

The Asymmetric Effects of Inflation and Interest Rates on MSMEs in Indonesia

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ABSTRACT

Studi ini mengkaji dampak jangka panjang dan jangka pendek dari kebijakan suku bunga (BI Rate) dan inflasi terhadap perkembangan Usaha Mikro, Kecil, dan Menengah (UMKM) di Indonesia. Menggunakan data deret waktu tahunan dari tahun 1997 hingga 2023, model Vector Error Correction Model (VECM) diterapkan untuk menangkap hubungan keseimbangan sekaligus penyesuaian dinamis antar variabel. Uji stasionaritas mengonfirmasi bahwa variabel-variabel terintegrasi dalam orde campuran, dan uji kointegrasi Johansen mengungkapkan adanya hubungan jangka panjang. Hasil penelitian menunjukkan bahwa inflasi memiliki pengaruh yang lebih substansial dan signifikan secara statistik terhadap kinerja UMKM dalam jangka pendek, khususnya melalui efek lag. Sebaliknya, BI Rate memiliki pengaruh yang terbatas dan tidak signifikan secara statistik, yang mengindikasikan bahwa inflasi merupakan kendala yang lebih langsung bagi pertumbuhan UMKM. Signifikannya error correction term mengonfirmasi bahwa UMKM menyesuaikan diri secara bertahap terhadap penyimpangan dari keseimbangan jangka panjang. Temuan ini menegaskan perlunya kebijakan yang berorientasi pada pengendalian inflasi serta mekanisme akses keuangan yang lebih baik untuk mendukung ketahanan UMKM. Studi ini menyimpulkan bahwa stabilitas makroekonomi, khususnya pengendalian harga, memainkan peran yang lebih kritis dibandingkan pengetatan moneter dalam membentuk kinerja UMKM. Studi ini juga menyarankan bahwa perluasan pembiayaan alternatif, seperti peer-to-peer lending dan solusi kredit digital, dapat melindungi UMKM dari volatilitas makroekonomi. Penelitian ini berkontribusi pada literatur yang ada dengan memberikan bukti empiris dari konteks negara berkembang dan menyarankan eksplorasi lebih lanjut mengenai instrumen keuangan digital sebagai strategi adaptif bagi UMKM.

This study examined the long-term and short-term impacts of interest rate policy (BI Rate) and inflation on the development of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. Using annual time-series data from 1997 to 2023, the Vector Error Correction Model (VECM) was applied to capture both equilibrium relationships and dynamic adjustments among the variables. Stationarity tests confirmed that the variables were integrated of mixed orders, and the Johansen cointegration test revealed the existence of long-run relationships. The results showed that inflation had a more substantial and statistically significant effect on MSME performance in the short run, particularly through lagged effects. In contrast, the BI Rate had a limited and statistically insignificant influence, suggesting that inflation posed a more immediate constraint on MSME growth. The significant error correction term confirmed that MSMEs adjusted gradually to deviations from long-term equilibrium. These findings highlighted the need for inflation-targeted policies and improved financial access mechanisms to support MSME resilience. The study concluded that macroeconomic stability, especially price control, played a more critical role than monetary tightening in shaping MSME outcomes. It also suggested that expanding alternative financing, such as peer-to-peer lending and digital credit solutions, could buffer MSMEs from macroeconomic volatility. This research contributed to the existing literature by providing empirical evidence from a developing country context and suggested future exploration of digital financial tools as adaptive strategies for MSMEs.

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Introduction

Micro, Small, and Medium Enterprises (MSMEs) are widely recognized as key drivers of inclusive and sustainable economic development, particularly in emerging economies such as Indonesia. Representing over 90% of business entities and contributing substantially to employment, MSMEs play a central role in reducing poverty and promoting economic diversification (Harahap et al., 2024; Ratnawati et al., 2023). In Indonesia, the MSME sector accounts for a significant portion of national GDP and employment, especially within rural and underserved areas. Over the past few years, MSMEs have demonstrated remarkable adaptability, particularly in the post-pandemic period, leveraging digital platforms and innovative business models to reach new markets and remain competitive in volatile environments (Mastintianto et al., 2025; Said & Soi, 2025). This evolution has been facilitated by increased integration of digital technologies and a growing focus on local empowerment and innovation, reinforcing the strategic importance of MSMEs in national development agendas (Alfarizi & Sari, 2024).

Despite this progress, MSMEs remain acutely sensitive to changes in macroeconomic conditions. Inflation and central bank interest rates such as Indonesia's BI Rate are two critical variables that affect business costs, pricing strategies, credit availability, and investment planning. When interest rates rise, borrowing becomes more expensive, particularly for MSMEs that already face challenges in accessing formal financing due to limited collateral and credit history (Talip & Wasiuzzaman, 2023; Tita & Opperman, 2023). Similarly, persistent inflation undermines the purchasing power of consumers and increases input costs for MSMEs, leading to narrower profit margins and reduced operational flexibility (Dhar et al., 2024a). Consequently, a stable macroeconomic environment becomes essential not only for attracting investment but also for ensuring the long-term sustainability of small businesses, which are often the first to suffer in times of economic turbulence.

A growing body of literature has explored the challenges MSMEs face in accessing credit and responding to inflationary pressures. However, there remains a conspicuous lack of studies examining the simultaneous and long-term impact of BI Rate and inflation on the development trajectory of MSMEs in Indonesia. Much of the existing research tends to focus either on general macroeconomic performance or on the internal characteristics of MSMEs, such as leadership, innovation capability, or human resources. These internal factors, while important, only partially explain business resilience and performance. The external environment, especially macroeconomic policy, plays an equally critical role, yet has been largely overlooked in empirical studies targeting the Indonesian context.

