

Corporate Governance and Bank Stability through Different Pathways

Revalina^{a,1}, Kusuma Indawati Halim^{a,2,*}

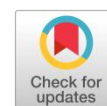
^aUniversitas Widya Dharma Pontianak, Pontianak, Indonesia

¹revalinareva88479@gmail.com; ²kusumaindawati@gmail.com*

*Corresponding Author

Abstract

This study examines the relationship between corporate governance and bank stability, focusing on profitability as a mediator and the moderating effect of the COVID-19 crisis in Indonesian banking. Using 180 firm-year observations from banks listed on the Indonesia Stock Exchange (IDX) over 2019–2024, the study applies panel data regression, bootstrap mediation analysis, and interaction analysis. The results show that board size and board independence significantly and positively affect bank stability, whereas audit committee size has no significant direct effect. Audit committee size, however, significantly and positively affects profitability, while board size and board independence do not. Profitability in turn significantly and positively affects bank stability. The interaction between profitability and the COVID-19 crisis is positive and significant, indicating that the crisis strengthened the profitability–stability relationship. The mediation analysis shows that profitability mediates the relationship between audit committee size and bank stability, but not the relationships involving board size or board independence. These findings highlight the importance of board monitoring, audit committee functions, and profitability in strengthening bank stability under economic uncertainty. The study contributes to the literature in three ways. First, it shows that governance mechanisms work through different pathways rather than a single uniform channel. Second, it provides new evidence on how a crisis moderates the profitability–stability nexus. Third, it offers context-specific evidence from Indonesian listed banks, thereby extending governance–stability theory to emerging markets.



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Introduction

The banking sector is essential for fostering economic expansion and ensuring financial system stability, especially in developing countries like Indonesia. As financial intermediaries, banks face various risks that may threaten their stability. The sustainability of economic expansion and the resilience of the financial system depend heavily on bank stability (Adu et al., 2024). Unlike traditional performance measures such as profitability, bank stability reflects a bank's ability to withstand risks and avoid financial crises. Therefore, understanding the determinants of bank stability has become increasingly important.

The COVID-19 pandemic created substantial challenges for the banking industry worldwide, including Indonesia. The pandemic disrupted economic activities, reduced business performance, and weakened borrowers' ability to repay loans (Silva et al., 2023). As a result, banks faced liquidity pressure and deteriorating bank stability. In many countries, banks also had to maintain their intermediation role while managing rising financial risks and unstable economic conditions (Shabir et al., 2023; Kusnadi & Halim, 2026). During crises, corporate governance becomes more important because banks need effective

monitoring and prudent decision-making to manage risks. Weak governance may lead to poor lending decisions and excessive risk-taking, which can worsen bank stability during economic downturns.

Corporate governance influences how banks are managed and monitored. In the banking sector, good corporate governance can improve transparency, accountability, and the effectiveness of decision-making, thereby reducing excessive risk-taking behavior (Aisa, 2018; Komath et al., 2023). Effective governance mechanisms, such as board oversight and institutional monitoring, are expected to encourage prudent banking practices and strengthen bank stability. However, several studies suggest that governance that strongly supports shareholder interests may also encourage banks to take higher risks, especially during periods of the COVID-19 crisis when uncertainty in the financial sector increases (Jebran & Chen, 2022; Semenova et al., 2026).

Profitability is considered an important factor influencing bank stability because profitable banks possess greater capacity to absorb financial shocks and maintain capital adequacy (Halim, 2024). Banks with higher profitability are generally more capable of managing risks and sustaining operational performance during periods of economic uncertainty (Pessarossi et al., 2020; Milenia & Halim, 2026). Therefore, profitability may act as an intervening mechanism through which governance characteristics influence bank stability. Furthermore, the COVID-19 crisis may alter the relationship between profitability and bank stability because financial pressure during crisis periods can weaken banks' ability to convert profits into financial resilience.

Previous studies have shown that good corporate governance can enhance bank stability through improved supervision and reduced excessive risk-taking. However, other studies have produced mixed results regarding the effectiveness of governance mechanisms during crises (Abdelbadie & Salama, 2019; Akbar et al., 2024; Nguyen Kim, 2024; Verma et al., 2025). In addition, prior studies have explored profitability as a mechanism that links governance characteristics to organizational performance and stability. However, less is known about whether different governance mechanisms operate through a common pathway or through different pathways in explaining bank stability. This issue matters because individual governance mechanisms may differ in their ability to improve financial performance and translate those improvements into bank stability.

To address this issue, this study examines how board size, board independence, and audit committee size affect bank stability, both directly and indirectly through profitability. This approach allows the study to investigate whether profitability is a common transmission channel across governance characteristics or whether the pathway differs across individual governance mechanisms. The study also examines the effect of the COVID-19 crisis on the profitability-bank stability nexus and highlights the importance of profitability amid increased financial instability.

This study shows that corporate governance mechanisms do not necessarily influence bank stability through a uniform pathway. By distinguishing the direct and profitability-mediated effects of board size, board independence, and audit committee size, the study provides evidence on which governance mechanisms are directly associated with bank stability and which operate through financial performance. Furthermore, the study shows whether profitability's role in supporting bank stability strengthens during the COVID-19 crisis. These results contribute to the banking governance literature by providing evidence from Indonesian listed banks operating in an emerging-market environment.

Literature Review and Hypothesis Development

In evaluating factors influencing bank stability, it is crucial to recognize that corporate governance and sustainability policies significantly impact organizational effectiveness. Banks' ability to sustain stability and manage risks effectively is as crucial as profitability in assessing success. This study uses agency theory and resource dependence theory as the main theoretical foundations to explain the relationship between corporate governance characteristics and bank stability. The two theories offer complementary views of corporate governance. Agency theory emphasizes governance's control function in reducing conflicts of

interest and managerial opportunism. Resource dependence theory focuses on the resources, knowledge, and external connections that governance members bring.

