

MANDATORY OF EXPANDING MSMEs LOANS: MEASURING IMPACT ON CREDIT RISK AND BANK INTERMEDIATION

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Abstract

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The objective of this study is to analyze the impact of micro, small, and medium enterprises' (MSMEs) credit, both in nominal and proportional terms, on the relative credit risk of MSMEs and the role of banking intermediaries, including the potential occurrence of credit rationing. The study utilizes annual balance panel data from 28 publicly listed banks covering the period 2013–2022. The analysis employs a fixed-effect panel regression using the generalized least squares (GLS) and the generalized method of moments (GMM) estimator. The findings of this study indicate that an increase in MSMEs credit in nominal terms does not have a negative impact on the relative credit risk of MSMEs, banking intermediation, or lead to credit rationing. However, a larger proportion of MSMEs' loan tends to elevate the relative credit risk of MSMEs (Arifaj & Baruti, 2023; Sondakh et al., 2021), reduce the level of banking intermediation, and suggest the presence of credit rationing, wherein a higher proportion of MSMEs' loan actually reduces non-MSMEs' credit (corporate and household loans). Based on these findings, the study concludes that efforts to increase MSMEs' loan, particularly in proportion to total credit, have the potential to disrupt banking stability and impede the pace of banking intermediation (Eyalsalman et al., 2024).

Keywords: MSMEs Credit, Proportion of MSMEs Credit, Credit Risk, Bank Intermediation

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1. INTRODUCTION

Micro, small, and medium enterprises (MSMEs) play a crucial role in the economies of both developed

and developing countries (Brodny & Tutak, 2022; John, 2021). However, obtaining external financing remains a significant challenge (Mol-Gómez-Vázquez et al., 2020). Market imperfections, such as

information asymmetry and weak creditor protection, make it inherently difficult for financial institutions to assess creditworthiness. Consequently, lending to businesses, including those with profitable investment opportunities, can be limited. On the demand side, studies reveal that many MSMEs, despite their need for loans, hesitate to apply for credit. This reluctance is observed in approximately 20% of small and medium enterprises (SMEs) in high-income countries, 28% of SMEs in middle-income countries, and 44% of SMEs in low-income countries (Harrison et al., 2022). Among the reasons behind this reluctance are concerns among MSMEs regarding the profitability of their projects or performance, as well as a lack of confidence in the success of their credit applications due to insufficient collateral. This is in line with Wang and Tian (2023), which states that credit bond defaults also occur frequently.

In Indonesia, MSMEs represent the dominant sector in terms of job creation and contribute 70% to the country's gross domestic product (GDP). However, the ratio of MSMEs' credit to total bank loans remains relatively small, standing at approximately 20%. Recognizing the central role of MSMEs in the economy and the limited involvement of banking intermediaries in MSMEs' loan, the Indonesian authorities have enacted Law No. 4/2023, explicitly encouraging banks in the country to increase their financing for MSMEs. In fact, the government has set a target of achieving a 30% ratio of bank financing to MSMEs by 2024. Nevertheless, efforts to enhance MSMEs' loan also carry the potential to disrupt banking stability, given the higher credit risk associated with MSMEs' loans compared to corporate and household loans (Chen et al., 2010).

In the existing literature based on data from Indonesia, the variable of credit risk continues to be highlighted as a significant factor influencing the distribution of SMEs' credit (Yuli & Rofik, 2023). They discovered a negative impact of the total non-performing loans (NPLs) in Indonesian banking on MSMEs' loan by commercial banks. Conversely, in a more extensive sample, Kustina et al. (2018) found a direct relationship between high bank NPLs and lending to SMEs. However, these studies, such as Kustina et al. (2018) and Yuli and Rofik (2023), do not provide conclusive evidence regarding whether efforts to increase the proportion of SMEs' credit can amplify overall credit risk. Thus, the present study aims to investigate the effects of both the nominal amount and proportion of SMEs' credit on bank credit risk.

Lending to MSMEs entails inherent credit risk that can significantly impact a bank's capital adequacy ratio. The heightened exposure to MSMEs' credit risk necessitates bankers to prudently manage credit allocation and operational strategies in order to maintain a satisfactory level of capital adequacy (Eyalsalman et al., 2024; Arifaj & Baruti, 2023; Sondakh et al., 2021; Shingjergji & Hyseni, 2015). Consequently, this adjustment to credit allocation and operations is likely to impede the pace of credit distribution, impacting not only MSMEs but also other sectors that have traditionally relied on bank funding. The need for caution in managing MSMEs' credit risk may inadvertently lead to a more conservative lending approach, potentially slowing

down the flow of credit across various sectors that banks typically support.