Furthermore, most studies addressing the influence of inflation and interest rates do so from a short-term or theoretical standpoint, without a comprehensive empirical examination using historical data. This creates a research gap in understanding how chronic or sustained macroeconomic pressures rather than momentary shocks shape MSME development. General policy prescriptions are often made without a clear empirical foundation linking monetary variables to measurable MSME outcomes over time. The lack of longitudinal analysis limits the policy relevance of existing studies, particularly in formulating interventions that are both responsive and anticipatory to long-term trends.

Several researchers have attempted to address MSME challenges by focusing on financial inclusion, regulatory reforms, or support programs. While these approaches have shown positive outcomes in specific contexts, they often neglect the foundational impact of macroeconomic variables. For instance, access to microcredit programs or business development services may prove ineffective in environments where high inflation or restrictive interest rates prevail. Therefore, a growing recognition has emerged in the literature that macroeconomic variables, especially those under the purview of central bank policy, must be integrated into any meaningful discussion of MSME support strategies (Kumarasamy et al., 2024; Troilo et al., 2025a).

In addressing this gap, recent studies have begun to examine the influence of national monetary policy on MSME performance, especially in developing countries. For example, Berisha et al. (2023a) highlight how high interest rates and inflation can dampen the growth potential of MSMEs by limiting their access to affordable capital and reducing consumer purchasing power. Similarly, Cruz et al. (2023) and Saifurrahman & Kassim (2023) demonstrate that policy misalignment between financial institutions and MSME needs exacerbates vulnerabilities during periods of macroeconomic instability. These findings suggest that MSMEs are disproportionately affected by monetary tightening and inflationary

cycles, which underscores the need for a deeper and more localized understanding of these relationships in countries like Indonesia.

Despite these insights, few empirical studies provide robust, data-driven models that specifically evaluate the long-term interplay between inflation, interest rates, and MSME development. Even fewer studies have attempted to assess these relationships using cointegration techniques or vector error correction models that are capable of distinguishing between short-term fluctuations and enduring structural trends. As a result, policy recommendations often rely on fragmented evidence, leading to suboptimal interventions that fail to address the underlying macroeconomic constraints faced by MSMEs.

Moreover, many MSME-focused studies have concentrated on internal dynamics such as entrepreneurship, organizational culture, or digital transformation while largely neglecting how these elements interact with broader economic forces. In Indonesia, this issue is particularly important because MSMEs contributed approximately 61% of national GDP and absorbed around 97% of total employment in 2023, according to the Ministry of Cooperatives and SMEs. Despite their substantial economic contribution, MSMEs remain highly vulnerable to inflationary pressures and fluctuations in interest rates, which directly affect production costs, purchasing power, and access to financing.

Tabel 1. Recent Contribution of MSMEs to Indonesia’s Economy

Indicator	Value	Year
Contribution to GDP	61%	2023
Employment Absorption	97%	2023
Number of MSMEs	65 Million Units	2023

Source: Ministry of Cooperatives and SMEs (2023); BPS Indonesia (2024)

For instance, while Rauf et al. (2023) and Anatan et al. (2023) emphasize the importance of internal management and training, their models omit external variables like interest rates or inflation, limiting the scope of their applicability in real-world policy formulation. This narrowed focus impedes the development of holistic support systems that consider both endogenous capacities and exogenous challenges. A more integrated approach, linking macroeconomic trends with MSME performance indicators, is essential to advancing the theoretical and practical understanding of MSME development.

This study seeks to fill this critical gap by empirically analyzing the long-term relationship between BI Rate, inflation, and MSME development in Indonesia using annual time series data from 1997 to 2023. By employing econometric techniques such as the Johansen cointegration test and the Vector Error Correction Model (VECM), this research offers a more precise and dynamic understanding of how monetary variables affect MSME performance over time. The study also proposes that inflation exerts a more pronounced negative effect on MSMEs compared to the BI Rate, challenging assumptions that credit access is solely constrained by interest levels. The novelty of this research lies in its integration of macroeconomic and microenterprise perspectives, offering a comprehensive analytical framework to inform inclusive and adaptive monetary policy design.

Literature Review

Micro, Small, and Medium Enterprises (MSMEs) occupy a strategic position in economic development because they function not only as business units but also as mechanisms for employment absorption, income distribution, poverty reduction, and local economic empowerment. In developing economies, MSMEs are often viewed as the backbone of inclusive growth due to their ability to operate across formal and informal markets and to reach communities that are not fully served by large-scale industries. Prior studies emphasize that MSMEs contribute to productivity, welfare improvement, and regional resilience, particularly when supported by financial literacy, market orientation, and enabling institutional environments (Harahap et al., 2024; Ratnawati et al., 2023; Royal et al., 2023). In the Indonesian context, this role is strengthened by the diversity of MSME activities across culinary, craft, fashion, service, and digital sectors, which makes MSMEs highly relevant for national development policy (Alfarizi & Sari, 2024; Sundaro et al., 2024).

Although MSMEs have strong development potential, their performance is strongly shaped by access to finance. Financial accessibility determines whether MSMEs are able to expand production capacity, adopt technology, improve product quality, and survive external shocks. Studies on MSME financing show that limited collateral, weak financial records, information asymmetry, and low financial literacy often restrict MSMEs from obtaining affordable formal credit (Talip & Wasiuzzaman, 2023; Tita & Opperman, 2023). Kumarasamy et al. (2024) further demonstrate that financial accessibility is closely linked to labor productivity in developing countries, suggesting that credit constraints can limit both firm-level growth and wider economic contribution. In a similar direction, Hiremath and Deb (2021) argue that credit constraints may become an invisible barrier to MSME competitiveness, especially when enterprises need working capital for production, exports, or business upgrading.