Agency theory states that conflicts of interest between managers and shareholders can result in inefficiencies and poor decision-making (Bonazzi & Islam, 2007). Corporate governance mechanisms such as board size, board independence, and audit committee size are crucial for monitoring managerial behavior and aligning it with shareholder interests. Efficient governance frameworks are expected to reduce agency costs and increase transparency. The function of governance becomes even more crucial in guaranteeing responsible decision-making and bank stability in the banking industry, whose activities include significant levels of risk and complexity (Al-Faryan, 2024). From this point of view, stronger monitoring is expected to improve managerial efficiency and reduce decisions that may increase risk, thereby supporting profitability and bank stability.

Resource dependence theory further explains that board members provide valuable resources, expertise, and external networks that may support organizational performance (Akram & Abrar, 2022; Kumari & Tiwari, 2025). Boards with diverse experience and knowledge may improve strategic decision-making and enhance banks' ability to respond to changing economic conditions. Board independence and audit committees may also provide professional expertise that strengthens financial oversight and operational effectiveness. Consequently, effective governance characteristics may contribute to higher profitability by improving managerial efficiency and resource utilization. Agency theory and resource dependence theory complement each other by explaining governance through monitoring and resource-provision channels. This distinction is important because board size, board independence, and audit committee size may affect profitability and bank stability in different ways.

Corporate Governance characteristics and Profitability

In the banking sector, governance mechanisms such as board size, board independence, and audit committee size play significant roles in reducing agency conflicts and strengthening oversight functions (Elnahass et al., 2023). Effective governance structures may encourage prudent managerial behavior and improve operational performance, thereby enhancing profitability. According to agency theory, a larger board may provide broader expertise and stronger supervision, which can improve managerial performance and operational efficiency. Similarly, board independence is expected to strengthen monitoring effectiveness by enhancing independent oversight of management. Audit committees also improve the quality of financial reporting and internal controls, which may reduce financial irregularities and improve organizational performance. These mechanisms may therefore affect profitability through different channels: board size may broaden expertise and monitoring, and board independence may strengthen objective oversight. At the same time, the audit committee may improve financial reporting and internal control. Resource dependence theory suggests that board members provide valuable resources, expertise, and external connections that may improve organizational performance and stability (Dike & Tuffour, 2024).

Larger, more independent boards may bring diverse knowledge and better strategic decision-making, strengthening banks' ability to manage risks during periods of uncertainty. Several studies reported that effective governance mechanisms positively affect profitability because stronger monitoring reduces inefficiencies and improves operational performance (Elnahass et al., 2023; Olowofela et al., 2025). Larger boards and board independence may improve managerial accountability and strategic decision-making, thereby increasing profitability. However, other studies found that excessively large boards may reduce efficiency due to communication and coordination problems. Similarly, some studies reported insignificant relationships between governance characteristics and profitability, indicating that governance effectiveness may differ across institutional environments and organizational structures. These conflicting findings suggest that the benefits of additional monitoring and expertise may be offset when governance structures become less efficient or difficult to coordinate. Therefore, examine each governance mechanism separately rather than assuming all governance characteristics affect profitability the same way.

H1a. Board size positively affects profitability.

H1b. Board independence positively affects profitability.

H1c. Audit committee size positively affects profitability.

Corporate Governance Characteristics and Bank Stability

The relationship between corporate governance characteristics and bank stability has received considerable attention in banking literature, particularly after periods of financial crisis. In the banking industry, governance practices are essential because banks operate in a highly regulated, risk-sensitive environment where poor decision-making can threaten financial system stability. Agency theory suggests that governance characteristics help reduce conflicts of interest between managers and shareholders by improving supervision and aligning managerial decisions with organizational objectives (Molla et al., 2021; Halim, 2023). Effective governance structures, such as board size, board independence, and audit committees, are expected to encourage prudent risk management and strengthen bank stability.

The resource dependence theory suggests that board members provide valuable resources, expertise, and external connections that may improve organizational performance and stability (Akram & Abrar, 2022). Boards with greater expertise and independence may enhance strategic decision-making and risk management effectiveness. In the banking industry, effective governance characteristics may improve banks' ability to respond to financial uncertainty and maintain operational resilience during crisis periods.

Previous studies provide mixed evidence regarding the impact of corporate governance characteristics on bank stability. Some studies found that stronger governance mechanisms improve bank stability by reducing insolvency risk and strengthening risk management practices. Effective governance may increase transparency, improve internal controls, and encourage more prudent banking operations during periods of economic uncertainty (Abdelbadie & Salama, 2019; Handa, 2022; Saheruddin & Soedarmono, 2022). However, other studies suggest that governance structures that strongly prioritize shareholder interests may encourage greater risk-taking behavior (Oktaviyanti & Purnawan, 2019), especially in banks that benefit from government protection and financial safety nets during crisis periods.

This inconsistency may reflect that governance can both enhance monitoring and incentivize risk-taking, depending on the institutional environment and how governance mechanisms are implemented. Furthermore, the research on bank governance and risk-taking indicates that the effect of board features could differ depending on banking settings and during periods of financial distress (Vallascas et al., 2017; Anginer et al., 2018). Therefore, the impact of governance on bank stability may depend on the specific governance mechanism, rather than the overall construct of corporate governance. This study therefore examines the role of board size, board independence, and audit committee size separately.

H2a. Board size positively affects bank stability.

H2b. Board independence positively affects bank stability.

H2c. Audit committee size positively affects bank stability.

Profitability and Bank Stability

Banks with strong profitability are generally better able to maintain adequate capital, absorb financial shocks, and sustain operational performance during periods of economic uncertainty. Agency theory suggests that higher profitability may indicate that management uses company resources efficiently and makes prudent financial decisions. Previous studies have documented that profitability positively influences bank stability (Athari et al., 2023).

