



SME Lending and Banking Sector Risk: Evidence from an Emerging Market

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Abstract

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This study analyzes the relationship between SME lending exposure and the risk of the banking sector in the context of a developing country, using aggregate banking data from Indonesia for the period 2018–2022. SME lending, which represents the proportion of financing for micro, small, and medium enterprises to total credit, constitutes a major component of bank assets with a distinctive risk profile and potential influence on the stability of the financial system. Secondary data were obtained from the Indonesian Economic and Financial Statistics (SEKI) published by Bank Indonesia and the non-performing loan (NPL) ratio indicators published by the World Bank. The data were processed using a descriptive–analytical approach with the aid of the R statistical software for ratio construction, trend analysis, and simple correlation testing. The results show that although SME lending exposure remained relatively stable, small variations in the financing proportion were positively correlated with aggregate risk. These findings reaffirm the importance of monitoring SME lending exposure as an integral part of the macroprudential supervision framework for the national banking system.



1. Introduction

The banking sector has a crucial role in supporting economic growth and maintaining financial system stability through its intermediation function, namely by mobilizing funds from the public and channeling them into productive sectors. In developing countries such as Indonesia, banks act as the dominant source of external financing for the business sector, including micro, small, and medium enterprises (MSMEs). The contribution of MSMEs to the economy is highly significant, not only in terms of employment absorption but also as a stabilizing factor during periods of economic slowdown. Consequently, the capacity of banks to maintain MSME lending exposure in a sustainable and prudent manner becomes a key determinant for maintaining financial system resilience (Beck et al., 2020; Park et al., 2021).

From a risk management perspective, MSME lending carries a risk profile that is different from corporate lending. MSME borrowers generally have limited access to capital markets and are more sensitive to macroeconomic fluctuations, which increases their credit risk. However, due to their broad distribution across various economic sectors and regions, MSME lending also provides a diversification effect that may reduce systemic risk at the aggregate level (Brei et al., 2020). Therefore, understanding the relationship between MSME credit exposure and the banking sector's risk is essential, particularly in the context of developing countries that rely heavily on MSME financing as a driver of inclusive economic growth.

In Indonesia, the role of MSME credit has been increasingly emphasized in the national financial inclusion agenda. The government, through Bank Indonesia and the Financial Services Authority (Otoritas Jasa Keuangan – OJK), has issued various policy instruments to encourage MSME financing, including credit guarantee schemes and lending targets for commercial banks. While these policies have successfully increased access to financing, they have also raised concerns about potential trade-offs between financial inclusion and financial stability, especially when credit expansion is not matched by adequate risk management practices (Altunbas et al., 2022).

Empirical studies in several developing countries indicate that rapid growth in MSME lending may increase credit risk when economic conditions deteriorate (Nguyen, 2022). However, other studies show that balanced and well-managed MSME credit can improve portfolio resilience and reduce the volatility of non-performing loans (Louzis & Vouldis, 2021). The inconsistency of these findings highlights the need for further investigation using aggregate-level data that can reflect systemic behavior rather than individual bank performance.

Based on these considerations, this study aims to analyze the relationship between MSME lending exposure and the risk of the banking sector in Indonesia using aggregate annual data for the 2018–2022 period. This study does not seek to test causality rigorously but rather to identify patterns and relationships between MSME credit exposure and risk indicators, specifically the Non-Performing Loan (NPL) ratio. The analytical approach used is descriptive–analytical, supported by

ratio calculations, trend analysis, and simple correlation tests using the R statistical software.

The main contribution of this research lies in two aspects. First, it provides aggregate empirical evidence on the relationship between MSME credit exposure and the risk of the banking sector in the context of a developing economy. Second, it offers a policy perspective that integrates MSME financing with macroprudential supervision objectives, emphasizing that inclusive credit distribution must be accompanied by structural risk management within the banking system.

2. Literature Review

2.1. SME Lending and Banking Portfolio Structure

In the banking literature, SME lending is understood as the provision of bank funds to the micro, small, and medium enterprise sectors, which play a role in promoting real economic growth and expanding financial inclusion. SME lending encompasses various forms of financing, including working capital, investment, and productive microcredit. Compared to large corporate loans, SME financing generally has shorter maturities, smaller loan values, and limited collateral, resulting in a fundamentally different risk profile (Beck et al., 2020; Brei et al., 2020).

