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The Effect of Lembaga Penjamin Simpanan Deposit Guarantee Implementation on Dual Rural Bank's Stability in Indonesia

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A B S T R A C T

Main Purpose - This study examines the role of deposit insurance in enhancing the stability of conventional and Islamic rural banks (BPR and BPRS) under economic uncertainty.
Method – A quantitative approach is employed using a dynamic panel data model, analyzing data from 1,266 BPRs and 113 BPRSs between 2013 and 2019. The Generalized Method of Moments (GMM) is applied to account for persistence in bank stability and potential endogeneity between deposit insurance and stability.
Main Findings – The results show that ethical climate has a positive effect on trust and a negative effect on organizational misidentification and workplace bullying. Employees who perceive a stronger ethical climate tend to have higher trust and lower negative workplace behaviors. The findings also provide preliminary evidence that trust mediates the relationship between ethical climate and negative workplace behaviors.
Theory and Practical Implications – The findings suggest that deposit insurance alone does not guarantee bank stability; it operates effectively when combined with sufficient capitalization. Policymakers and bank managers should ensure strong bank fundamentals to maximize the protective role of deposit insurance, especially under economic uncertainty.
Novelty – This study uniquely investigates how economic uncertainty conditions the interaction between deposit insurance, capitalization, and bank stability, focusing on the often-overlooked BPR and BPRS sector.

Keywords: bank stability, conventional rural banks, credit risk, economics uncertainty, sharia rural banks

1. INTRODUCTION

Strengthening banking stability has become increasingly important amid rising economic uncertainty and growing concerns over the resilience of financial institutions. Episodes of financial distress, particularly among smaller and less diversified banks, can trigger depositor withdrawals and weaken public confidence in the banking system (Oino, 2021; Sanderson et al., 2025). Bank runs represent one of the most critical threats during financial crises because they may accelerate bank failures and create negative expectations among depositors (Gong & Zou, 2021). In this context, bank failure reflects a form of financial system instability because it indicates institutional fragility and declining market confidence (Karmakar et al., 2024; Stewart & Chowdhury, 2025). Negative public expectations may intensify depositor concerns and increase the risk of banking instability, particularly when depositors respond by withdrawing funds massively from bank deposits (Agoraki et al., 2022; Chernykh et al., 2023). Such behavior can reduce financial system stability and may even encourage the diversion of funds abroad during periods of uncertainty. Therefore, maintaining banking stability requires consistent institutional intervention, transparent restructuring mechanisms, and credible depositor protection to prevent systemic instability.

Indonesia provides an important context for examining banking stability because of the complexity of its financial institutions and its historical experience with banking crises. After the 1998 crisis, the government introduced a blanket guarantee policy to restore public confidence and prevent further bank runs. This policy was later transformed into a limited guarantee system through the development of deposit insurance institutions and a broader financial safety net, as reflected in the regulatory transition following Banking Law No. 11 of 1998. Deposit insurance was designed to maintain depositor confidence, reduce the probability of panic withdrawals, and support long-term banking stability (Ashraf et al., 2019). However, the effect of deposit insurance on banking stability remains theoretically and empirically contested. Some studies argue that deposit insurance supports banking stability by reducing depositor panic, limiting bank failure risk, and providing confidence during periods of crisis (Lekpek, 2025; Suljić Nikolaj et al., 2022). Tran et al. (2024) further suggest that deposit guarantees may encourage creditors to monitor banks, Suhardiono, Sembel, and Suwandi (2025) and Napitupulu (2026) indicate that deposit guarantees may provide stabilizing benefits for banks. In this view, a credible and well-designed deposit guarantee scheme can reduce bank-run risk and strengthen financial stability.