Higher profitability may also improve public confidence in banking institutions, thereby strengthening financial sustainability and reducing vulnerability to economic shocks (Pessarossi et al., 2020). In contrast, low profitability may weaken banks' ability to absorb losses and increase the risk of financial instability. During the COVID-19 crisis, profitability became increasingly important in determining the stability of banking institutions. Under such conditions, profitable banks were expected to show greater resilience and stronger risk-management capabilities than less profitable banks (Cao & Chou, 2022; Shabir et al., 2023). Taken together, the literature suggests that profitability can serve as a financial buffer that

translates managerial efficiency into greater resilience. This also provides the basis for considering profitability as a potential transmission mechanism between governance characteristics and bank stability. H3. Profitability positively affects bank stability.

COVID-19 Crisis, Profitability, and Bank Stability

During the pandemic, banks faced significant pressure in maintaining profitability and bank stability because deteriorating economic conditions increased the risk of loan defaults and weakened financial performance (Shabir et al., 2023). Banks with stronger profitability were expected to possess greater flexibility in managing liquidity and operational disruptions during the crisis period. In contrast, banks with lower profitability may have faced greater difficulty maintaining stability under adverse economic conditions. Therefore, profitability may play a more important role in supporting bank stability during the COVID-19 crisis compared to normal periods.

According to agency theory, managers are expected to implement prudent financial decisions and effective risk management practices to maintain organizational stability during periods of uncertainty. In crisis conditions, profitable banks are generally better able to absorb financial shocks, maintain capital adequacy, and sustain operational performance. Previous studies indicate that the COVID-19 outbreak significantly affected banks' financial performance and stability (Chernykh et al., 2023; Paltrinieri et al., 2021; Tan & Walheer, 2024). Banks with stronger profitability and better financial conditions tended to demonstrate greater resilience during the pandemic, suggesting that profitability became a more critical determinant of bank stability under crisis conditions. Therefore, the COVID-19 period provides a relevant context for testing whether profitability has a stronger relationship with bank stability during a crisis.

H4. The COVID-19 crisis moderates the relationship between profitability and bank stability.

Corporate Governance, Profitability and Bank Stability

Corporate governance characteristics may influence bank stability indirectly through profitability. Effective governance mechanisms are expected to improve monitoring quality, reduce agency conflicts, and enhance managerial efficiency, which may subsequently improve banks' financial performance. Effective governance characteristics may increase profitability through improved operational efficiency and better resource management (Anginer et al., 2018). Agency theory and resource dependence theory suggest a potential two-stage pathway: governance mechanisms can first influence managerial efficiency and financial performance, and profitability can subsequently strengthen bank stability. However, the strength of this pathway may differ across governance mechanisms because board size, board independence, and audit committee size perform different monitoring and resource-related functions.

Previous studies suggest that effective governance mechanisms may not directly improve bank stability unless they first enhance financial performance. Better governance quality may strengthen profitability through improved monitoring and managerial discipline, while higher profitability subsequently contributes to greater bank stability and lower insolvency risk (Martynova et al., 2020; Le et al., 2025). Thus, profitability is expected to mediate the relationship between corporate governance characteristics and bank stability. Based on this reasoning, the present study does not assume that profitability mediates all governance-stability relationships in the same way. Instead, it examines whether the indirect pathway differs across board size, board independence, and audit committee size. This provides the conceptual basis for the study's different pathways.

H5a. Profitability mediates the relationship between board size and bank stability.

H5b. Profitability mediates the relationship between board independence and bank stability.

H5c. Profitability mediates the relationship between audit committee size and bank stability.

Research Method

This study utilises panel data from banking firms listed on the Indonesia Stock Exchange (IDX) from 2019 to 2024. Purposive sampling is employed to select the sample to ensure data consistency and accessibility.

The final sample is restricted to banks that: (1) are regularly listed during the observation period and (2) provide comprehensive annual reports. The research employs secondary data derived from financial statements and annual reports. The study obtains financial data from official bank reports and the IDX database. This approach yields a balanced panel dataset suitable for empirical study.

Table 1 presents the measurements and sources of all variables used in this study. The variables include dependent, independent, mediating, moderating, and control variables, constructed from prior literature and available data. The Z-score is a widely used proxy for bank stability and bankruptcy risk in the banking literature, and this paper uses it to measure bank stability. A higher Z-score indicates greater bank stability and a lower probability of failure. This measure has been extensively adopted in prior banking literature because it captures both risk and performance dimensions simultaneously (Athari et al., 2023; Pessarossi et al., 2020). The Z-score is particularly relevant in the banking industry because it reflects the distance from insolvency and provides a more comprehensive measure of bank soundness than traditional accounting-based performance indicators.

Table 1. Variable Measurement

Variable	Acronym	Measurement	Source of Data
<u>Dependent Variable</u>			
Bank Stability	Z-Score	$[(ROA + Equity/Total Assets) / \sigma(ROA)]$ The standard deviation of ROA is calculated separately for each bank using its ROA observations over the full observation period (2019-2024).	Financial Statements
<u>Independent Variables</u>			
Board Size	BS	Total number of members on the Board of Commissioners	Annual Reports
Board Independence	BI	Independent commissioners / total commissioners	Annual Reports
Audit Committee Size	AC	Number of audit committee members	Annual Reports
<u>Mediating Variable</u>			
Profitability	ROA	Net income / total assets	Financial Statements
<u>Moderating Variable</u>			
Crisis Period	COVID	1 = 2020–2021 (crisis period); 0 = otherwise	Constructed by the authors based on the observation year
<u>Control Variables</u>			
Bank Size	SIZE	Ln(Total Assets)	Financial Statements
Liquidity	LDR	Total loans / total deposits	Financial Statements
Bank Age	AGE	The number of years since establishment	Annual Reports
Capital Adequacy Ratio	CAR	Total capital / Risk-weighted assets	Financial Statements
Cost-to-Income Ratio	CIR	Operating expenses / Operating income	Financial Statements
Gross Domestic Product	GDP	Annual percentage growth rate of real GDP	Statistics Indonesia (BPS)
Inflation	INF	Annual percentage change in the Consumer Price Index (CPI)	Statistics Indonesia (BPS)