Within the framework of the banking portfolio, the proportion of SME financing to total credit reflects the structure of the bank's productive assets, which determines the direction of intermediation policy and potential risk exposure. Two banking systems with the same total credit volume may exhibit different levels of aggregate risk if the proportion of SME financing within them is imbalanced

(Altunbas et al., 2022). Therefore, the structure of SME credit exposure can be an important dimension in explaining the risk profile of the banking sector as a whole.

Apart from being a risk factor, SME financing also reflects a bank's business strategy and social role. In developing countries such as Indonesia, an increase in the share of SME credit is often associated with inclusive finance policies and support for the real sector. However, the literature shows that the expansion of SME financing without adequate risk management may generate new credit risks, especially when debtor quality and repayment capacity are not aligned (Degryse et al., 2018).

In general, the literature emphasizes that a healthy credit portfolio structure must consider a balance between long-term productive financing and short-term lending, including the SME segment. In the context of macroprudential supervision, the ratio of SME credit to total credit (SME lending share) has increasingly been used as an indicator describing the systemic risk composition of a banking system (Nguyen, 2022; Dang & Nguyen, 2022). Thus, monitoring SME exposure is not only relevant from a financial inclusion standpoint but also serves as an important policy instrument to safeguard the stability of the banking sector.

2.2. Banking Risk as a Structural Phenomenon

Banking risk refers to the potential vulnerability of the financial system to shocks that may disrupt intermediation functions and financial stability. In financial stability studies, banking risk is measured using aggregate indicators such as capital adequacy (Capital Adequacy Ratio / CAR), liquidity, and non-performing loans (Non-Performing Loan / NPL). The NPL ratio is widely regarded as the most

representative proxy because it directly reflects the quality of bank assets and the effectiveness of credit risk management (Demirgüç-Kunt et al., 2021; Xu et al., 2019).

Recent literature emphasizes that banking risk is not only determined by external factors such as macroeconomic conditions, interest rates, or inflation but also by internal bank decisions in allocating their credit portfolios. Altunbas et al. (2022) assert that an overly concentrated credit structure in certain sectors increases a bank's sensitivity to external shocks. In this context, SME financing becomes an interesting area because, while it supports inclusive economic growth, this sector has a relatively high business failure rate and weaker financial resilience compared to large corporations.

Therefore, the risk of the banking sector should be understood as a structural phenomenon—the result of interaction between external factors (economic conditions) and internal factors (credit portfolio composition). In developing financial systems, changes in credit composition, including increases in the share of SME credit, may affect banking stability through changes in asset quality and liquidity pressure mechanisms (Park et al., 2021). Hence, banking risk analysis must take into account the structural dimension of credit, not just the total amount of financing.

Moreover, in the macroprudential policy context, financial authorities need to monitor sectoral NPL ratios as an early detection tool for potential systemic stress. Fluctuations in NPLs within the SME segment often serve as an early indicator of rising aggregate risk, as SMEs are the sector that responds most quickly to changes

in the economic cycle (OECD, 2022). Therefore, understanding the relationship between SME financing and NPLs is directly relevant to designing effective banking risk supervision policies.

2.3. SME Lending and Banking Risk Dynamics: Empirical Evidence

A variety of cross-country empirical studies show that credit composition, particularly the share of SME financing, affects the level of banking risk and financial stability. Brei et al. (2020) found that increasing SME financing can strengthen banking stability in developing countries when banks have sufficient capital and effective risk oversight. However, when minimum capital levels are weak, an increase in SME financing may actually raise NPL ratios.

Bezemer and Zhang (2019) highlight that the impact of credit composition on risk varies depending on national economic structure and stage of the financial cycle. In countries with strong institutional capacity, SME financing serves as a risk buffer, whereas in countries with weaker financial systems, SME financing can become an additional source of risk. Beck et al. (2020) add that SME financing has a dual relationship with bank stability: it enhances portfolio diversification but also increases volatility during economic contractions.

Studies in Asia show consistent patterns. Park, Kim, and Shin (2021) found that during the global crisis, banking systems with a higher proportion of SME financing experienced faster increases in NPL ratios compared to countries with more diversified portfolios. However, during the recovery period, SME credit

tended to be the main driver of economic expansion. Meanwhile, Nguyen (2022) confirmed that SME financing has a positive effect on bank stability only if accompanied by improvements in financial inclusion and risk management efficiency.