The relationship between monetary policy and MSME development can be understood through the cost-of-capital channel. Interest rates, including the BI Rate in Indonesia, influence lending rates, credit affordability, and investment decisions. When benchmark interest rates rise, financial institutions generally adjust lending rates upward, increasing the cost of borrowing for firms. For MSMEs, this effect can be more severe because they usually have weaker bargaining power, limited collateral, and thinner profit margins than larger firms. Berisha et al. (2023) show that access to finance remains a central challenge for MSMEs, while Cruz et al. (2023) highlight that interventions designed to improve financial services are critical in low- and middle-income countries. Therefore, interest rate movements may affect MSMEs indirectly through the availability and affordability of bank loans, as well as directly through business expectations and investment postponement.

However, the sensitivity of MSMEs to interest rate changes is not always uniform. Some MSMEs rely heavily on bank credit, while others depend on internal funds, informal lending, family capital, microfinance, or digital financing. This financing diversity may weaken the direct effect of formal interest rate policy on MSME development. Saifurrahman and Kassim (2023) note that regulatory and institutional constraints can limit financial inclusion for MSMEs in Indonesia, particularly in the Islamic banking sector. Similarly, Troilo et al. (2025) emphasize that supply-side finance policies are needed to overcome structural barriers in MSME lending. These findings suggest that the BI Rate may influence MSMEs with a time lag and with different magnitudes depending on the degree of formal financial integration, the structure of credit markets, and the availability of alternative financing channels.

Inflation represents another macroeconomic variable that directly affects MSME performance. Rising prices increase the cost of raw materials, transportation, utilities, wages, and other operating expenses. At the same time, inflation reduces consumer purchasing power, which can weaken demand for MSME products and services. Dhar et al. (2024) argue that MSMEs contribute to sustainable development, but their contribution depends on the stability of the entrepreneurial ecosystem. When inflation is persistent, MSMEs face difficulty maintaining price competitiveness because they often cannot fully transfer higher costs to consumers. This condition can reduce profit margins, disrupt cash flow, and limit the capacity of firms to reinvest in business development.

The impact of inflation on MSMEs may also be interpreted through the demand and operational stability channels. Inflation can create uncertainty in planning, inventory management, and pricing strategy. Singh et al. (2022) show that MSMEs must adopt revival and adaptation strategies when facing shocks that disturb market demand and operational continuity. Saxena and Sahoo (2022) also indicate that liquidity management is important for MSMEs, as firms need sufficient cash holdings to respond to uncertainty. In periods of rising inflation, MSMEs with limited cash reserves become more vulnerable because the cost of maintaining inventory and meeting short-term obligations increases. Thus, inflation can affect MSME development more immediately than interest rates, particularly among firms operating with narrow working capital buffers.

Recent literature also highlights the importance of resilience, innovation, and digital transformation in strengthening MSMEs under macroeconomic pressure. Digital adoption enables MSMEs to broaden market access, reduce transaction costs, improve customer engagement, and maintain competitiveness during periods of instability (Anatan & N., 2023; Mastintianto et al., 2025; Said & Soi, 2025). Digital literacy and knowledge sharing are also associated with business sustainability because they help MSMEs adapt to changing market conditions and participate in the digital economy (Noerchoidah et al., 2025). At the same time, financial innovation can expand access to credit and reduce dependence on conventional bank lending. Ismanto et al. (2023) show that fintech affects MSME credit performance and accessibility, while Charfeddine et al. (2024) find that financial literacy, ICT use, digitization, and perceived access to finance are related to credit constraints. These studies suggest that

digital finance can serve as an adaptive mechanism for MSMEs facing inflationary pressure and interest rate volatility.

Government support and local development strategies also play a complementary role in strengthening MSME resilience. Rauf et al. (2023) emphasize the role of government development models, such as the One Village One Product approach, in supporting MSMEs through localized economic potential. Ekayanthi et al. (2024) further show that communication strategies are important for MSME resilience during crises, as they help firms access information, coordinate support, and adjust business practices. In addition, Nyoman and Suasih (2023) highlight the need for mitigation policies for SMEs affected by shocks, especially in sectors vulnerable to demand contraction. These findings indicate that macroeconomic stability should be accompanied by targeted support programs, business assistance, and communication mechanisms that help MSMEs respond to changing economic conditions.

From a theoretical perspective, this study integrates macroeconomic stability theory, monetary transmission mechanisms, and MSME development theory. Inflation affects MSMEs through purchasing power, input costs, pricing behavior, and uncertainty, while the BI Rate affects MSMEs through credit costs, investment incentives, and access to formal financing. Financial inclusion and digital finance can moderate the impact of macroeconomic instability on MSMEs by improving access to working capital and reducing dependence on conventional lending channels. Previous studies on interest rates show that higher borrowing costs tend to reduce MSMEs' access to formal credit and limit business expansion, particularly for firms with limited collateral and financial capacity (Berisha et al., 2023; Troilo et al., 2025). Meanwhile, studies on inflation indicate that rising prices increase production costs, weaken purchasing power, and reduce MSME profitability and operational stability (Dhar et al., 2024; Singh et al., 2022).

Although prior studies have explored MSME performance from perspectives such as financial inclusion, digital transformation, market orientation, and entrepreneurship (Abduh et al., 2024; Febriansyah et al., 2024; Shama et al., 2024), relatively few studies have examined the combined long-run effects of inflation and interest rates on MSME development, particularly in Indonesia. Most existing studies focus on short-term impacts or internal business factors, leaving a gap in understanding how macroeconomic variables jointly influence MSME sustainability over time.

Based on the reviewed literature, inflation and interest rates are expected to influence MSME development both in the short run and in the long run. Inflation is expected to exert a stronger and more immediate influence because it directly affects operating costs and consumer demand. The BI Rate is expected to have a negative effect through borrowing costs, although the effect may be delayed or weakened by the prevalence of informal financing and alternative credit sources. Therefore, this study contributes to the literature by empirically examining the dynamic relationship among BI Rate, inflation, and MSME development using time-series analysis. The use of cointegration and VECM allows the study to distinguish between temporary fluctuations and long-term equilibrium relationships, thereby providing a stronger basis for policy recommendations related to macroeconomic stability, financial inclusion, and MSME resilience.