Nevertheless, deposit insurance may also produce unintended consequences. Several studies suggest that deposit insurance can weaken market discipline and encourage excessive risk-taking when supervisory quality is weak or banking deregulation is excessive (Calomiris & Jaremski, 2019). Igwe and Toby (2022) also show that collateralized deposits may be associated with bank financial distress, while Chandera and Setia-Atmaja (2020) argue that deposit insurance affects banks' risk sensitivity through different transmission channels depending on

the type of risk. Kusairi et al. (2018) find that bank financial distress may have a negative relationship with deposit insurance, although this relationship may not apply equally to leverage and deposit-related conditions. In addition, the determination of deposit insurance premiums may depend not only on credit risk but also on broader non-credit risks and supervisory considerations (Nuugulu & Aupindi, 2025). Nizar and Mansur (2023) further emphasize that larger banks do not always have better risk management than smaller banks, suggesting that supervisory schemes should be more dynamic and risk-based. Prior studies also indicate that deposit insurance may reduce banks' interest burden and risk sensitivity, but its effectiveness depends on the level of coverage, banking capital adequacy, and the quality of regulation and supervision (Gong & Zou, 2021). These mixed findings suggest that deposit insurance cannot be treated as an automatically stabilizing mechanism because its effect may depend on institutional conditions, bank capitalization, and the level of economic uncertainty.

The issue becomes more critical in the context of Rural Banks (BPRs) and Sharia Rural Banks (BPRSs), which are relatively more vulnerable than larger commercial banks. BPRs and BPRSs typically operate with more limited capital buffers, narrower business models, and higher exposure to local economic shocks. Their vulnerability is reflected in credit/default risk that has exceeded the maximum threshold of 5 percent and reached around 7 percent per year, partly due to high lending rates and weaker borrower quality. This condition indicates that BPRs and BPRSs may be in a transitional state of instability and require special policy attention to prevent financial distress and potential bank runs. However, previous studies on deposit insurance have mainly focused on commercial banks, government banks, and the direct relationship between deposit insurance and banking risk (Dahir et al., 2018; Fatmawati et al., 2019; Gong et al., 2017; Gong & Zou, 2021). Other studies have examined the relationship between deposit insurance, competition, and market discipline. Meanwhile, research on BPRs and BPRSs has more often addressed bank performance, efficiency, and competition rather than the determinants of bank stability under deposit insurance and economic uncertainty (Fatmawati et al., 2019; Wasiaturrahma et al., 2020). This creates a substantial research gap, particularly because little is known about whether deposit insurance remains effective in maintaining the stability of rural banking institutions that are more exposed to credit risk and economic shocks.

This study addresses this gap by examining the relationship between deposit insurance and bank stability in BPRs and BPRSs under conditions of economic uncertainty in Indonesia. Unlike previous studies that generally treat deposit insurance as an independent stabilizing mechanism, this study explicitly considers the moderating role of economic uncertainty and investigates whether the effectiveness of deposit insurance depends on banks' capitalization levels. The dynamic specification is relevant because bank stability tends to persist over time, meaning that current stability is influenced by previous stability conditions. In addition, the relationship between deposit insurance and bank stability may be endogenous because stable

banks may attract greater depositor confidence, while deposit insurance may simultaneously affect banks' risk-taking behavior. By utilizing a comprehensive dataset covering 1,266 BPRs and 113 BPRSs in Indonesia, this study provides new evidence from an underexplored segment of the banking industry. The findings are expected to contribute to the banking stability literature by clarifying how depositor protection, capitalization, credit risk, and economic uncertainty jointly shape the stability of rural banking institutions in a dual banking system.

2. RESEARCH METHODS

This study uses secondary data obtained from the Financial Services Authority (OJK) of Indonesia, covering the financial statements of Rural Banks (BPRs) and Sharia Rural Banks (BPRSs) during the 2013–2019 period. Instead of drawing a sample, this study utilizes the full population of banks with complete and consistent financial information during the observation period, resulting in a final dataset consisting of 1,266 BPRs and 113 BPRSs. The 2013–2019 period was selected because it reflects the early operational phase of OJK as an independent institution authorized to supervise national banking activities under Law No. 21 of 2011. The selection of variables is grounded in banking stability theory, deposit insurance theory, and the literature on economic uncertainty.

Therefore, this study incorporates both bank-specific and macroeconomic variables to capture the internal and external determinants of banking stability. The variables used in this study include non-performing loans and z-score as proxies for banking stability, deposit guarantees provided by LPS, deposit insurance bank dummy, bank size, equity ratio, loan ratio, income diversification ratio, economic growth, and economic uncertainty in Indonesia. Non-performing loans are used as one of the indicators of banking stability, while the deposit guarantee variable is calculated based on the proportion of guaranteed deposits, assuming that 90% of deposits are guaranteed for BPRs and BPRSs. Bank size is measured using the logarithm of total assets, the equity ratio is measured by comparing total equity to total assets, the loan ratio is measured by comparing loans disbursed to total assets, the income diversification ratio is measured by comparing non-interest income to total income, and economic uncertainty is measured using the Indonesian uncertainty index.