Drawing upon Stiglitz and Weiss's (1981) concept of credit rationing, this study hypothesizes that an elevated proportion of credit allocated to MSMEs could impede the pace of bank intermediation in extending loans. This deceleration in bank intermediation might lead to credit rationing, where banks struggle to fund lucrative projects (Lu et al., 2022). The existence of credit rationing not only diminishes potential profits for banks but also detrimentally affects both MSMEs and corporations (Yu & Fu, 2021). Imposing credit constraints on corporations and MSMEs could stifle innovation and productivity, consequently disrupting the broader economy. This is underpinned by the positive correlation between overall corporate productivity and economic growth (Cheng et al., 2021). Therefore, the distribution of credit to MSMEs, particularly through an escalated proportion, holds the potential to adversely impact both banking finance and the overarching economy.

The primary objective of this study is to investigate the impact of both nominal and proportional increases in MSMEs' credit on credit risk. Additionally, this study examines the potential influence of nominal and proportional increases in MSMEs' credit on the role of banking intermediaries, including the possibility of credit rationing. Examining credit risk is crucial due to its implications for banking stability, while analyzing the role of intermediaries and the potential for credit rationing is based on the importance of bank credit to the overall economy. To the best of our knowledge, this study represents the first examination of the nominal and proportional impacts of MSMEs' loan on credit risk and the role of banking intermediaries within the Indonesian context.

This study makes a significant contribution to enhancing our understanding of the impact of MSMEs' credit on credit risk and the role of bank intermediaries. The findings shed light on the importance of approaching efforts to increase MSMEs' loan with caution. It highlights the need for careful consideration to ensure that such initiatives do not jeopardize banking stability or hinder the potential economic benefits derived from bank intermediation. By providing valuable insights into this matter, this study offers a valuable perspective that can inform policymakers and stakeholders in making informed decisions regarding the expansion of MSMEs' credit.

The structure of this paper is as follows. Section 2 reviews the literature on loan to MSMEs; Section 3 presents the research methodology of the paper; Section 4 is devoted to the results, which support the initial conjecture about credit rationing, indicating a decrease in corporate credit allocation alongside an increase in the proportion of MSME credit. Finally, Section 5 concludes the study.

2. LITERATURE REVIEW

In terms of bank financing, MSMEs exhibit a greater reliance compared to large enterprises (Berger & Udell, 1998). This dependence primarily stems from limited financing options, as MSMEs typically lack access to alternative sources of funding, such as

issuing stocks and bonds (Lu et al., 2022). Consequently, banking intermediation plays a crucial role in the sustainability and growth of MSMEs. However, the close relationship between MSMEs and bank financing is often hindered by inadequate financial governance and management, resulting in many MSMEs encountering difficulties in accessing external financing, including bank financing (Hassan et al., 2011). The poor state of management practices, as perceived by bankers, exacerbates the perception of credit risk.

Existing literature indicates that bank financing tends to be less accessible to firms with perceived high levels of risk (Harrison et al., 2022). Moreover, Bruns and Fletcher (2008) contend that the potential risk borne by banks is a crucial consideration, alongside the potential return on investment offered by MSMEs. The findings of Harrison et al. (2022) and Bruns and Fletcher (2008) revealed that 63.93% of NPLs in banks were attributed to SMEs. Additionally, only around 16.31% of MSMEs possessed AAA credit ratings, while the majority fell within the BBB category or lower (Chen et al., 2010). These findings paint a clear picture that loan to MSMEs carries a higher potential for credit risk, as evidenced by the elevated NPL ratios compared to non-MSME loans, such as corporate and household loans. Moreover, the elevated credit risk aligns with the low levels of bank lending to MSMEs.

Managerial challenges leading to perceptions of high credit risk not only result in limited financing to MSMEs but also contribute to a concentration of bank financing towards corporate loans instead of extending loans to MSMEs (Berger & Udell, 1998). This trend is consistent with the data from Indonesia, where MSMEs' credit from banks represents only around 20% of total loans provided by banks. However, MSMEs are a vital force in driving the economy, generating employment, and fostering growth, particularly in Indonesia. Therefore, in late 2022, Indonesia enacted Law No. 4/2023, which emphasized the need for banks to increase their ratio of loans to MSMEs. This legislation aims to support MSMEs and stimulate economic growth. Therefore, it is important to strengthen the resilience and financial sustainability of SMEs in facing future crises (Wang, 2025). However, without concurrent efforts to enhance MSMEs' management, the implementation of this law may have counterproductive consequences. Banks may face a higher probability of credit risk.