Based on the theoretical and empirical literature, macroeconomic variables such as interest rates and inflation are expected to influence MSME development through different transmission channels. Interest rates affect MSMEs primarily through the cost of capital and access to credit, while inflation influences operational costs, purchasing power, and market demand. Higher interest rates increase borrowing costs, which may discourage investment and limit business expansion, particularly for MSMEs that rely on external financing. Therefore, interest rates are expected to have a negative relationship with MSME development.

Inflation, on the other hand, directly affects MSMEs through rising input costs and declining consumer purchasing power. Persistent inflation can reduce profit margins, disrupt planning, and weaken demand, making it a critical constraint for MSME growth. Based on these arguments, the following hypotheses are proposed:

H1: The BI Rate has a negative effect on MSME development.

H2: Inflation has a negative effect on MSME development.

The conceptual model of this study illustrates the relationship between macroeconomic variables and MSME development. The BI Rate (interest rate) and inflation are treated as independent variables, while MSME development is the dependent variable.

$$Y=f(\text{BI Rate, Inflation})$$

BI Rate → MSME Development (negative effect expected)

Inflation → MSME Development (negative effect expected)

The conceptual framework of this study posits that MSME development is influenced by macroeconomic conditions, particularly interest rates and inflation. The BI Rate affects MSMEs through the cost of borrowing and access to formal financial institutions, while inflation affects MSMEs through input costs, pricing behavior, and consumer demand. These relationships are tested empirically using a time-series econometric framework to capture both short-run dynamics and long-run equilibrium relationships.

Methods

This study adopts a quantitative time-series econometric approach to examine both the long-term and short-term relationships between the BI Rate (the benchmark interest rate set by Bank Indonesia), inflation, and the development of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. The objective is to capture the equilibrium relationships and dynamic adjustments that characterize how macroeconomic policy variables influence MSME development over time.

The study utilizes secondary annual data spanning from 1997 to 2023, covering multiple economic cycles, monetary policy shifts, and structural transformations relevant to MSMEs. Data on the BI Rate were obtained from Bank Indonesia, inflation data (measured using the Consumer Price Index) from the Central Statistics Agency (BPS), and MSME development data from BPS, the Ministry of Cooperatives and MSMEs, and the Financial Services Authority (OJK). MSME development is proxied by the number of active MSMEs operating in Indonesia. This indicator was selected because it reflects the growth and sustainability of MSME activities over time and is consistently available across the observation period from 1997 to 2023. The use of the number of active MSMEs as a proxy is considered appropriate for capturing structural changes in the MSME sector, particularly in relation to macroeconomic conditions such as inflation and interest rate fluctuations. Although other indicators such as MSME contribution to GDP and productivity are also important, consistent long-term annual data for these indicators were limited during the study period MSMEs.

To examine the long-run relationships, this study employs a multi-step econometric approach. First, the Augmented Dickey-Fuller (ADF) unit root test is conducted to determine the stationarity properties of each variable. All variables are tested at level $[I(0)]$ and at first difference $[I(1)]$ to ensure the validity of subsequent econometric analysis. To specify the long-run equilibrium relationship, the following baseline model is formulated:

$$Y_t = \beta_0 + \beta_1 \text{BI Rate}_t + \beta_2 \text{Inflation}_t + \varepsilon_t$$

where Y_t represents MSME development, BI Rate_t denotes the benchmark interest rate, and Inflation_t represents the inflation rate. This equation captures the long-run relationship among the variables. Following the unit root test, the optimal lag length is determined using standard information criteria, including the Akaike Information Criterion (AIC) and Schwarz Criterion (SC), to ensure model stability and avoid over-parameterization.

Next, the Johansen cointegration test is applied to examine whether a long-run equilibrium relationship exists among the variables. Both the trace statistic and maximum eigenvalue statistic are used to determine the number of cointegrating equations. The presence of cointegration indicates that the variables move together in the long run despite short-term fluctuations. Given the existence of cointegration, the model is subsequently estimated using the Vector Error Correction Model (VECM), which allows for the analysis of both short-run dynamics and long-run equilibrium adjustments. The VECM specification can be expressed as follows:

$$\Delta Y_t = \alpha + \lambda ECT_{t-1} + \sum_{i=1}^k \gamma_i \Delta X_{t-i} + \varepsilon_t$$

where ECT_{t-1} is the error correction term derived from the long-run equation, representing the

speed of adjustment toward equilibrium after short-run shocks. The coefficient λ is expected to be negative and statistically significant, indicating convergence toward long-run equilibrium. To ensure the robustness of the model, several diagnostic tests are conducted, including tests for serial correlation, heteroskedasticity, and normality of residuals. In addition, model stability is evaluated using the CUSUM test to confirm that the estimated parameters remain stable throughout the sample period.

The theoretical framework underlying this study posits that macroeconomic stability, particularly through controlled inflation, and monetary accessibility, through moderate interest rates, are critical determinants of MSME development. Inflation is expected to affect MSMEs through cost pressures, purchasing power, and market demand, while the BI Rate influences MSMEs through credit costs and investment decisions. Therefore, this study provides a comprehensive empirical framework to assess how these macroeconomic variables jointly influence MSME performance in both the short run and long run.