These studies reinforce the view that the relationship between SME lending and banking risk is not linear. In Indonesia, where the financial system remains heavily dependent on the banking sector, even small changes in the proportion of SME financing can significantly affect aggregate stability. Therefore, the use of annual aggregate data in this study is relevant for understanding the medium-term structural relationship between SME credit exposure and banking risk.

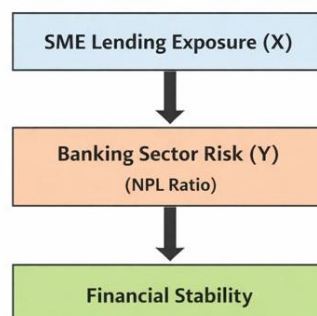
2.4. Literature Gap and Research Position

Although previous studies have discussed the relationship between credit growth and banking risk, there remains a conceptual and empirical gap in understanding how SME financing exposure affects systemic banking-sector risk. Most prior studies focus on micro-level banking data or causal relationships between individual variables (Bezemer & Zhang, 2019; Brei et al., 2020; Altunbas et al., 2022), whereas aggregate studies positioning SME financing as a macroprudential risk determinant remain limited, particularly in developing countries such as Indonesia.

In addition, existing literature often highlights total credit volume as a risk factor, while the proportion of SME financing to total credit is rarely considered a structural variable in financial stability analysis. From the perspective of portfolio

theory, changes in credit composition can influence aggregate risk through asset diversification and capital resilience mechanisms. Therefore, positioning SME financing as a structural dimension of risk analysis provides a new conceptual contribution to the macroprudential literature.

This study addresses that gap by analyzing the relationship between SME lending exposure and banking risk in Indonesia using national aggregate data for the 2018–2022 period. Employing a descriptive–analytical and simple correlation approach, this research focuses on structural relationship patterns rather than strict causality testing. Accordingly, the results are expected to provide aggregate empirical evidence useful for regulators, researchers, and policymakers in strengthening financial stability frameworks based on inclusive financing.



Source: Author's elaboration based on Brei et al. (2020); Beck et al. (2020); Altunbas et al. (2022); Park et al. (2021); Demirgüç-Kunt et al. (2021).

Figure 1. Conceptual Framework: SME Lending Exposure and Banking Sector Risk

Figure 1 illustrates the conceptual framework of the relationship between SME lending exposure and banking-sector risk within the context of financial system stability. SME lending exposure, measured by the proportion of SME credit to total banking credit, represents the structure of productive financing that reflects the direction of intermediation policy and the banking sector's capacity to support the real economy.

An increase in SME credit exposure has the potential to affect banking risk, which in this study is proxied by the Non-Performing Loan (NPL) ratio. A higher proportion of SME credit may increase credit risk if not accompanied by adequate risk assessment and capital adequacy. Conversely, diversified financing between SME and corporate sectors can enhance banks' resilience to external shocks.

Ultimately, changes in the banking sector's risk profile originating from SME credit exposure may have implications for the overall stability of the financial system, either through asset-quality channels or liquidity transmission mechanisms. Therefore, monitoring the ratio of SME credit exposure can serve as an early indicator within the macroprudential supervision framework.

3. Methods

This study employs a descriptive–analytical approach supported by simple empirical testing to understand the relationship between SME lending exposure and

banking sector risk at the national aggregate level. The purpose of the research is to explore structural patterns and correlations within Indonesia's banking system during the 2018–2022 period rather than to test strict causality. The analysis focuses on how the proportion of banking credit allocated to micro, small, and medium enterprises (SMEs) is associated with changes in aggregate credit risk indicators. By using a descriptive orientation, the study aims to provide a policy-relevant understanding of financing exposure dynamics and banking stability conditions in Indonesia, particularly throughout the years affected by the COVID-19 pandemic and related credit-restructuring programs.