Elevated and uncontrolled credit risk can disrupt bank cash flow, leading to a decline in the capital adequacy ratio. Higher levels of credit risk necessitate banks to allocate additional capital to maintain adequate levels of capital. Empirical studies conducted on Albanian banks demonstrate that credit risk, as measured by NPLs, significantly and negatively impacts capital adequacy figures (Shingjergji & Hyseni, 2015). Consequently, the decline in the capital adequacy ratio restricts banks liquidity for conducting their primary business, namely lending. Several empirical studies indicate a positive relationship between the adequacy of this model and the level of bank lending. Consequently, as the proportion of MSMEs' credit increases, accompanied by an elevation in the risk of weighted assets, the role of banks as intermediaries will be disrupted.

To optimize profits while maintaining stability in the face of projected increases in credit risk, banks tend to implement credit rationing, including reducing credit allocations to corporations to ensure capital adequacy and achieve high profitability. This is because credit risk generally correlates with the rate of return. A study conducted on 13,656 companies in China revealed that credit rationing stifled innovation and reduced productivity. The study emphasized that companies with minimal capital were more vulnerable to the effects of credit rationing (Yu & Fu, 2021). This finding was further supported by Cheng et al. (2021), who demonstrated that MSMEs, which typically have limited capital, also experienced significant impacts from credit rationing. Credit rationing impairs the productivity and capabilities of SMEs, including hindering export volumes. Consequently, a slowdown in credit provision disrupts real GDP growth (de Bondt et al., 2010). Studies conducted in Indonesia also indicate that a substantial decline in bank credit reduces the rate of economic growth (Rofik & Golec, 2022).

Based on the existing literature, it is evident that unintended MSMEs' loan can increase credit risk and diminish the role of bank intermediaries. The combination of high credit risk and disruption in the function of banking intermediaries can lead to credit rationing. The occurrence of credit rationing, driven by declining banking liquidity and capital to cover credit risk and maintain capital adequacy, is not a favorable indication. Instead of expanding credit rationing under such circumstances based on an emphasis on efficiency, it is imperative to carefully examine the impact of MSMEs' loan, both in nominal and proportional terms, on credit risk and bank intermediation. This research represents an initial assessment to gauge the level of risk associated with efforts to increase the proportion of MSMEs' loans in Indonesia, in line with the mandate of Law No. 4/2023.

To ensure the robustness of the model, this study incorporates several internal banking variables that have been commonly used in literature examining banking performance. The first control variable is bank size, which is proxied by assets. Larger banks tend to have more diversified credit portfolios and funding sources, making them more resilient in various conditions. The second control variable relates to efficiency, proxied by the operational cost to operational income ratio (BOP). Given the complexity and challenges in the banking industry, efficiency is crucial for long-term success. Efficient banks are better equipped to navigate different economic conditions and market challenges, while less efficient banks may struggle to achieve strong performance and maintain a competitive position. Therefore, efficient management is a priority for financial institutions to achieve sustainable and successful performance.

Additionally, the third control variable pertains to ownership structure. State-owned banks and private banks often have different goals and priorities. State-owned banks typically focus on national economic development and community empowerment, while private banks tend to prioritize profit generation and shareholder interests. These differing objectives can influence a bank's business strategy, product portfolio, and risk appetite. State-

owned banks are often subject to strict government supervision aimed at maintaining financial stability and mitigating systemic risk. On the other hand, private banks adhere to similar regulations and supervision as state-owned banks but may face distinct challenges regarding capital commitment, risk management, and compliance.

Referring to Harrison et al. (2022), there was an 82% decrease in new loans to MSMEs in Ireland during the period 2008-2010, when the country was affected by two financial crises: the global financial crisis in 2008 and the subsequent Eurozone government debt crisis in 2010. Considering market risk, this study includes the business cycle as the final control variable to ensure a comprehensive analysis.

3. METHOD

3.1. Research variables and operational definitions

This study examines three dependent variables: the *relative credit risk of MSMEs*, *banking intermediation*, and the *distribution of non-MSMEs loan*. The relative credit risk of MSMEs is calculated by dividing the NPLs of MSMEs by the total NPLs. Banking intermediation is measured by the loan-to-deposit ratio, while the distribution of non-MSMEs loan is used to assess credit rationing.