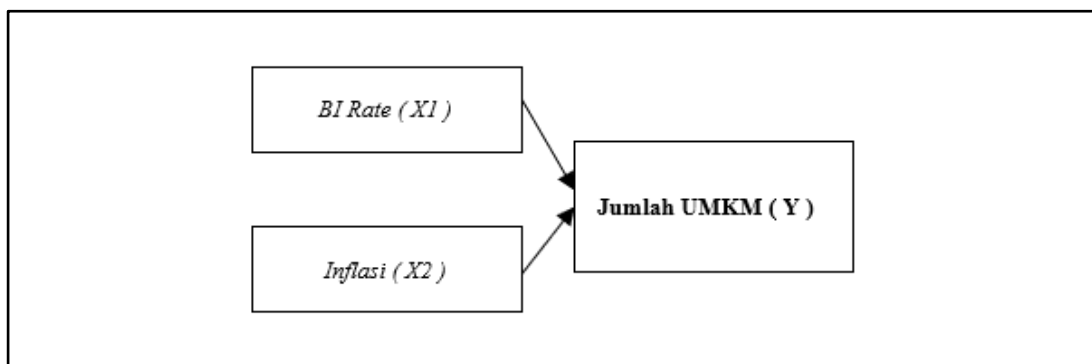


Figure 1. Theoretical Framework of the Impact of BI Rate and Inflation on MSME Development
 Source: Author (2026)

In conclusion, this methodology combines standard and advanced econometric techniques to analyze the interplay between macroeconomic policy variables and MSME development in Indonesia. The findings contribute to the empirical literature on MSME resilience in developing economies and offer insights for policymakers to design more inclusive and macro-sensitive interventions to foster MSME growth.

Result

This section presents the empirical findings from the estimation of the relationship between macroeconomic indicators BI Rate and inflation and the development of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. The analysis follows a structured sequence beginning with descriptive statistics, followed by unit root and cointegration tests, Vector Error Correction Model (VECM) estimation, and interpretation of long-run and short-run coefficients, including model stability and diagnostic testing. These results collectively validate the theoretical expectations and provide an empirical basis for understanding the dynamic linkages between monetary policy variables and MSME development over the study period (1997–2023).

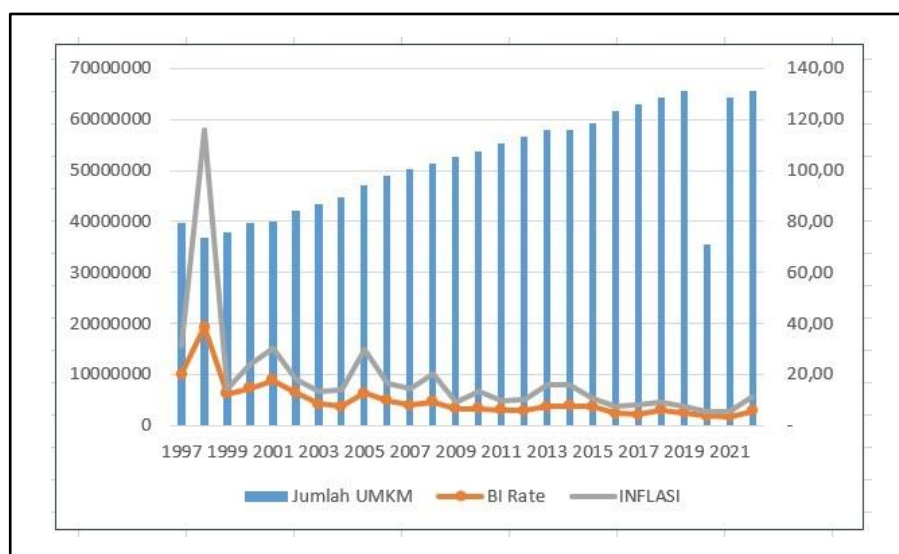


Figure 2. The MSME development, Inflation, and the BI Rate from 1997 to 2023
 Source: Author (2026)

Descriptive statistical analysis provides a foundational understanding of variable trends, levels of dispersion, and relative volatility throughout the sample period. As emphasized in prior literature, descriptive statistics can offer valuable insights into macroeconomic volatility and its implications for MSME development (Abduh et al., 2024b). In Indonesia, MSMEs contribute approximately 61.07% to GDP and employ around 64.2 million individuals, making them a critical sector in economic resilience and labor absorption. Over time, their development has mirrored the broader macroeconomic climate. For instance, periods of heightened inflation or rapid shifts in the BI Rate often coincide with either stagnation or contraction in MSME growth. This trend reflects the sensitivity of MSMEs to macroeconomic shocks, where inflation increases operational costs and interest rate hikes limit access to financing (Nyoman & Suasih, 2023; Rauf et al., 2023).

To ensure valid econometric modeling, the stationarity of all variables was first examined using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Table 1 presents the results, indicating that the MSME development variable (Y) and the BI Rate (X1) are non-stationary at level but become stationary after first differencing, confirming that both are integrated of order one [I(1)]. Conversely, the inflation variable (X2) is stationary at level, thus integrated of order zero [I(0)]. These results are consistent across both ADF and PP tests. The implication is a mixed order of integration, which aligns with expectations in developing economies where macroeconomic variables frequently exhibit unit root characteristics due to long-term exposure to shocks and policy shifts (Cruz et al., 2023; Nallabathula & Doraiswamy, 2023).