Previous empirical studies have shown that bank-specific indicators and macroeconomic conditions play an important role in explaining banking stability. When examined jointly, bank size and income diversification have been found to have a significant positive relationship with banking stability in Malaysia, East Asia, and CIS countries (Clark et al., 2018; Ibrahim et al., 2019; Phan et al., 2019). A positive relationship between the loan ratio, equity ratio, and banking stability has also been documented in Malaysia, the United States, and 134 non-OECD countries (Ibrahim et al., 2019). Meanwhile, macroeconomic variables also influence banking risk and stability. Economic growth has been found to have a positive relationship with banking risk in Malaysia and five major ASEAN countries, while a negative

relationship between economic growth and banking stability has been reported in G10 countries (Ibrahim et al., 2019; Islam et al., 2020). These findings indicate that banking stability is shaped not only by internal bank characteristics, but also by broader macroeconomic conditions.

Based on these empirical findings, this study develops a dynamic banking stability model by incorporating deposit insurance, economic uncertainty, bank-specific indicators, and macroeconomic variables. The use of a dynamic specification is appropriate because bank stability tends to persist over time, meaning that current banking stability may be influenced by previous stability conditions. In addition, deposit insurance, capitalization, lending behavior, and banking stability may be simultaneously related, creating potential endogeneity. The baseline empirical model is specified as follows:

$$BS_{it} = \alpha_0 + \alpha_1 BS_{it-1} + a_2 Dep\ Ins + \alpha_3 D_1 \times Uncertainty_t + \beta Bank_{it} + \gamma Macro_{it} + u_{it} \quad [1]$$

Where BS is banking stability, $Dep\ Ins$ is a deposit guarantee, D_1 is a deposit guarantee dummy ($1 = LPS$ provides a guarantee, $0 = LPS$ does not provide a guarantee), Uncertainty is economic uncertainty, Bank is a banking indicator, and Macro is a macroeconomic indicator.

The interaction term between deposit insurance and economic uncertainty is included to examine whether uncertainty moderates the relationship between deposit insurance and banking stability. To provide a more detailed specification, the bank-specific indicators consist of bank size, equity ratio, loan disbursement ratio, and income diversification ratio, while the macroeconomic indicators include economic growth and inflation. The extended empirical model is expressed as follows:

$$BS_{it} = \alpha_0 + \alpha_1 BS_{it-1} + a_2 Dep\ Ins + \alpha_3 D_1 \times Uncertainty_t + \beta_1 \ln Aset_{it} + \beta_2 EQA + \beta_3 LAR + \beta_4 DIV + \gamma_1 \ln GDP + u_{it} \quad [2]$$

Where $lnAset$ is the logarithm of assets, EQA is the equity ratio, LAR is the lending ratio, DIV is the diversified income ratio, and $lnGDP$ is economic growth. For comparison, BS will align with banking performance such as competitiveness and concentration ratio.

The use of system-GMM is motivated by the potential endogeneity among deposit insurance, capitalization, lending behavior, and banking stability. In the context of BPRs and BPRSs, deposit insurance may affect banking stability by strengthening depositor confidence and reducing the likelihood of bank runs. However, more stable banks may also attract greater deposits and exhibit different risk-taking behavior, creating potential reverse causality. Similarly, capitalization and lending decisions may influence bank stability while simultaneously being affected by banks' financial conditions. These bidirectional relationships may lead to biased and inconsistent estimates when conventional panel estimators are

employed. The estimator of the GMM parameter itself is δ. Meanwhile, GMM also has an estimate of $\hat{\delta}$ to minimize the value of J($\hat{\delta}$) in the following way:

$$\hat{\delta} = \left(\left[N^{-1} \sum_{i=1}^{n} \Delta y_{i,t-1} z_i \right] \widehat{W} \left[N^{-1} \sum_{i=1}^{n} z_i \Delta y_i \right] \right)^{-1} \left[N^{-1} \sum_{i=1}^{n} \Delta y_{i,t-1} z_i \right] \widehat{W} \left[N^{-1} \sum_{i=1}^{n} z_i \Delta y_i \right] \quad [3]$$