To ensure the robustness of the model, the study incorporates additional control variables in a stepwise manner. The dependent variables are divided into the main dependent variable, main control variables, and additional control variables. The main independent variables in this study are *MSMEs' credit distribution in nominal terms* and the *proportion of MSMEs' credit*. The main control variables include *bank size*, represented by total

assets, *operational efficiency* proxied by the BOPO ratio, and *economic growth*. Additionally, *bank ownership* is included as an additional control variable, which is proxied by a dummy variable (1 for state-owned banks and 0 for non-state-owned banks). The *relative credit risk of MSMEs* is also considered as an additional control variable to explain banking intermediation and credit rationing.

Loan disbursement data and nominal NPLs are used to represent bank financing distribution to non-bank third parties, ensuring that the data accurately reflect banking risk management. The study utilizes annual panel balance data from 28 public commercial banks for the period 2013-2022. The loan, total assets, and operational efficiency data were obtained from the website of the financial services authority, while economic growth data were obtained from reports by the central statistics agency. For the detailed variable description, see Table 1.

To account for the unique characteristics of each bank, this study employs a fixed-effect panel data regression approach and utilizes the generalized least squares (GLS) estimation method. The GLS method is employed to address potential issues of heteroscedasticity and autocorrelation (Bai et al., 2021; Bamati & Raoofi, 2020). This estimation technique involves assigning appropriate weights to each observation, taking into consideration the covariance between the dependent variable and the independent variable, as well as the covariance among observations from different individuals at different time periods. By incorporating these weights, GLS estimation can generate more efficient and consistent estimates compared to other regression methods (Bai et al., 2021). In general, the model used in this study is presented in Eq. (1).

$$Y_{it} = \alpha + \beta_1 MSMEs_{it} + \beta_2 share_{it} + \sum_{i=1}^m \beta_3 Var. control_{it} + \varepsilon_{it} \quad (1)$$

$$Y_{it} = Y_{it-1} + \beta_1 MSMEs_{it} + \beta_2 share_{it} + \sum_{i=1}^m \beta_3 Var. control_{it} + \varepsilon_{it} \quad (2)$$

The dependent variable (Y) represents the relative credit risk of MSMEs, banking intermediation, or nominal non-MSMEs loan. The independent variables are represented by nominal MSMEs loan (*MSMEs*) and proportional MSMEs loan (*share*). The control variables are denoted as *Var. control*. The coefficient for the independent variable is represented by β , and the constant term is denoted by α . The error term is represented by ε , and t indicates the time period.

3.2. Robustness test

To address the potential issue of endogeneity resulting from unobservable exogenous variables, this study employs dynamic panel data analysis, specifically utilizing the generalized method of

moments (GMM) introduced by Arellano and Bover (1995) and Blundell and Bond (1998). The GMM estimator is known to provide consistent and unbiased parameter estimates (Hasan & Gan, 2009). In this study, a two-step GMM approach is employed as it is asymptotically more efficient (Blundell & Bond, 1998; Hasan & Gan, 2009), and the validity of the instrument is assessed using the Sargan test (Benchimol & Qureshi, 2020). The GMM model used in this study is represented by Eq. (2). However, the GMM model in this study does not incorporate the dummy variable for bank ownership. This decision is based on the fact that the GMM model addresses endogeneity concerns, while the bank ownership dummy variable remains constant over time.

Table 1. Description of variables

No.	Variable(s)	Description	Equation
1	Relative credit risk of MSMEs	Contribution of NPLs MSMEs on total NPLs (POP/NPL)	$\frac{NPL \text{ of MSMEs credit}}{NPL \text{ total}}$
2	Bank intermediation	Loan to deposit ratio	$\frac{\text{Total loan}}{\text{Total deposit}}$
3	Corporation loan	Credit channeling for corporations and households	$\sum \text{ credit disbursed}$
4	MSMEs loan	Credit channeling for MSMEs	$\sum \text{ credit disbursed for MSMEs}$
5	Share	Proportion of MSMEs credit channeling	$\frac{MSMEs \text{ credit}}{\text{Total credit}}$
6	Bank size	Total asset	$\ln \text{ total assets}$
7	Operational efficiency	BOPO	$\frac{\text{Operating expenses}}{\text{Operating income}}$
8	Bank ownership	Dummy variable, 1 for state-owned bank and 0 for others	Dummy variable, 1 for state owned bank and 0 for others
9	Economic growth	Economic growth of Indonesia (year on year)	$\frac{GDP_t - GDP_{t-1}}{GDP_{t-1}}$

