. Although the direction of influence is positive, ROA does not provide a strong statistical contribution to financial stability. This may be due to ROA being a short-term profitability measure, while Z-Score reflects long-term resilience. Other causes may include low ROA variation across banks or the influence of more dominant factors such as capital or risk management.

The interaction variable  $ROA \times \text{Bank Size (X1M)}$  shows a negative coefficient of -30.705 with a significance of 0.194, indicating no significant effect. This suggests that bank size does not significantly moderate ROA's impact on stability, possibly because high profitability does not always reflect sustainable stability especially in large banks with more complex business models and higher non-operational risks.

**6. Hypothesis 6: Bank Size significantly moderates the relationship between LDR and Z-Score (bank financial stability)**

The significance value for LDR in Table 5 is 0.007 ( $p < 0.05$ ), which means that Bank Size significantly moderates the effect of LDR on Z-Score. This indicates that higher LDR leads to higher financial stability, supporting the financial intermediation theory, where a high LDR reflects efficient credit distribution. This supports stability when accompanied by adequate risk management. It also suggests that aggressive lending is not always risky particularly if conducted by sound and efficient banks.

However, large banks with high LDR tend to show lower financial stability than smaller banks with similar LDR. This can be attributed to more aggressive risk-taking behavior in larger banks, which, if unchecked, increases systemic risk.

## CONCLUSION

Based on the outputs from Table 4 and Table 5, the study concludes:

One independent variable, Capital Adequacy Ratio (CAR), significantly affects banking financial stability during the 2020–2024 period, with a significance value of 0.00 (< 0.05).

The other variables, *Return on Assets (ROA)* and *Loan to Deposit Ratio (LDR)*, do not show significant effects on Z-Score. From the moderation regression results, only one interaction between LDR and Bank Size is statistically significant, with a p-value of 0.007. This indicates that bank size significantly moderates the relationship between LDR and financial stability, but in such a way that large banks with high LDR may be less stable.

These findings imply that risk management and institutional structure are more crucial for financial stability than merely profitability or capital size. Moderating effects of bank size do not always strengthen the relationship between financial performance variables and stability; in some cases, they may even weaken it.

Research Limitations The R-Square value of 0.689 (or 68.9%) indicates that there are other factors outside the research variables that still influence banking stability. The study period is limited to five years, covering 25 banks selected based on specific criteria. Extreme outlier data had to be removed, reducing the number of observations.

Implications & Recommendations: Bank management is advised to actively manage the LDR ratio, improve operational efficiency, and maintain a strong capital structure. Large bank size does not guarantee stability without strict risk controls. Sustainable and quality growth is more important than purely aggressive expansion. Future research should consider a longer time frame and additional variables to better explain the determinants of banking financial stability.

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