Furthermore, it is possible to model W so that the value of $\widehat{W}$ so the value of $\widehat{W} = \widehat{\Lambda}^{-1}$; $\widehat{\Lambda} = N^{-1} \sum_{i=1}^{n} z_i \, \Delta v_i \Delta v_i' z$. Furthermore, the estimation equation $\hat{\delta}$ will be transformed as follows:

$$\hat{\delta} = \left(\left[N^{-1} \sum_{i=1}^{n} \Delta y_{i,t-1} z_i \right] \hat{\Lambda}^{-1} \left[N^{-1} \sum_{i=1}^{n} z_i \Delta y_i, -1 \right] \right)^{-1} \left[N^{-1} \sum_{i=1}^{n} \Delta y_{i,t-1} z_i \right] \hat{\Lambda}^{-1} \left[N^{-1} \sum_{i=1}^{n} z_i \Delta y_i \right] \quad [4]$$

By using this equation, the estimation results will be the most efficient and aligned with the population. This research and diagnosis process is identical to the difference-GMM which in its application will review $y_{1it} - y_{1it-1}$ directly. Then, validity testing continues on logarithmic bedakala, this research was introduced by using system-GMM in the analysis process, which includes logarithmic bedakala as an instrumental variable. Thus, system-GMM is more efficient than difference-GMM .

The GMM specification tests consist of instrument validity and autocorrelation tests. Instrument validity is assessed using the Sargan and Hansen tests, where a valid model requires a p-value greater than the chosen significance level, while autocorrelation is examined using the Arellano-Bond test, in which AR(1) is expected to be significant and AR(2) should be insignificant to confirm the absence of second-order serial correlation. Dynamic panel regression using the Generalized Method of Moments is appropriate for analyzing banking stability and credit risk because it accommodates lagged dependent variables, captures persistence in non-performing loans and bank adjustment behavior, controls for unobserved heterogeneity across banks, and addresses endogeneity among deposit insurance, lending behavior, capitalization, and banking stability (Boussaada et al., 2023; Dahir et al., 2018; Sharma & Mehta, 2024; Xu et al., 2025). Overall, system-GMM enables this study to generate more efficient, consistent, and reliable estimation results in explaining the determinants of credit risk and banking stability in BPRs and BPRSs.

3. RESULT AND DISCUSSION

The empirical analysis begins with descriptive statistics and correlation testing to understand the characteristics of the data before estimating the dynamic model. The dataset shows considerable variation across BPRs and BPRSs in terms of non-performing loans, bank size, equity-to-asset ratio, lending activity, income diversification, and economic growth, indicating that rural banking institutions in Indonesia operate under heterogeneous financial conditions. The correlation matrix generally shows relatively low correlations among most explanatory variables, suggesting that the variables capture different dimensions of banking behavior and macroeconomic conditions. However, the correlation between bank size and

lending is relatively high, which is economically reasonable because banks with larger asset bases tend to have greater intermediation capacity and wider market access. Although both variables are related, they remain conceptually different, as bank size reflects institutional scale while lending captures credit distribution activity. In addition, deposit insurance shows a negative correlation with non-performing loans, suggesting that depositor protection may reduce banking vulnerability, while income diversification shows a positive correlation with non-performing loans, indicating that non-interest income activities may not always reduce risk when not supported by adequate governance and risk management.

The dynamic panel estimation results show that lagged non-performing loans have a positive and significant effect across all model specifications, indicating that credit risk in BPRs and BPRSs is persistent over time. This means that previous credit risk conditions strongly influence current banking vulnerability because problem loans cannot be resolved immediately and often require time for restructuring, recovery, or collateral liquidation. Deposit insurance shows a negative and significant effect on credit risk in the first and second model specifications, suggesting that deposit guarantees may strengthen banking stability by increasing depositor confidence and reducing the likelihood of panic withdrawals. This finding argues that deposit guarantees reduce bank-run risk by assuring depositors that their funds remain protected during financial distress. However, the positive and significant coefficient of deposit insurance in the third model indicates that depositor protection may also generate moral hazard incentives. When depositors become less concerned about monitoring bank risk-taking behavior, banks may have greater incentives to expand lending aggressively or take riskier positions. Therefore, the stabilizing effect of deposit insurance is not automatic and depends on complementary mechanisms such as strong governance, adequate capitalization, effective supervision, and prudent risk management.