Table 1. Results of the Unit Root Test

Panel A: ADF					
Variable	@level; I(0)		@First Difference; I(0)		Remark
	t-statistic	Prob.	t-statistic	Prob.	
Y	-1.551824	0.4902	-5.661133	0.0001	I(1)
X1	-2.829755	0.0685	-4.398707	0.0031	I(1)
X2	-4.856551	0.0007	-5.822359	0.0002	I(0)

Panel B: PP					
Variable	@level; I(0)		@First Difference; I(0)		Remark
	t-statistic	Prob.	t-statistic	Prob.	
Y	-1.551824	0.4902	-5.661133	0.0001	I(1)
X1	-2.829755	0.0685	-4.398707	0.0031	I(1)
X2	-4.856551	0.0007	-5.822359	0.0002	I(0)

Source: Author (2026)

Given the stationarity results, a Johansen cointegration test was conducted to determine whether a long-run equilibrium relationship exists among the variables. Table 2 displays the findings, showing that the null hypothesis of no cointegrating relationship is rejected at the 5% significance level. The test identifies at least one cointegrating vector, confirming that despite the non-stationarity of the series, they move together in the long run. This supports the application of the VECM framework, as recommended in the literature when cointegration is established (Hiremath & Deb, 2021; Noerchoidah et al., 2025). The presence of cointegration also affirms that shocks to inflation or the BI Rate will, over time, induce adjustments in the MSME sector toward a stable long-run path.

Tabel 2. Results of the Johansen Cointegration Test

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.695475	27.34706	21.13162	0.0059
At most 1	0.416577	12.39338	14.26460	0.0967
At most 2 *	0.232664	60.91092	3.841465	0.0136

Source: Author (2026)

To reinforce the robustness of the long-run relationship, the Bounds Test was also applied, especially given the presence of I(0) and I(1) variables. Table 3 shows that the calculated F-statistic exceeds the upper bound critical value at the 5% significance level, confirming the presence of a long-run relationship. The dual confirmation from both Johansen and Bounds Tests adds methodological credibility to the findings.

Tabel 3. Bound Test Result

Test Statistic	Value	Signif.	I(0)	I(1)
Asymtotic: n=1000				
F-Statistic	6.758241	10%	2.63	3.35
		5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5.00

Source: Author (2026)

Long-run estimates were obtained using VECM. Table 4 displays the coefficients, which show that while both the BI Rate and inflation have expected directional effects, only inflation exhibits a statistically meaningful impact. Specifically, the coefficient for inflation is positive but not statistically significant in the long run at conventional levels ($p = 0.2019$), whereas the BI Rate shows a negative sign but with an even higher p-value (0.8847). Although statistical significance is limited, the directional interpretation suggests that inflation is more closely aligned with changes in MSME development over the long term.

Tabel 4. Long Run Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X1_BIRATE)	-84.278	570,679.30	-0.1477	0.8847
X2_INFLASI	279.408	208,687.50	1.34	0.2019
C	-958.325	1,424,826.00	-0.6726	0.5122

Source: Author (2026)

Table 5 provides the short-run dynamic estimates from the VECM. Here, the error correction term (ECT) is negative and statistically significant, confirming that the system adjusts to restore long-run equilibrium after short-term shocks. The ECT coefficient of approximately -1.05 indicates a relatively fast adjustment rate, meaning deviations from the long-run path are corrected in the subsequent periods. This confirms the existence of error correction mechanisms, as documented in prior studies using similar frameworks (Kumarasamy et al., 2024; Royal et al., 2023).

Within the short-run dynamics, several lags of the MSME development variable are significant, particularly the first and second lags, suggesting inertia in the sector’s response to macroeconomic fluctuations. For the BI Rate, the second lag is marginally significant, indicating delayed negative effects of interest rate changes on MSME development. In contrast, the inflation variable at its second lag is positively significant ($p = 0.0341$), which may reflect inflation-induced nominal growth effects rather than real economic improvement. This finding aligns with past literature that highlights the dual nature of inflation where moderate inflation can initially boost nominal revenues before eroding real purchasing power. From a practical perspective, these findings suggest that MSMEs need to adopt adaptive business strategies during periods of high inflation, such as improving cost efficiency, adjusting pricing strategies, diversifying suppliers, and strengthening digital marketing channels to maintain customer demand. MSMEs may also reduce vulnerability to inflationary shocks by increasing financial literacy and utilizing alternative financing mechanisms, including digital financial services and microfinance institutions. (Ismanto et al., 2023).

Tabel 5. VECM Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
D(Y_UMKM(-1))	-1.051263	0.238161	-4.414080	0.0017
D(Y_UMKM(-2))	-1.185353	0.339307	-3.493449	0.0068
D(Y_UMKM(-3))	-4.423246	3.473945	-1.273263	0.2342
D(Y_UMKM(-4))	-4.113386	2.499270	-1.645835	0.1342
D(X1_BIRATE)	-96086.79	1457159	-0.065914	0.9489
D(X1_BIRATE(-1))	2434165	1631703	1.491794	0.1699
D(X1_BIRATE(-2))	-2654170	1237710	-2.144420	0.0606
D(X1_BIRATE(-3))	886961.8	575335.0	1.541644	0.1576
X2_INFLASI	-56216.96	875553.3	-0.064207	0.9502
X2_INFLASI(-1)	-446721.8	959135.1	-0.465755	0.6525
X2_INFLASI(-2)	2431722	974260.1	2.495968	0.0341
C	2329022	7051042	0.330309	0.7487
R-squared	0.767986		Mean dependent var	1214946
Adjusted R-squared	0.484413		S.D. dependent var	9318637
S.E. of regression	6691193		Akaike info criterion	34.56064
Sum squared resid	4.03E+14		Schwarz criterion	35.16291
Log likelihood	-350.9434		Hannan-Quinn criter.	34.69558
F-statistic	2.708246		Durbin-Watson stat	2.913768
Prob(F-statistic)	0.072795			

Source: Author (2026)

Figure 3 presents the CUSUM stability test, used to evaluate the constancy of model parameters over time. The CUSUM line remains well within the 5% significance bounds, indicating that the model is structurally stable throughout the sample period. This is essential for ensuring that the estimated relationships are not driven by structural breaks or regime shifts.