Corporate governance variables expected to influence monitoring effectiveness include board size, board independence, and the audit committee. Profitability is measured using Return on Assets. Control variables, such as bank size, loan-to-deposit ratio, bank age, capital adequacy ratio, cost-to-income ratio, GDP growth, and inflation, are included to account for bank-specific and macroeconomic characteristics. COVID-19 period indicators assess the pandemic's potential impact in 2020–2021. Following earlier research, the COVID-19 crisis period is identified as 2020–2021 because these years were the most disruptive to Indonesian banking operations and financial performance. To test the proposed hypotheses, this study employs panel data regression models as presented in Equations 1- 3.

$$ROA_{it} = \beta_0 + \beta_1 BS_{it} + \beta_2 BI_{it} + \beta_3 AC_{it} + \beta_4 CONTROL_{it} + \varepsilon_{it} \quad (1)$$

$$Zscore_{it} = \beta_0 + \beta_1 BS_{it} + \beta_2 BI_{it} + \beta_3 AC_{it} + \beta_4 ROA_{it} + \beta_5 CONTROL_{it} + \varepsilon_{it} \quad (2)$$

$$Zscore_{it} = \beta_0 + \beta_1 BS_{it} + \beta_2 BI_{it} + \beta_3 AC_{it} + \beta_4 ROA_{it} + \beta_5 COVID_{it} + \beta_6 (ROA \times COVID)_{it} + \beta_7 CONTROL_{it} + \varepsilon_{it} \quad (3)$$

where ZSCORE represents bank stability, ROA indicates profitability, BS denotes board size, BI refers to board independence, AC represents audit committee size, SIZE indicates bank size, LDR refers to the loan-to-deposit ratio, AGE represents bank age, and COVID is the crisis period dummy variable. Profitability serves as a mediator because governance mechanisms may influence stability through financial performance, while its interaction with COVID captures whether profitability's contribution to stability differs under crisis conditions.

These models use panel data techniques to capture both cross-sectional and time-series variation. Based on model selection using the Breusch–Pagan Lagrange Multiplier (LM) test and the Hausman test, the fixed-effects model is the most appropriate estimation approach. The fixed-effects model is preferred because it controls for unobserved, time-invariant bank-specific characteristics that may be related to governance structures, profitability, and bank stability. This is particularly important in the banking sector as organizational culture, managerial practices and other permanent institutional characteristics may differ between banks and are not necessarily fully reflected in the observed control variables. Thus, the fixed effects specification helps reduce bias from omitting time-invariant bank characteristics, while the Hausman test provides statistical justification for preferring fixed effects to random effects.

The mediation analysis was estimated using a cluster/block bootstrap procedure at the bank level to account for the panel structure and within-bank dependence across years. The bootstrap procedure resampled banks as clusters, not individual bank-year observations, thereby keeping the annual observations within each bank. The significance of indirect effects was tested with 95% bootstrap confidence intervals based on 5,000 bootstrap replications. Potential endogeneity is also considered because the relationship between corporate governance, profitability, and bank stability may involve reverse causality. The fixed-effects model controls time-invariant bank-specific heterogeneity but does not eliminate the possibility of reverse causality. The results are therefore interpreted as associations rather than as definitive causal effects.

Results and Discussion

Before estimating the regression models, this study conducted descriptive statistics and correlation analyses to provide an overview of the characteristics of the variables used in this study. The descriptive statistics present the mean, standard deviation, minimum, and maximum values for each variable. Meanwhile, the correlation matrix examined relationships among the variables and identified potential multicollinearity.

The regression analysis was conducted in several stages. The first stage estimated the direct effects of corporate governance characteristics and profitability on bank stability. The second stage examined how corporate governance characteristics influenced profitability. The third stage extended the model by incorporating the interaction term between profitability and the COVID-19 crisis to examine the pandemic's moderating effect on the relationship between profitability and bank stability. In addition, this study used bootstrap mediation analysis to test whether profitability mediates the relationship between corporate governance characteristics and bank stability.

Table 2 presents the descriptive statistics of the variables used in this study. The average Z-score of the sampled banks is 3.603, indicating that most banks were generally financially stable during the observation period. However, the minimum value of 1.262 suggests that several banks experienced relatively high financial distress risk. The standard deviation of 0.952 further indicates moderate variation in bank stability across the sample.

Table 2. Descriptive Statistics

Variables	N	Mean	Std. Dev.	Min.	Max.
Zscore	180	3.603	0.952	1.262	5.920
BS	180	7.333	2.7299	3	12
BI	180	0.571	0.092	0.333	0.75
AC	180	3.806	1.247	2	9
ROA	180	0.008	0.020	-0.092	0.110
SIZE	180	32.033	1.672	27.909	35.426
LDR	180	82.693	23.676	12.35	163.1
AGE	180	56.70	26.1099	21	129
COVID	180	0.333	0.4727	0	1
CAR	180	0.299	0.200	0.105	1.690
CIR	180	0.615	0.378	0.001	3.574
GDP	180	3.673	2.628	-2.070	5.31
INF	180	2.660	1.352	1.570	5.51

Note: Z-Score = Bank Stability; BS = Board Size; BI = Board Independence; AC = Audit Committee Size; ROA = Return on Assets; SIZE = Bank Size; LDR = Loan-to-Deposit Ratio; AGE = Bank Age; COVID = COVID-19 Crisis Period; CAR = Capital Adequacy Ratio; CIR = Cost-to-Income Ratio; GDP = Gross Domestic Product; INF = Inflation.