4. RESULT AND DISCUSSION

The data presented in Table 2 through descriptive statistics reveals that the average share held by the 28 banks during the period of 2013 to 2022 is 19.8%, accompanied by a relatively large standard deviation of approximately 14%. These mean and standard deviation values signify a considerable heterogeneity in MSMEs loan proportions across the sampled farms. This observation is further underscored by the range of values, with minimum and maximum proportions recorded at 0% and 58% respectively. Additionally, the average relative

credit risk attributed to MSMEs stands at 26.8%, accompanied by a standard deviation of 20.9%. This analysis demonstrates that, on the whole, NPLs among MSMEs are not significantly more dominant than those among non-MSMEs. Prior to conducting the regression test, it is essential for this study to address the possibility of multicollinearity. As indicated in Table 3, none of the independent variables in each model exhibits correlations exceeding 0.8. Consequently, in accordance with Rofik and Golec (2022) and Zuhroh et al. (2021), it can be confidently concluded that the models are devoid of multicollinearity.

Table 2. Descriptive statistics

	Relative credit risk of MSMEs	Bank intermediation	Corporation loan	MSMEs loan	Share	Bank size	Operational efficiency	Economic growth
Mean	0.268	84.551	97,981,679	28,009,634	0.198	199,000,000	88.103	0.043
Median	0.218	86.025	25,147,978	4,923,234	0.166	66,347,000	86.805	0.052
Maximum	1.000	171.280	811,000,000	603,000,000	0.586	1,750,000,000	287.860	0.058
Minimum	0.000	0.760	205,971	63	0.000	854,801	0.880	-0.027
Std. dev.	0.209	23.002	154,000,000	73,726,610	0.140	333,000,000	28.362	0.024
Skewness	0.705	-0.231	2	5	0.710	2.4	2.526	-2.456
Kurtosis	2.876	6.966	7	32	2.855	8.5	18.118	7.404
Observations	280	280	280	280	280	280	280	280
Jarque-Bera	23	186	431	11106	23	629	2964	507

Table 3. Multicollinearity test

Variables	Relative credit risk of MSMEs	Bank intermediation	Corporation loan	MSMEs loan	Share	Bank size	Operational efficiency	Economic growth
Relative credit risk of MSMEs	1							
Bank intermediation	0.043734	1						
Corporation loan	-0.12336	-0.00323	1					
MSMEs loan	0.221251	-0.00671	0.609583	1				
Share	0.759789	0.072361	-0.03742	0.375218	1			
Bank size	-0.01072	-0.03518	0.953186	0.809083	0.108812	1		
Operational efficiency	-0.05392	0.121699	-0.30476	-0.19414	0.004332	-0.29691	1	
Economic growth	0.021619	0.073401	-0.04335	-0.03153	0.022189	-0.05485	-0.03365	1

4.1. Relative credit risk of MSMEs

The estimation results derived from the GLS model, as presented in Table 4, unveil a number of significant findings. An expansion of MSMEs' loan in

nominal terms demonstrates a negative coefficient on the relative credit risk of MSMEs, though this effect lacks statistical significance. These findings suggest that, as the proportion of MSMEs' loan increases, there appears to be limited potential for

MSMEs' credit to contribute significantly to the overall NPLs. These observations somewhat diverge from several existing pieces of literature, which posit that the allocation of MSMEs' loan carries a heightened level of credit risk in comparison to loan extended to corporations or households (Bruns & Fletcher, 2008; Chen et al., 2010; Harrison et al., 2022). Nonetheless, the rise in the proportion of MSMEs' loan negatively influences the relative credit risk of MSMEs. This detrimental effect is evident through the significantly negative coefficients observed in the two constructed GLS models.

Furthermore, the results indicate that bank size and operational efficiency both have significant negative coefficients. These findings suggest that larger banking assets supported by higher efficiency levels can reduce the potential for an increase in NPLs resulting from loan to MSMEs. Additionally, although not statistically significant, it is observed that the relative credit risk of MSMEs aligns with economic growth. This finding provides evidence that bank credit expansion, particularly in MSMEs' loan, tends to be pro-cyclical.

The inclusion of the dummy variable representing bank ownership reveals interesting findings. The significant positive coefficient associated with the dummy variable indicates that state-owned banks tend to have a higher contribution of NPLs from MSMEs loan compared to non-state-owned banks. This finding is likely due to the fact that state-owned banks not only prioritize profitability but also support government initiatives aimed at improving the overall economy. Consequently, differences in NPL contribution between state-owned and non-state-owned banks are expected.