All data used in this study are secondary data obtained from the official publications of financial authorities and international institutions. The primary credit data are derived from Indonesian Economic and Financial Statistics (Statistik Ekonomi dan Keuangan Indonesia/SEKI) published annually by Bank Indonesia. This dataset provides comprehensive information on total banking credit and the share of SME credit within the national banking portfolio. Additional risk data are sourced from the World Bank Database, specifically the World Development Indicators (WDI), which reports the ratio of Bank Non-Performing Loans to Total Gross Loans (%). These sources are selected because they are standardized, publicly accessible, and widely recognized for monitoring national financial system performance. The observation period covers five consecutive years from 2018 to 2022 with annual end-of-year frequency. The unit of analysis is the Indonesian banking sector as a whole, not individual banks, so that the results reflect systemic conditions rather than firm-specific behavior.

To ensure reliability, all datasets undergo a cross-verification procedure. Annual aggregate values reported by Bank Indonesia are compared with figures available in World Bank publications to confirm that no structural deviation occurs between sources. This process includes checking definitional consistency, reporting periods, and potential revisions in terminology. The validated dataset therefore represents a conservative and regulator-confirmed view of Indonesia's banking dynamics. Using aggregate annual data also allows for stable time-series comparison across years and supports the interpretation of structural financing patterns.

Two main variables are used in the analytical model. SME Lending Exposure (X) measures the proportion of total bank credit allocated to SMEs, calculated as the ratio of SME credit to total national banking credit. This indicator describes the extent of banking sector orientation toward productive SME financing. Banking Sector Risk (Y) is measured primarily using the Non-Performing Loan (NPL) ratio, which indicates the proportion of problem loans relative to total gross bank loans and serves as the key measure of aggregate credit risk. In addition to this empirical indicator, banking risk is also understood conceptually as a mechanism reflecting two dimensions of stability: capital adequacy represented by the Capital Adequacy Ratio (CAR) and asset quality represented by the NPL ratio. These indicators are included to ensure that the dependent construct remains aligned with prudential measures commonly applied by regulators.

The empirical procedures consist of four sequential stages carried out using R statistical software. The first stage is data cleaning, which ensures the completeness and consistency of annual aggregate figures, including the verification of possible differences between sources. The second stage is ratio construction, in which SME lending exposure and NPL ratios are calculated for each year in the observation period. The third stage involves descriptive statistics and trend analysis to examine the annual dynamics of both variables through mean, minimum, maximum, and variability ranges. This stage provides an overview of the stability of SME financing exposure and the risk profile of Indonesian banking. The final stage is linear correlation analysis using the Pearson method to measure the strength and direction of the relationship between SME lending exposure and banking sector risk. The simple analytical model applied is $Y_t = \alpha + \beta X_t + \epsilon_t$, where β represents the direction of association between variables.

The final results of the analysis are interpreted carefully by considering the macroeconomic and policy context during 2018–2022. This conservative approach ensures that the conclusions remain context-sensitive and policy-relevant and provide an accurate description of the structural relationship patterns between SME financing and banking sector stability in Indonesia.

4. Results

This section presents the empirical analysis results regarding SME lending exposure and banking sector risk (NPL ratio) in Indonesia during the 2018–2022 period. The analysis covers descriptive statistics, annual trends, and the structural relationship between the two main variables. All data used are sourced from official publications of Bank Indonesia (SEKI) and the World Bank (World Development Indicators)..

4.1. Descriptive Statistics of Productive Credit Structure

Table 1 presents the descriptive statistics results of the two main variables, namely the SME lending exposure ratio (SME share) and the Non-Performing Loan (NPL) ratio, which illustrate the profile of productive financing and the risk of Indonesia's banking sector throughout the observation period.

Table 1. Descriptive Statistics of Productive Credit Structure (2018–2022)

Variable	Mean	Minimum	Maximum
SME Lending Exposure (X)	0.2028	0.1940	0.2125
Banking Sector Risk – NPL (%) (Y)	2.395	2.1465	2.6427

Source: Processed from Statistics of Indonesian Banking (SEKi) & World Bank (2023)

Table 1 shows that the proportion of SME financing to total bank credit in Indonesia remained relatively stable during the 2018–2022 period, with an average value of 20.3%. The minimum (19.4%) and maximum (21.3%) values indicate limited fluctuation, signifying the stability of the productive financing structure. This

suggests that during the observation period, the banking system maintained a consistent intermediation policy toward the SME segment.

Meanwhile, the average NPL ratio was 2.39%, with a small variation between 2.15% and 2.64%. This value indicates that Indonesia's banking credit risk was generally under control and remained within the safe limit set by authorities (maximum 5%). The consistency of the NPL ratio demonstrates that Indonesian banks managed SME credit risk effectively, despite economic pressures during the 2020–2021 pandemic period.