Source: Secondary data processed (2026)

The average Board Size (BS) is 7.333 members, with a minimum of 3 and a maximum of 12 members, suggesting considerable variation in board composition among banks. Meanwhile, Board Independence (BI) averages 0.571, indicating that board independence accounts for about 57.1 percent of the board structure on average. This suggests that most sampled banks have complied with corporate governance regulations on independent board representation. The Audit Committee (AC) variable averages 3.806 members, ranging from 2 to 9, suggesting differences in monitoring mechanisms across banks.

Profitability, measured by Return on Assets (ROA), averages 0.008, indicating moderate profitability within the banking sector during the study period. The minimum ROA value of -0.092 demonstrates that several banks experienced financial losses, particularly during periods of economic uncertainty. Firm Size (SIZE) has a mean value of 32.033, suggesting that the sampled banks are relatively large institutions. In addition, the Loan to Deposit Ratio (LDR) averages 82.693, indicating that banks generally maintain a moderate level of liquidity risk. However, the maximum value of 163.1 suggests some banks adopted aggressive lending policies.

The AGE variable reveals that the sampled banks have operated for an average of 56.70 years, with the oldest bank reaching 129 years, implying that most banks possess substantial operational experience. Furthermore, the COVID dummy variable ranges from 0 to 1, representing the classification between non-crisis and crisis periods during the COVID-19 pandemic. This variable allows the study to capture differences in bank stability before and during the pandemic period. Overall, the descriptive statistics indicate substantial variation in governance structure, profitability, and bank stability among the sampled banks.

The Capital Adequacy Ratio (CAR) has a mean of 0.299, with a standard deviation of 0.200 and values ranging from 0.105 to 1.690, indicating substantial differences in banks' capital adequacy and capacity to absorb financial risks. The Cost to Income Ratio (CIR) has a mean of 0.615 and a standard deviation of 0.378, with a minimum of 0.001 and a maximum of 3.574, suggesting considerable variation in operational efficiency among the sample banks. Gross Domestic Product (GDP) has a mean of 3.673, with a standard deviation of 2.628 and values ranging from -2.070 to 5.310, reflecting variations in economic growth during the observation period, including the economic contraction during the COVID-19 pandemic. Meanwhile, inflation (INF) has a mean of 2.660, with a standard deviation of 1.352, ranging from 1.570 to 5.510, reflecting variation in macroeconomic conditions during the observation period. Overall,

these findings indicate that the sample banks differ substantially in terms of capital adequacy, operational efficiency, and exposure to changing macroeconomic conditions.

Table 3 presents the Pearson correlation matrix among the variables used in this study. ZSCORE is positively associated with ROA and AC, indicating that higher bank stability is associated with higher profitability and a larger audit committee. Meanwhile, ZSCORE is negatively related to BS, BI, SIZE, LDR, AGE and CAR. Although the bivariate correlations between ZSCORE and BS and BI are negative, the regression results show positive and significant coefficients after controlling for other bank-specific and macroeconomic factors. ROA is also significantly related to several bank-specific characteristics, particularly BS, BI, SIZE, LDR and AGE. Furthermore, the correlations between BS, BI and SIZE are relatively high, especially between BS and SIZE. These relationships suggest that multicollinearity should be considered and further tested using the Variance Inflation Factor test.

The macroeconomic and crisis-related variables generally exhibit weak relationships with the bank-specific variables. GDP is not significantly associated with ZSCORE or most bank-level variables. However, it is significantly associated with INF and COVID. INF is usually weakly related to the bank-specific variables, but it is significantly related to CAR. COVID is negatively associated with LDR, CAR, GDP, and INF, and is insignificant with ZSCORE. Overall, the correlation matrix shows both significant and insignificant correlations. The absence of perfect correlations is initial evidence that the variables can be included in the regression models, although the multicollinearity test should confirm this.

Table 3. Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) ZSCORE	1.00												
(2) ROA	0.30***	1.00											
(3) BS	-0.19**	-0.29***	1.00										
(4) BI	-0.32***	-0.22***	0.74***	1.00									
(5) AC	0.53***	0.21***	0.27***	0.22***	1.00								
(6) SIZE	-0.30***	-0.43***	0.92***	0.75***	0.21***	1.00							
(7) LDR	-0.43***	-0.29***	0.18**	0.28***	-0.20***	0.25***	1.00						
(8) AGE	-0.20***	-0.21***	0.58***	0.67***	0.11	0.61***	0.26***	1.00					
(9) CAR	-0.13*	-0.29***	0.40***	0.28***	0.03	0.49***	0.17**	0.40***	1.00				
(10) CIR	0.04	0.27***	-0.39***	-0.26***	-0.01	-0.43***	-0.06	-0.22***	-0.23***	1.00			
(11) GDP	0.03	0.03	0.03	-0.01	0.00	0.02	-0.04	0.00	0.04	-0.05	1.00		
(12) INF	0.10	0.07	0.04	0.01	0.08	0.05	0.08	0.03	0.14*	0.01	0.42***	1.00	
(13) COVID	-0.11	-0.01	-0.02	-0.02	-0.11	-0.04	-0.15**	-0.03	-0.19**	-0.03	-0.46***	-0.77***	1.00

Note: Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively

Source: Secondary data processed (2026)

The VIF results in Table 4 confirm that the model has no serious multicollinearity problem. All VIF values are below the commonly used threshold. The highest value is 2.92 (COVID) and the lowest is 1.34. The mean VIF of 1.80 further indicates that multicollinearity is not a serious concern. Therefore, the research model shows no evidence of multicollinearity that could affect the regression estimates.