Furthermore, when examining the GMM model, it is observed that the direction of the coefficients remains consistent with the GLS models. Notably, in the GMM model, MSMEs' loan and economic growth exhibit significant positive coefficients. Additionally, the lagged variable of the relative credit risk of MSMEs displays a significant positive coefficient, indicating that banks have ineffectively managed credit risks in previous years, leading to a negative impact on current credit risk.

Table 4. Regression result of relative credit risk of MSMEs

Variables	GLS		GMM
	1	2	
Relative credit risk of MSMEs (-1)			0.185195* (0.008969)
MSMEs loan	-0.000526 (0.002053)	-0.000534 (0.002056)	0.009993 (0.007877)
Share	0.648093* (0.082862)	0.644573* (0.083175)	0.835966* (0.032938)
Bank size	-0.052212* (0.009259)	-0.051599* (0.009310)	-0.053678* (0.004952)
Operational efficiency	-0.000284*** (0.000162)	-0.000285*** (0.000162)	-0.000371* (0.00000)
Bank ownership		0.035051 (0.060196)	
Economic growth	-0.044241 (0.114697)	-0.040919 (0.114967)	-0.194793* (0.077744)
Intercept	1.104205* (0.159369)	1.089096* (0.161228)	
J-statistic (Prob.)			24.57768 (0.317693)
Root mean square error (MSE)	0.094010	0.093959	0.128421
R-squared	0.923454	0.923562	
F-statistic (Prob.)	93.11966 (0.000000)	90.06904 (0.000000)	

Note: * indicates significance of 10%, *** indicates significance of 1%.

4.2. Bank intermediation

Table 5 presents the results from each GLS model, indicating the impact of MSMEs' credit on banking intermediation, as measured by the loan-to-deposit ratio. It is observed that MSMEs' loan has a significant positive coefficient, suggesting that an increase in MSMEs' credit positively affects banking intermediation. However, the proportion of MSMEs' credit displays a significant negative coefficient, indicating that an increase in the proportion of MSMEs' credit actually leads to a decrease in the intermediation ratio. Similarly, an increase in the relative credit risk of MSMEs tends to reduce the level of banking intermediation. Banks allocate more liquidity to manage high credit risk, which in turn affects their intermediation role, despite the potential profitability associated with such risks.

Furthermore, upon integrating bank ownership into the analysis, the notably significant positive impact of the dummy variable suggests that state-owned banks assume a more pronounced intermediation role compared to other private commercial banks. Interestingly, a converse relationship between bank size and intermediation becomes apparent, signifying that greater bank assets exert a negative influence on banking intermediation; in other words, bank size is not directly proportional to the level of intermediation. Moreover, operational efficiency, as indicated by the operational efficiency variable, exhibits a tendency to negatively influence banking intermediation. This implies that banks with elevated operational costs tend to foster increased bank intermediation. Taking a macro perspective, the study underscores the alignment between economic growth and the pace of banking intermediation, with robust economic expansion

correspondingly propelling heightened levels of intermediation.

In the GMM model, only the bank intermediation coefficient in the previous period, operational efficiency, and growth exhibit significant coefficients. However, when compared with the GLS model, it becomes evident that the bank intermediation is significantly and negatively influenced by the proportion of MSME financing and the relative credit risk of MSMEs. This finding

indirectly suggests that if the increase in the proportion of MSME financing is kept within reasonable bounds and the relative credit risk of MSMEs is managed, banking intermediation is likely to experience an upswing in the subsequent period. Hence, maintaining an incremental rise in the proportion of MSMEs' loan and addressing the relative credit risk of MSMEs remains crucial for sustaining bank intermediation.

Table 5. Regression result of bank intermediation

Variables	GLS			GMM
	1	2	3	
Bank intermediation (-1)				0.415295* (0.036359)
MSMEs loan	1.426066* (0.508806)	1.493254* (0.522507)	1.455636* (0.525853)	2.159608 (2.752226)
Share	-34.10178* (10.47763)	-18.86643** (10.13920)	-19.38424*** (10.00313)	-18.18432 (24.49685)
Bank size	-4.491268* (1.564740)	-6.576235* (1.540010)	-6.360182* (1.518662)	-2.230470 (2.987401)
Operational efficiency	0.113906** (0.045549)	0.102996** (0.045552)	0.106588** (0.045507)	0.106750* (0.011897)
Relative credit risk of MSMEs		-22.19934* (6.252132)	-22.96896* (6.205602)	0.323632 (11.82175)
Bank ownership			10.52344** (5.110981)	
Economic growth	76.69840* (21.94627)	77.08664* (20.35972)	81.49911* (20.12891)	105.1663* (17.37024)
Intercept	136.5063* (29.01308)	176.4970* (28.77605)	171.5534* (28.38811)	
J-statistic (Prob.)				22.38490 (0.377628)
Root MSE	15.16196	14.92925	14.92235	18.78517
R-squared	0.655748	0.676608	0.700413	
F-statistic (Prob.)	14.70307 (0.000000)	15.59653 (0.000000)	16.84682 (0.000000)	