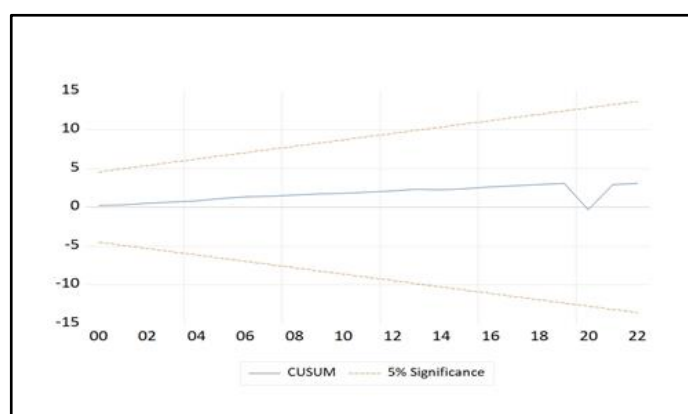


Figure 3. CUSUM Test

Source: Author (2026)

Finally, diagnostic tests were conducted to validate the model’s robustness. Table 6 summarizes the outcomes. The serial correlation test, heteroskedasticity test, and Jarque–Bera normality test all indicate that the model residuals are well-behaved. With p-values above 0.05, none of these diagnostics show signs of misspecification, suggesting that the VECM model is suitable for inference and forecasting.

Tabel 6. Diagnostic Test Results

Test for Serial Correlation			
F-stat	2.861771	Probability	0.1235
Heteroskedasticity Test			
F-stat	2.476023	Probability	0.0920
Jarque–Bera			
t-stat	5.019083	Probability	0.0831

Source: Author (2026)

The overall empirical results confirm several key findings. First, there is clear evidence of a long-run relationship between BI Rate, inflation, and MSME development. Second, inflation appears to exert a more pronounced effect than interest rates in both the long- and short-run, a pattern consistent with existing literature (Febriansyah et al., 2024b; Sundaro et al., 2024). Third, the significant error correction mechanism underscores the ability of the MSME sector to gradually adjust to macroeconomic shocks, reaffirming its adaptive capacity amid volatility.

From an economic interpretation standpoint, these results suggest that policy interventions targeting MSMEs must account for the timing and magnitude of macroeconomic shocks. When monetary authorities raise interest rates, MSMEs face increased borrowing costs, which constrain access to capital for investment and growth (Cruz et al., 2023; Troilo et al., 2025a). Simultaneously, inflationary pressures heighten operational costs and reduce profitability, particularly for smaller firms with thin margins and limited pricing power. These challenges are exacerbated in the absence of targeted financial support mechanisms or fiscal buffers.

Furthermore, the findings reinforce the argument that macroeconomic instability undermines MSME resilience. As noted by Ekayanthi et al. (2024) and Charfeddine et al. (2024), frequent economic shocks necessitate agility and innovation in MSME strategies, particularly in terms of digital adoption, financial literacy, and product diversification. The empirical results presented here complement this literature by quantifying the macro-financial dynamics at play and highlighting the importance of coordinated policy frameworks that stabilize inflation while maintaining affordable credit conditions.

In summary, the results of this study confirm the theoretical expectation that macroeconomic variables significantly influence the MSME development. The established long-run relationships, significant error correction mechanism, and robust diagnostics collectively provide strong empirical support for policy initiatives that aim to improve macroeconomic stability as a foundation for MSME sustainability and growth in Indonesia.

Discussions

This study provides new empirical evidence on the dynamics between the BI Rate and inflation and their effects on the development of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. The Vector Error Correction Model (VECM) was used to examine both long-term and short-term impacts.

The first hypothesis posited that the BI Rate has a negative effect on MSME development in the long term. Although the long-run coefficient for the BI Rate was negative, it was not statistically significant. However, the short-run model showed a statistically significant lagged effect of the BI Rate, indicating delayed impacts of interest rate changes on MSMEs. This supports prior literature suggesting

that high interest rates reduce access to credit and limit investment and growth for small businesses (Kumarasamy et al., 2024). The modest impact may be due to the reliance of many MSMEs on informal or non-bank sources of financing, insulating them from formal credit constraints (Cruz et al., 2023). Despite this, the negative relationship reinforces the importance of targeted interventions, such as subsidized credit or credit guarantees, to alleviate the impact of interest rate fluctuations, especially for MSMEs relying on formal financing.

The second hypothesis, stating that inflation negatively affects MSME development, was strongly supported. The short-run model revealed that inflation significantly affects MSME performance, particularly at the second lag. This finding aligns with earlier research highlighting how inflation disrupts business operations, pricing strategies, and consumer demand (Saxena & Sahoo, 2022; Singh et al., 2022). Inflation increases input costs, reduces real income, and depresses demand, impairing MSMEs' ability to plan, invest, and maintain stable profit margins. Compared to interest rate shocks, inflation's impact is more immediate and pervasive, affecting all aspects of MSME operations. These findings reinforce the view that inflation is a more dominant constraint on MSME sustainability than interest rates, particularly in economies with weak financial buffers (Harahap et al., 2024; Shama et al., 2024a).

The error correction mechanism confirms that MSMEs adjust to inflationary shocks over time, but the speed of adjustment also underscores their vulnerability to ongoing macroeconomic volatility. These results emphasize that inflation control is crucial for supporting MSMEs, particularly in developing countries.

Policymakers and MSME stakeholders should focus on ensuring macroeconomic stability, especially price stability, to reduce uncertainty and improve MSME growth prospects. Expanding alternative financing options, such as peer-to-peer lending, microfinance institutions, and digital credit channels, can help buffer MSMEs against macroeconomic shocks. Additionally, clear communication of interest rate and inflation targets can reduce uncertainty and strengthen the entrepreneurial ecosystem, fostering resilience among MSMEs.