Table 4. Multicollinearity Results

Variable	VIF	1/VIF
COVID	2.92	0.3427
GDP	2.60	0.3843
BS	2.32	0.4309
BI	1.88	0.5318
CAR	1.79	0.5592
AC	1.57	0.6376
CIR	1.52	0.6574
AGE	1.48	0.6764
LDR	1.44	0.6958
SIZE	1.43	0.7001
ROA	1.37	0.7317
INF	1.34	0.7436
Mean VIF	1.80	

The regression results reported in Table 5 show that corporate governance characteristics, profitability, and the COVID-19 period play different roles in explaining bank profitability and stability. Model 1 examines the determinants of profitability measured by Return on Assets (ROA), while Models 2 and 3 examine the determinants of bank stability measured by the Z-score.

Table 5. Regression Results

Variables	Model 1 ROA	Model 2 ZSCORE	Model 3 ZSCORE
BS	0.750 (0.691)	0.0122* (0.00684)	0.0110 (0.00681)
BI	1.235 (0.920)	0.0208** (0.00914)	0.0190** (0.00910)
AC	4.873*** (0.683)	-0.00256 (0.00788)	-0.00410 (0.00785)
COVID	-1.371 (1.688)	-0.0309* (0.0167)	-0.0203 (0.0174)
ROA		0.0213*** (0.000837)	0.0212*** (0.000831)
ROA × COVID			0.000924* (0.000484)
SIZE	1.604 (1.963)	0.00559 (0.0194)	-0.00290 (0.0197)
LDR	3.191 (5.376)	0.0232 (0.0531)	-0.00434 (0.0546)
AGE	-0.209 (0.358)	-0.00128 (0.00354)	0.000291 (0.00360)
CAR	12.50*** (4.235)	0.171*** (0.0431)	0.169*** (0.0427)
CIR	2.898 (4.933)	-0.0633 (0.0487)	-0.0708 (0.0484)
INF	0.143 (0.276)	-0.00194 (0.00272)	-0.00124 (0.00272)
GDP	0.0517 (0.395)	-0.000116 (0.00390)	0.00179 (0.00399)
Constant	-35.76 (54.26)	2.482*** (0.536)	2.635*** (0.537)
Prob > F	0.0090	0.0000	0.0000
R-squared	0.425	0.604	0.607
Observations	180	180	180

Note: Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively

Source: Data processed (2026)

In Model 1, the independent variables Board Size (BS), Board Independence (BI), and Audit Committee (AC) are positively related to ROA. However, only AC significantly influences ROA, while BS and BI do not. Similarly, Firm Size (SIZE), Loan-to-Deposit Ratio (LDR), Firm Age (AGE), COVID, CAR, CIR, INF, and GDP are not statistically significant in relation to ROA, although CAR has a positive coefficient. The model has an R-squared of 0.425, meaning the variables explain about 42.5 percent of the variation in ROA.

Model 2 captures the direct determinants of bank stability. The results show that Board Size and Board Independence have positive and statistically significant effects on Z-score, implying that stronger board characteristics are associated with higher bank stability. ROA also has a positive and statistically significant effect on Z-score, meaning that banks with higher profitability are more stable. CAR has a

positive and significant effect on bank stability. This means that the higher the capital adequacy, the higher the financial resilience. In contrast, Audit Committee, Firm Size, Loan-to-Deposit Ratio, Firm Age, CIR, inflation and GDP do not have a significant relationship with bank stability. COVID-19 has a negative and statistically significant effect, suggesting that the pandemic period was associated with a decline in bank stability. The model's R-squared is 0.604, meaning the included variables explain about 60.4 percent of the variation in bank stability.

In Model 3, this study introduces the interaction between ROA and COVID-19 to test whether the COVID-19 pandemic moderates the relationship between profitability and bank stability. The positive and statistically significant coefficient of the interaction term indicates that the positive relationship between profitability and bank stability is stronger in the COVID-19 period. The Z-score and ROA are highly positively correlated, indicating profitability's significant role in enhancing bank stability. Both CAR and board independence remain positively and significantly related to bank stability. Furthermore, board size is no longer statistically significant. The following factors are still not statistically significant: Audit Committee, Firm Size, Loan-to-Deposit Ratio, Firm Age, CIR, inflation and GDP. When the interaction term is included, the direct effect of COVID-19 is insignificant. The R-squared increases to 0.607, meaning the model explains a little more. Overall, capital adequacy, board independence, and profitability are significant variables for bank stability.

Table 6. Cluster Bootstrap Results for the Indirect Effects

Mediation Path	Observed Coefficient	Bias	Bootstrap SE	95% BC Conf. Interval	Decision
BS → ROA → ZSCORE	0.0159	-0.0037	0.0229	-0.0180 to 0.0788	H5a not supported
BI → ROA → ZSCORE	0.0261	0.0017	0.0205	-0.0269 to 0.0567	H5b not supported
AC → ROA → ZSCORE	0.1032	-0.0092	0.0296	0.0501 to 0.1510	H5c supported

Note: Bootstrap results are based on 5,000 replications and 30 clusters in id. BC denotes bias-corrected 95% confidence intervals.

Source: Data processed (2026)

Table 6 indicates that ROA plays an important role in the relationship between AC and bank stability (ZSCORE). The indirect effect of AC through ROA is 0.1032, with a 95% bias-corrected confidence interval ranging from 0.0501 to 0.1510. The mediation effect is statistically significant because the confidence interval does not include zero. However, the indirect effect of BS is 0.0159 via ROA (95% confidence interval: -0.0180 to 0.0788). The interval contains zero, suggesting ROA plays no significant role in the association between BS and ZSCORE.