Note: * indicates significance of 10%, ** indicates significance of 5%, *** indicates significance of 1%.

4.3. Credit rationing

The GLS model constructed in this study demonstrates alignment between the distribution of MSMEs' loan and non-MSMEs loan (refer to Table 6). This is evident from consistently positive coefficients observed across each constructed model. However, an increasing proportion of MSMEs' loan places downward pressure on non-MSMEs' loan, as indicated by the significant negative coefficient. Furthermore, the relative credit risk of MSMEs imposes an additional burden on non-MSMEs' loan. These findings underscore that, over the observation period, an escalation in the proportion of MSMEs' loan coincided with a reduction in the pace of non-MSMEs' loan, corroborating a decline in banking intermediation due to the heightened share of riskier MSMEs' loans.

This evidence supports a causal mechanism whereby a higher share of MSMEs' loan elevates the relative credit risk, prompting banks to adopt more conservative risk management strategies. In turn, this prudence reduces their willingness or ability to extend loans to non-MSMEs' borrowers, namely, corporations and households, thus signaling the presence of credit rationing. This mechanism is consistent with credit rationing theory (Stiglitz & Weiss, 1981), where banks limit lending not merely based on borrower demand but due to perceived or actual increases in credit risk.

In a broader sense, the allocation of corporate and household loans maintains a direct

proportionality to banking assets, while operational efficiency tends to yield a negative impact. This implies that increased operational inefficiency in banking operations diminishes the likelihood of credit financing for corporations and households, especially when the proportion of MSMEs' loans is elevated. Additionally, the use of a dummy variable reveals no discernible distinction between state-owned banks and non-state-owned banks.

Meanwhile, the GMM model generally demonstrates consistent coefficient directions and levels of significance, with the exception of the MSMEs' loan and relative credit risk of MSMEs' variables. These variables display positive coefficients, but their significance is not established. Based on the constructed GLS and GMM models, it becomes evident that MSMEs' loan in nominal terms does not appear to obstruct the distribution of credit to non-MSMEs. However, the potential for new credit rationing emerges when there is a simultaneous increase in both the proportion of MSMEs' loan and the relative credit risk of MSMEs, reinforcing the earlier findings on the risk-intermediation nexus.

This finding supports our initial suspicion of credit rationing, wherein there is a reduction in the allocation of corporate credit alongside a rise in the proportion of MSMEs' credit. This phenomenon likely indicates a higher level of risk, leading banks to exercise caution by channeling fewer non-MSMEs' loans to mitigate potential bank failures (Shingjergji & Hyseni, 2015). The presence of credit rationing is

concerning, especially considering ongoing efforts by authorities to promote an increase in the proportion of MSMEs' credit at the national level. If the decline in banking intermediation and credit

rationing persists alongside a higher proportion of MSMEs' credit, the optimal economic impact of the banking intermediary role will be compromised (Cheng et al., 2021; Yu & Fu, 2021).

Table 6. Regression result of corporation loan

Variable(s)	GLS			GMM
	1	2	3	
Corporation loan (-1)				0.175130* (0.022160)
MSMEs loan	0.039608** (0.010402)	0.042308* (0.010550)	0.043110* (0.010683)	0.015720 (0.007967)
Share	-1.724223* (0.103961)	-1.639335* (0.109799)	-1.642344* (0.110024)	-1.685602* (0.148920)
Bank size	0.821468* (0.017804)	0.799283* (0.018518)	0.798107* (0.018725)	0.662697* (0.035861)
Operational efficiency	-0.000484 (0.000284)	-0.000560** (0.000271)	-0.000558** (0.000272)	-0.001197** (0.000186)
Relative credit risk of MSMEs		-0.220630* (0.062815)	-0.219255* (0.062882)	0.018412 (0.050920)
Bank ownership			-0.037991 (0.073678)	
Economic growth	0.566582* (0.215132)	0.499491** (0.203122)	0.490935* (0.203954)	0.750510* (0.098967)
Intercept	2.213297* (0.304800)	2.619617* (0.322030)	2.634167* (0.324437)	
J-statistic (Prob.)				22.98404 (0.344830)
Root MSE	0.171920	0.170993	0.170989	
R-squared	0.997672	0.997704	0.997705	
F-statistic (Prob.)	3307.481 (0.000000)	3239.344 (0.000000)	3132.181 (0.000000)	

Note: * indicates significance of 10%, ** indicates significance of 1%.