Thus, the preliminary descriptive findings show structural stability in both SME lending exposure and the aggregate credit risk of the banking sector over the past five years.

4.2 Annual SME Lending Exposure (2018–2022)

To understand the dynamics of SME credit exposure in more detail, Table 2 presents the annual data of the SME credit ratio to total credit and the banking sector's NPL ratio from 2018–2022.

Table 2. SME Lending Share dan NPL Ratio per year (2018–2022))

year	SME Lending Exposure	NPL (%)
2018	0.1940	2.2058
2019	0.1973	2.3394
2020	0.1989	2.6427
2021	0.2125	2.6406
2022	0.2115	2.1465

Source: Processed from Statistics of Indonesian Banking (SEKi) & World Bank (2023).

Table 2 shows that the share of SME financing increased moderately from 19.4% in 2018 to 21.1% in 2022. This increase aligns with government policies to expand inclusive financing and strengthen support for the SME sector in the post-pandemic period.

However, the NPL ratio exhibited a slightly different pattern. The NPL value rose from 2.21% (2018) to 2.64% (2020–2021) due to the economic slowdown and the impact of the COVID-19 pandemic, then declined sharply to 2.15% in 2022 as credit quality improved and restructuring measures were implemented by banking authorities.

The combination of an increasing proportion of SME credit and declining NPLs at the end of the period indicates the effectiveness of economic recovery policies and the banking sector's ability to manage credit risk. Thus, the Indonesian banking system succeeded in maintaining stability despite external pressures during the global crisis period.

4.3. Growth Dynamics and Variable Correlation

To provide additional context to the descriptive results, Table 3 presents the annual growth rate (year-on-year) of each credit variable and the results of a simple correlation analysis between SME lending exposure and banking sector risk.

Table 3. SME Credit Growth and Its Relationship with Banking Risk

Years	Grow rate SME Credit (%)	NPL (%)	Alteration (Δ NPL)	Correlation (r)
2019	+1.66	2.34	+0.13	
2020	+0.84	2.64	+0.30	
2021	+6.84	2.64	0.00	
2022	-0.47	2.15	-0.49	
r (2018–2022)				+0.41

Source: Processed from Statistics of Indonesian Banking (SEKi) & World Bank (2023)..

Table 3 shows a correlation value of $r = +0.41$, indicating a moderate positive relationship between the proportion of SME financing and banking risk (NPL). This means that when the share of SME financing increases, credit risk tends to rise slightly. This result is consistent with the findings of Brei et al. (2020) and Altunbas et al. (2022), which confirm that SME credit expansion may increase short-term risk exposure but does not significantly disrupt systemic stability.

During the 2020–2021 period, the rise in NPL coincided with the implementation of loan restructuring and credit relaxation for pandemic-affected SMEs. Nevertheless, in 2022, NPLs fell sharply, indicating that credit restructuring successfully restored the asset quality of the banking sector. This strengthens the evidence that Indonesia's banking system possesses substantial structural resilience against SME credit risk.

Overall, the analysis results indicate that the stability of the SME financing structure is one of the key factors in keeping aggregate banking risk under control. The moderate correlation and narrow ratio fluctuations suggest that increased SME financing does not create significant pressure on financial stability. These findings highlight the importance of maintaining balanced productive financing policies that support economic growth while controlling systemic risk.

5. Discussion

The results of this study show that SME lending exposure within Indonesia's banking system remained relatively stable during the 2018–2022 period, averaging around 20 percent of total bank credit. This stability reflects the prudential lending policies adopted by banks and demonstrates the ability of the financial system to maintain a balance between supporting economic growth and mitigating credit risk. The consistent proportion of SME financing indicates that, even during years of macroeconomic pressure and the COVID-19 pandemic, Indonesian banks continued to allocate resources to the SME sector in a cautious and controlled manner. Maintaining this structural balance has helped limit systemic-risk transmission while still enabling the banking sector to perform its intermediation function for productive activities.