The BC 95% bias-corrected confidence interval for the indirect effect of BI through ROA is also 0.0261, ranging from -0.0269 to 0.0567. The inclusion of zero indicates that the mediation effect is not statistically significant. Overall, the results show that ROA significantly affects the relationship between audit committee size (AC) and bank stability. The effects on board size (BS) and board independence (BI) are not statistically significant.

The Effect of Corporate Governance on Profitability

Model 1 shows that board size has a positive but statistically insignificant effect on ROA. Larger boards aren't automatically translating into more profitable banks. A larger board may bring a wider range of expertise and opinions, but it may also create coordination and communication problems. Thus, H1a is not supported. This is consistent with Elnahass et al. (2023), who contended that board characteristics are not always important determinants of bank performance.

Board independence has a positive but statistically insignificant effect on ROA. This shows that more independent board members do not guarantee higher profitability. Independent members may not provide

sufficient oversight and may depend on their skills and participation. Thus, H1b is not supported. This result is consistent with previous research indicating that board independence does not always significantly improve bank performance.

Alternatively, audit committee size has a positive and significant effect on ROA. This result suggests that a larger audit committee can improve the oversight of financial reporting, internal controls and compliance and therefore support bank profitability. From an agency theory perspective, effective audit committee oversight can reduce managerial opportunism and information asymmetry. Thus, H1c is supported. This is consistent with Olowofela et al. (2025), who note the importance of effective governance mechanisms in improving monitoring and bank performance. The results provide some support to agency theory. The findings show that board size and board independence have no significant impact on profitability, whereas audit committee size is important to enhance bank performance. These results mean that corporate governance effectiveness depends not only on board structure but also on the effectiveness of the board's monitoring functions.

The Effect of Corporate Governance on Bank Stability

The results show that board size has a positive and significant effect on bank stability. The results support H2a and suggest that a larger board may improve monitoring and bring more expertise and perspectives to managing bank risks. A larger board can better supervise management and enable more effective strategic decision-making, which in turn leads to higher bank stability. This finding aligns with previous studies showing that board size can improve governance and bank stability in the banking sector.

Board independence also has a positive and significant effect on bank stability, supporting H2b. This finding suggests that higher board independence could enhance objective monitoring and reduce potential managerial opportunism, which in turn strengthens banks' capacity to manage risks and maintain financial resilience. This result aligns with prior studies showing that independent board members may improve monitoring effectiveness and contribute to bank stability.

In contrast, audit committee size has a negative but statistically insignificant effect on bank stability. Therefore, H2c is not supported. This result indicates that the number of audit committee members alone does not necessarily enhance bank stability. The number of audit committee members may be less important than their expertise, independence, and active involvement. The results are consistent with agency theory, which emphasizes the importance of governance mechanisms in improving monitoring and reducing agency conflicts. The findings are consistent with the earlier studies of Vallascas et al. (2017) and Nguyen (2022) which suggest that board composition can affect bank stability. The small size of the audit committee suggests that factors other than size may influence its effectiveness.

The effect of Profitability on Bank Stability

The empirical results demonstrate that profitability has a positive and significant influence on bank stability. This indicates that banks with higher profitability tend to exhibit stronger bank stability compared to less profitable banks. Therefore, H3 is supported. This finding implies that profitability plays an important role in strengthening banks' ability to withstand financial pressure and maintain operational sustainability during uncertain economic conditions.

Agency theory suggests that profitability reflects management's ability to use organizational resources efficiently and implement prudent financial policies. Banks that generate higher profits are generally better able to increase retained earnings, maintain capital adequacy, and absorb potential financial losses. As a result, profitable banks tend to face lower financial distress risk and show stronger resilience to economic shocks. In addition, resource dependence theory explains that organizations with stronger financial resources have greater flexibility to respond to environmental uncertainty and operational challenges. In the banking industry, profitability may improve public confidence, support liquidity management, and strengthen banks' capacity to maintain stable financial performance during crisis periods.

The findings of this study are consistent with previous studies stating that profitability positively affects bank stability. Prior research suggests that profitable banks tend to demonstrate better risk management practices and stronger financial resilience (Cao & Chou, 2022; Shabir et al., 2023), thereby reducing the probability of instability and insolvency risk in the banking sector.

Moderating effect of COVID-19 on the influence of Profitability on Bank Stability

The positive interaction effect indicates that the COVID-19 crisis strengthens the positive relationship between profitability and bank stability. Under these conditions, banks with higher profitability tended to have stronger financial resilience because they were better able to absorb financial shocks, maintain liquidity, and sustain operational performance. This finding suggests that profitability becomes more important for maintaining bank stability during periods of economic uncertainty and crisis. Therefore, H4 is supported.

The stronger relationship may indicate the greater importance of internal financial capacity amid increased uncertainty and financial pressure on banks. Banks with higher profitability can absorb losses better and maintain capital buffers to continue operations amid rising financial risks during the crisis. In this regard, profitability was not only a performance measure but also a key financial buffer supporting banks' resilience.

Under agency theory, managers are expected to make prudent financial decisions and implement effective risk management strategies during periods of uncertainty. Higher profitability may reflect management effectiveness in managing organizational resources and maintaining financial performance under crisis conditions. Therefore, profitability becomes a more critical determinant of bank stability during the COVID-19 crisis.

The findings of this study are also consistent with previous studies reporting that crisis periods strengthen the role of profitability in supporting bank stability. Previous research explained that banks with stronger profitability and healthier financial conditions tend to demonstrate greater resilience and lower insolvency risk during periods of economic downturn and financial crisis (Chernykh et al., 2023; Paltrinieri et al., 2021; Tan & Walheer, 2024).