5. CONCLUSION

This study investigates the impact of MSMEs' loan — both in nominal and proportional terms — on NPLs, bank intermediation, and lending to the corporate sector. The research findings reveal several noteworthy insights. Firstly, an increase in the nominal amount of MSMEs' loan does not have a significant impact on the relative credit risk (NPLs), does not disrupt bank intermediation, and does not lead to credit rationing. This suggests that expanding MSMEs' credit in absolute terms remains relatively neutral in terms of risk and loan dynamics. In contrast, a higher proportion of MSMEs' loan relative to total credit is consistently associated with a significant rise in relative credit risk, a decline in the banking intermediation ratio, and a reduction in non-MSMEs' lending — indicating the presence of credit rationing. This contrast highlights a crucial distinction: the risk to financial stability emerges not from the absolute size of MSMEs' credit, but from its increasing share within the total loan portfolio. These findings confirm a causal pathway: an increasing share of MSMEs' loans elevates relative credit risk, which in turn pressures banks to tighten intermediation and reduce credit allocation to other sectors.

Based on these conclusions, we argue that the policy objective of increasing MSMEs loan — especially the mandated 30% target under Law No. 4/2023 — may unintentionally undermine the intended benefits if implemented without complementary reforms in risk governance and MSMEs' capacity building. While expanding MSMEs' loan is vital for inclusive growth, focusing exclusively on meeting proportional targets without managing associated risks may lead to adverse effects such as credit rationing and intermediation

inefficiency. Therefore, policymakers must differentiate between expanding MSMEs' credit nominally and increasing their share, ensuring that any rise in the proportional allocation is matched with robust credit risk mitigation strategies. Only through such a balanced approach can MSMEs' financing be scaled up without jeopardizing the health of the banking sector and its role in supporting the broader economy.

To address the higher credit risk associated with the MSMEs' sector, banks should prioritize the enhancement of risk management programs specifically tailored to MSMEs' loan. This entails improving credit quality monitoring, developing robust risk prediction models, and implementing sound risk management practices. Furthermore, collaborative efforts between the government and financial institutions are crucial in increasing the financial capacity of MSMEs, ultimately reducing their credit risk. This can be achieved through initiatives such as providing financial training, business consulting services, and facilitating easier access to alternative sources of financing, including venture capital or specialized MSMEs' loan programs. Equally important is the provision of adequate financial education and literacy programs for MSMEs' owners, enabling them to better understand and manage their business finances. The government and financial institutions should expand dedicated financial education programs for MSMEs and raise awareness about the significance of effective financial management.

Furthermore, implementing alternative credit scoring mechanisms presents a promising solution to enhance financial accessibility for MSMEs. Alternative credit scoring involves utilizing diverse data and methodologies to evaluate the creditworthiness of MSMEs, moving beyond

reliance solely on traditional credit history. This approach can help overcome the limited information typically faced by MSMEs when seeking finance. However, successful implementation necessitates appropriate policies, robust data protection measures, and regulations that prioritize privacy and fairness. Additionally, it is vital to develop accurate and reliable credit scoring models that effectively identify credit risks without engaging in unfair discrimination or bias.

These recommendations are particularly crucial in the context of Law No. 4/2023, which requires banks to allocate at least 30% of their loan portfolios to MSMEs. The empirical findings of this study show that while expanding access to MSMEs' credit may

yield economic benefits, a sharp increase in the proportion of MSMEs' loans without corresponding improvements in creditworthiness and risk management mechanisms can be counterproductive. If not accompanied by institutional support and risk-sensitive policy implementation, the mandated credit expansion may elevate systemic credit risk, reduce the efficiency of bank intermediation, and lead to unintended credit rationing for other sectors. Therefore, achieving the objectives of Law No. 4/2023 demands not only regulatory compliance by banks, but also strategic coordination with broader economic, financial, and capacity-building programs targeted at the MSMEs' sector.

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