The interaction between deposit insurance and economic uncertainty does not show a statistically significant effect in any model specification, suggesting that deposit insurance affects banking stability independently rather than through its interaction with macroeconomic uncertainty. This may occur because deposit insurance primarily works through depositor confidence, and this confidence mechanism may remain relatively stable across different levels of uncertainty. Another explanation is that credit risk in BPRs and BPRSs is more strongly shaped by bank-specific factors, such as lending quality, capitalization, governance, and risk management practices, than by the interaction between deposit insurance and uncertainty. The relationship-based nature of rural banking operations may also reduce the sensitivity of depositor behavior to macroeconomic changes. Among the bank-specific variables, the equity-to-asset ratio consistently has a negative and significant effect on credit risk, confirming that stronger capital buffers enhance banks' ability to absorb potential loan losses and adverse shocks. Well-capitalized banks are less vulnerable to asset quality deterioration, more capable of maintaining stability during periods of stress, and less likely to

engage in excessive risk-taking. Thus, higher equity ratios contribute not only to lower non-performing loans but also to the long-term resilience of BPRs and BPRSs.

Economic growth shows a positive and significant effect on credit risk, indicating that stronger macroeconomic performance does not necessarily improve rural banking stability. From the perspective of procyclical lending theory, periods of economic expansion may increase optimism among banks and borrowers, encouraging more aggressive credit expansion and weaker lending standards. This is consistent with credit cycle theory and the financial accelerator framework, which suggest that favorable macroeconomic conditions may stimulate risk-taking behavior when collateral values and borrower balance sheets appear stronger. Over time, excessive credit expansion may increase future non-performing loans when economic conditions normalize. Overall, the findings show that banking stability in BPRs and BPRSs is shaped by persistent credit risk, the dual role of deposit insurance, capital strength, and macroeconomic conditions. Deposit insurance may reduce credit risk by strengthening depositor confidence, but it may also encourage moral hazard when not supported by strong supervision and adequate capitalization. The insignificant interaction with economic uncertainty indicates that deposit insurance and uncertainty affect banking stability through separate channels, while the negative effect of equity ratio and the positive effect of economic growth highlight the need for risk-based supervision, stronger capital buffers, and prudent credit risk management to enhance the resilience of BPRs and BPRSs.

The estimation results indicate that deposit insurance reduces credit risk in BPRs and BPRSs. A 1% increase in deposit insurance is associated with a 0.187% decrease in credit risk, ceteris paribus. This finding is consistent with previous studies showing that deposit guarantees contribute to banking stability by strengthening depositor confidence and reducing the likelihood of bank runs (Dahir et al., 2018; Fatmawati et al., 2019; Gong et al., 2017; Gong & Zou, 2021). Ibrahim, Salim, Abojeib, and Yeap (2019) argue that deposit guarantees provide protection against bank failure within a certain period, while Gropp and Vesala (2004) suggest that deposit guarantees may encourage monitoring behavior that helps control moral hazard. However, this stabilizing effect depends on the internal condition of the banks. When BPRs and BPRSs maintain good customer retention, prudent lending, and effective risk management, deposit insurance can reduce credit risk more effectively. Conversely, during periods of economic uncertainty, declining depositor confidence and weaker borrower repayment capacity may disrupt intermediation and increase non-performing loans.

In addition to deposit insurance, capital adequacy also plays a critical role in strengthening banking stability. The estimation results show that a 1% increase in the equity ratio reduces credit risk by 0.024%, ceteris paribus. This finding indicates that stronger capital adequacy contributes to banking stability by increasing banks' capacity to absorb losses and withstand financial shocks. The result is consistent with previous studies documenting a positive relationship between equity and banking stability in Malaysia, the United States, and

134 non-OECD countries (Ibrahim et al., 2019). Gong et al. (2017) also argue that low capitalization encourages higher credit risk, while Sobarsyah et al. (2020) explain that insufficient capital may fail to absorb moral hazard and risk-taking behavior within the banking industry. For BPRs and BPRSs, high capital adequacy reflects stronger institutional resilience in carrying out intermediation activities. Capital acts as an internal buffer beyond the protection provided by deposit insurance, allowing banks to absorb unexpected losses without relying excessively on external guarantees. When capital is greater than deposits, the probability of bankruptcy becomes relatively lower, thereby strengthening depositor confidence and improving overall bank stability.