The effect of Corporate Governance Characteristics on Bank Stability through Profitability

The results show that profitability mediates the effect of the audit committee on bank stability. However, it does not mediate the influence of board size and board independence on bank stability. This finding indicates that profitability only mediates the relationship between the audit committee and bank stability. Therefore, H5c is supported, whereas H5a and H5b are not supported. Unlike audit committee size, board size and board independence do not significantly affect profitability, limiting the possibility of an indirect effect through ROA.

Based on agency theory, governance mechanisms are expected to reduce agency conflicts and improve managerial discipline, which may contribute to stronger organizational performance. In addition, resource dependence theory explains that governance mechanisms provide expertise, monitoring capability, and strategic resources that may support organizational effectiveness. However, this study's findings suggest that audit committees play a more effective governance role in improving profitability and strengthening bank stability than other governance mechanisms.

The results are consistent with previous studies showing that profitability can mediate the relationship between governance quality and bank stability. Prior studies by Martynova et al. (2020) and Le et al. (2025) found that effective audit committees may improve operational efficiency and financial performance, which subsequently contribute to greater organizational stability in the banking sector. However, this study offers a more specific finding: the mediation effect is significant only for the audit committee, while board size and board independence do not operate through profitability. This suggests that governance mechanisms may influence bank stability through different pathways rather than through a uniform mechanism.

Robustness check

Additional analyses assess the robustness of the findings on the relationship between board characteristics, profitability, and bank stability. For the robustness check, the non-performing loan ratio (NPL) is used as an alternative outcome measure reflecting bank credit risk, rather than bank stability as measured by the Z-score. Unlike ZSCORE, where higher values indicate greater stability and lower values indicate greater instability, higher NPL values indicate poorer asset quality. The robustness models use the same fixed-effects specification, control variables, and sample of 180 bank-year observations from 30 banks as the main analysis. Table 7 presents the robustness test results using Non-Performing Loans (NPL) as an alternative dependent variable.

Table 7. Robustness check using Non-Performing Loans (NPL) as a dependent variable

Variables	NPL	NPL
BS	0.00362 (0.00438)	0.00418 (0.00439)
BI	-0.00685 (0.00501)	-0.00614 (0.00502)
AC	-0.0146** (0.00649)	-0.0137** (0.00650)
ROA	-0.00353 (0.0107)	-0.00835 (0.0112)
COVID	0.000893 (0.000553)	0.000933* (0.000552)
ROA × COVID		-0.000422 (0.000311)
SIZE	-0.0141 (0.0127)	-0.0101 (0.0130)
LDR	0.0374 (0.0341)	0.0499 (0.0352)
AGE	0.000759 (0.00226)	0.00003 (0.00232)
CAR	0.0397 (0.0509)	0.0382 (0.0507)
CIR	1.780*** (0.0311)	1.784*** (0.0311)
INF	0.000458 (0.00177)	0.000141 (0.00178)
GDP	-0.000729 (0.00252)	-0.00161 (0.00260)
Constant	-1.252*** (0.353)	-1.322*** (0.356)
Prob > F	0.0019	0.0032
R-squared	0.462	0.463
Observations	180	180

Source: Data processed (2026)

The results show that the Audit Committee is negatively and significantly associated with NPL, indicating that stronger audit committee characteristics are associated with lower credit risk. In contrast, the coefficients of Board Size and Board Independence are not statistically significant. ROA is also statistically insignificant in the NPL specification. In Model 2, the COVID coefficient is positive and statistically significant, indicating higher NPL during the COVID-19 period. When we include the ROA × COVID

interaction, the main conclusions remain broadly unchanged, and the interaction term remains statistically insignificant.

The NPL specification provides partial robustness evidence, particularly for the Audit Committee result. However, differences in the significance of Board Size and Board Independence indicate that the robustness evidence is not fully consistent with the main ZSCORE results. The significant association between AC and NPL provides additional evidence that audit committee characteristics are associated with lower credit risk. However, BI is not statistically significant in the NPL specification. Therefore, the robustness analysis should be interpreted as partial rather than complete confirmation of the main findings.

Conclusion

This study examined the influence of corporate governance characteristics on bank stability with profitability as a mediating variable and the COVID-19 crisis as a moderating variable in Indonesian banking firms. The results indicate that board size and board independence have positive, significant effects on bank stability, whereas audit committee size has no significant direct effect. However, board size and board independence are not significantly associated with profitability, while only audit committee size is positively and significantly associated with profitability. Profitability has a positive and significant effect on bank stability, meaning that banks with high profitability are more likely to have greater financial resilience.

The findings also show that the COVID-19 crisis strengthens the positive relationship between profitability and bank stability. This suggests that profitability became particularly important in supporting bank resilience during periods of economic uncertainty. Therefore, banking supervisors may need to pay closer attention to banks' profitability and financial capacity during crises, alongside capital, liquidity, and risk conditions.

For banking regulators, the findings underscore the importance of effective governance mechanisms rather than formal board structures. The results indicate that board size and board independence significantly influence bank stability, implying that board oversight and independence can directly contribute to financial resilience. In contrast, the audit committee's significant role in improving profitability suggests that financial reporting, internal control, and monitoring functions remain important for improving bank performance.

For bank management, the findings suggest that increasing board size or board independence may contribute to bank stability, but these mechanisms do not necessarily improve profitability. Therefore, banks should focus on the effectiveness of board monitoring, expertise, participation, and coordination. At the same time, strengthening the audit committee's financial oversight and internal control functions may improve profitability, which can subsequently contribute to greater bank stability.

The findings contribute to agency theory and resource dependence theory by providing evidence that bank corporate governance mechanisms affect bank stability in different ways. The strong direct effects of board size and board independence indicate that effective governance and monitoring resources are important for improving bank stability. In addition, the panel regression, mediation, and moderation analyses have methodological limitations and may not fully capture the dynamic relationships among the variables. Future research may employ more advanced panel-data estimation techniques to provide further evidence on these relationships.

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