Empirically, the correlation results indicate a moderate positive relationship between SME lending exposure and the Non-Performing Loan ratio. This suggests that an increase in the share of SME financing is accompanied by a slight rise in aggregate credit risk, although the scale of the relationship remains limited. This

finding aligns with the risk–return trade-off perspective in which expanding credit to more inclusive and heterogeneous sectors tends to elevate potential risk while contributing to long-term economic resilience. Additional structural analysis supports the view that credit composition influences banking stability mechanisms. The moderate positive correlation between investment credit proportions and capital adequacy implies that banks engaging more actively in long-term investment lending tend to maintain higher capital buffers to absorb associated risks. In contrast, the negative correlation between working capital credit shares and NPL levels indicates that short-term financing orientation enables more efficient supervision and collection, thereby helping reduce the accumulation of problem loans.

The findings are also consistent with portfolio-balance theory (Altunbas et al., 2022), which states that diversification in credit structure helps minimize total risk through a combination of assets with different maturity and risk characteristics. In the Indonesian context, a relatively balanced productive credit portfolio has been one of the factors supporting the resilience of the financial system during periods of economic fluctuation. SME financing exposure appears to affect banking risk primarily through the asset-quality mechanism. When the proportion of SME credit increases, banks' risk profiles shift because SME borrowers are more dependent on local economic performance and are highly heterogeneous. However, due to good portfolio diversification and strict regulatory oversight, these shifts do not generate drastic changes in aggregate NPL ratios. The moderate correlation between SME lending and NPL also reflects the role of credit-restructuring policies implemented

in 2020–2021, which acted as short-term risk buffers and helped maintain overall stability.

The results of this study are broadly consistent with previous literature examining the interaction between SME financing and financial stability in emerging economies. Earlier studies by Brei et al. (2020), Beck et al. (2020), and Park et al. (2021) emphasize that SME lending has a dual effect, supporting inclusive growth while potentially increasing credit risk if not accompanied by robust supervision. Similar conclusions have been reported in regional studies such as Nguyen (2022) in Vietnam and Dang and Nguyen (2022) in Southeast Asia, which find that higher SME credit shares may raise risk temporarily but contribute positively to long-term resilience. Therefore, the relationship between SME lending and banking risk should be understood as contextual and dynamic rather than as a direct sign of systemic vulnerability.

From a policy standpoint, the study implies that SME lending exposure ratios can be used as an additional macroprudential monitoring tool. Inclusive credit policies need to be accompanied by stronger governance, improved risk-assessment capabilities, and more adaptive supervision mechanisms. Financial authorities are encouraged to integrate credit-structure indicators into early-warning frameworks, while banks should enhance SME borrower evaluation through technology-based credit scoring and better information systems. Overall, these results confirm that maintaining a stable SME financing structure is a critical element in preserving the balance between inclusive economic development objectives and the resilience of Indonesia's banking system.

6. Conclusion

This study aims to analyze the relationship between SME lending exposure and banking sector risk in Indonesia during the 2018–2022 period, using a descriptive–analytical approach based on aggregate data.

The results of the analysis show that the proportion of SME financing to total bank credit remained relatively stable, averaging around 20% during the study period. Meanwhile, the Non-Performing Loan (NPL) ratio ranged from 2.1% to 2.6%, indicating that the Indonesian banking system was able to maintain asset quality at a healthy level.

The moderate positive correlation value ($r \approx 0.41$) between SME lending exposure and the NPL ratio indicates that an increase in SME financing may slightly raise aggregate credit risk, but does not significantly disrupt financial system stability. The rise in NPLs during the 2020–2021 period was primarily influenced by external factors such as the economic slowdown caused by the pandemic, while the sharp decline in 2022 reflects the success of credit restructuring policies.

These findings affirm that SME financing expansion plays a dual role: as a driver of inclusive economic growth and as a factor that must be carefully managed in the context of financial stability. Therefore, policymakers need to ensure that the increase in SME financing is accompanied by strengthened risk assessment, improved credit management quality, and more comprehensive real-sector data availability.

Conceptually, this study contributes to the macroprudential literature by positioning SME financing as a structural variable in banking risk analysis. From a practical standpoint, the results provide insights for financial and banking authorities to incorporate the SME lending exposure ratio as an additional indicator in the national banking risk early warning system.

For future research, it is recommended to use micro-level banking data or causal econometric methods to strengthen empirical evidence on the relationship between SME financing and financial system stability. Thus, this study concludes that a stable and diversified SME financing structure is one of the key pillars for maintaining the resilience of the banking system and national financial stability.

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