While deposit insurance and capital adequacy are found to reduce credit risk, economic growth shows a different pattern. A 1% increase in economic growth has the potential to raise credit risk by 1.543%, ceteris paribus. This finding is consistent with previous studies showing that higher economic growth may increase banking risk, particularly when credit expansion becomes excessive during periods of economic optimism (Ibrahim et al., 2019; Islam et al., 2020; Sobarsyah et al., 2020). Sobarsyah et al. (2020) further show that economic expansion may be associated with banking instability in Asian countries, while Clark, Radić, and Sharipova (2018)argue that banking stability in developing countries may decline when GDP growth increases because banks tend to weaken their monitoring function during boom periods. In the context of BPRs and BPRSs, the positive relationship between economic growth and credit risk is reflected in the increase in the NPL ratio to 9.7% during 2015–2019, despite relatively high credit demand. This condition may be driven by the concentration of credit in lower-middle-income borrowers, consumer credit, housing renovation, vehicle loans, and MSME financing, where borrower quality may remain vulnerable even during periods of economic growth.

Taken together, these findings indicate that banking stability in BPRs and BPRSs is shaped by the interaction between depositor protection, capital strength, and macroeconomic conditions. Deposit insurance strengthens depositor confidence, reduces panic withdrawals, and helps maintain liquidity conditions, allowing BPRs and BPRSs to continue intermediation during periods of uncertainty. However, without strong governance, effective credit monitoring, adequate capital buffers, and supervision by OJK and LPS, deposit guarantees may create moral hazard by encouraging aggressive lending because part of the potential loss is indirectly protected by the guarantee scheme. Therefore, deposit insurance should not be treated as a stand-alone stabilizing instrument. It needs to be supported by capital adequacy requirements, borrower screening, financial literacy improvement, and risk-based supervision to reduce excessive credit risk accumulation.

Furthermore, the positive effect of economic growth on credit risk reinforces the importance of macroprudential control in rural banking. Macroeconomic expansion does not automatically improve banking stability, especially for rural and sharia rural banks that are

highly concentrated in consumer and MSME financing. From the perspective of procyclical lending behavior, strong economic growth may increase optimism among banks and borrowers, encouraging aggressive credit expansion and weaker lending standards. The institutional memory hypothesis explains that banks may underestimate credit risk during economic expansions because recent favorable economic conditions dominate risk assessments (Ashraf et al., 2019). This may lead to excessive credit growth and subsequent deterioration in loan quality. The finding is also consistent with evidence that rapid loan expansion increases credit risk when monitoring and risk management capacity fail to keep pace with lending growth (Sharma & Mehta, 2024; Sobarsyah et al., 2020). Consequently, stronger macroprudential policies, tighter credit monitoring systems, and more selective borrower screening are essential to ensure that economic expansion does not translate into higher banking vulnerability.

4. CONCLUSION

Based on the empirical findings, deposit insurance and capital adequacy significantly strengthen the stability of BPRs and BPRSs, while economic growth may increase credit risk through procyclical lending behavior. These results indicate that deposit insurance does not act as an independent stabilizing mechanism but functions effectively when complemented by adequate capitalization, risk-based supervision, and prudent lending practices. For policymakers, including OJK and LPS, the findings suggest that deposit insurance schemes should be supported by strong prudential regulations, effective supervisory mechanisms, and macroprudential policies to prevent excessive credit growth and systemic vulnerabilities. For bank management, maintaining sufficient capital buffers, improving internal risk management, and enhancing credit assessment procedures are critical, as deposit insurance should be viewed as a complementary tool rather than a substitute for prudent governance. Society and depositors benefit from increased confidence and reduced liquidity pressures when banks are well-capitalized and effectively supervised. The study has limitations, including the exclusion of additional macroeconomic indicators such as inflation and unemployment, and the use of aggregate economic growth that may not capture sectoral differences affecting BPR and BPRS borrowers. Future research could incorporate broader macroeconomic and institutional variables to provide a more comprehensive understanding of the determinants of banking stability and credit risk in rural banking institutions.

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