The findings of this study also suggest the importance of more targeted policy interventions for MSMEs affected by inflationary pressures. Governments may consider providing fiscal incentives such as temporary tax reductions, subsidized credit schemes, energy subsidies, or working capital assistance to help MSMEs maintain operational stability during periods of high inflation. In addition, strengthening financial literacy and digital financial inclusion programs can improve MSMEs' adaptive capacity in responding to macroeconomic volatility.

Beyond Indonesia, these findings may also provide important insights for other developing countries with similar economic structures, where MSMEs constitute a major source of employment and economic activity. In economies characterized by limited financial access and high vulnerability to inflationary shocks, maintaining macroeconomic stability and expanding inclusive financing mechanisms are essential for supporting MSME sustainability and long-term economic resilience.

Conclusion

This study examines the long- and short-term impacts of interest rate policy (BI Rate) and inflation on MSMEs in Indonesia. The findings show that inflation significantly affects MSME development in the short run, while the BI Rate has a relatively limited influence in both the short and long term. The error correction mechanism indicates that MSMEs gradually adjust to macroeconomic disequilibrium at varying speeds. Inflation emerges as the dominant constraint, directly influencing production costs, consumer demand, and business stability.

The study highlights the importance of inflation-targeted policies and inclusive financial support mechanisms to strengthen MSME resilience against macroeconomic shocks. Policymakers may consider implementing more concrete interventions such as subsidized credit programs, temporary tax incentives, energy subsidies, and working capital assistance for MSMEs affected by inflationary pressures. In addition, expanding digital financing technologies, including peer-to-peer lending platforms, fintech-based microcredit, and digital payment ecosystems, may help MSMEs improve financial accessibility and operational flexibility during periods of economic instability.

This study also emphasizes the need for integrated policy frameworks that combine

macroeconomic stability, financial inclusion, and digital transformation to support sustainable MSME development. Furthermore, the findings provide a foundation for future research to explore additional moderating or mediating variables, such as digital inclusion, financial literacy, institutional quality, or regulatory frameworks, in explaining the relationship between macroeconomic variables and MSME performance. Future studies may also employ panel data or comparative cross-country approaches to provide broader insights into MSME resilience in developing economies.

References

- Abduh, T., Remmang, H., Abubakar, H., & Karim, A. (2024). Entrepreneurship and MSME Market Orientation Toward Creative Industries: Society Era 5.0 in Makassar City. *Asian Economic and Financial Review*, 14(2), 76–87. <https://doi.org/10.55493/5002.v14i2.4964>
- Alfarizi, M., & Sari, R. K. (2024). Interconnection of Green Knowledge Management and Sustainable Business Capabilities: An Investigation of the Culinary MSME Sector in the Food Waste Emergency Zone of Indonesia. *Iop Conference Series Earth and Environmental Science*, 1324(1), 12072. <https://doi.org/10.1088/1755-1315/1324/1/012072>
- Anatan, L., & N. (2023). Micro, Small, and Medium Enterprises' Readiness for Digital Transformation in Indonesia. *Economies*, 11(6), 156. <https://doi.org/10.3390/economies11060156>
- Berisha, A., Hoti, A., & Hoti, H. (2023). An Empirical Study on Micro, Small, and Medium Enterprises Access to Finance in Kosovo: A Survey Based Analysis. *Multidisciplinary Science Journal*, 6(5), 2024068. <https://doi.org/10.31893/multiscience.2024068>
- Charfeddine, L., Umlai, M. I., & El-Masri, M. (2024). Impact of Financial Literacy, Perceived Access to Finance, ICT Use, and Digitization on Credit Constraints: Evidence From Qatari MSME Importers. *Financial Innovation*, 10(1). <https://doi.org/10.1186/s40854-023-00557-4>
- Cruz, N. A. D., Villanueva, A. C. B., Tolin, L. A. C., Disse, S., Lensink, R., & White, H. (2023). PROTOCOL: Effects of Interventions to Improve Access to Financial Services for Micro-, Small- and Medium-sized Enterprises in Low- and Middle-income Countries: An Evidence and Gap Map. *Campbell Systematic Reviews*, 19(3). <https://doi.org/10.1002/cl2.1341>
- Dhar, S., Zaman, K. A. U., & Dhar, B. K. (2024). <sc>MSMEs</Sc> and Economic Growth: Fostering an Entrepreneurial Ecosystem in Bangladesh for Sustainable Development. *Business Strategy & Development*, 7(3). <https://doi.org/10.1002/bsd.2423>
- Ekayanthi, D., Lubis, D. P., Sumardjo, S., & Sarwoprasodjo, S. (2024). Communication Strategies to Strengthen the Resilience of Micro, Small and Medium-Sized Enterprises During the COVID-19 Pandemic: A Systematic Review. *Multidisciplinary Reviews*, 8(5), 2025137. <https://doi.org/10.31893/multirev.2025137>
- Febriansyah, A., Syafei, M., Narimawati, U., Chochole, T., & Stakić, A. J. (2024). How Important Is Financial Inclusion for the Performance of MSMEs? *Australasian Accounting Business and Finance Journal*, 18(5). <https://doi.org/10.14453/aabfj.v18i5.04>
- Harahap, Z. I., Lubis, S. N., Erlina, E., & Arintonang, E. (2024). The Impact of Financial Literacy, Inclusion, and Access on Msme Growth and Welfare in North Sumatra: A Mediating Role of Business Growth. *Journal of Ecohumanism*, 3(7), 3271–3283. <https://doi.org/10.62754/joe.v3i7.4456>
- Hiremath, G. S., & Deb, S. (2021). Export Performance of MSMEs in India: Is Credit Constraint an Invisible Gorilla? *The Indian Economic Journal*, 70(1), 138–157. <https://doi.org/10.1177/00194662211062417>
- Ismanto, H., Wibowo, P. A., & Shofwatin, T. D. (2023). Bank Stability and Fintech Impact on MSMEs' Credit Performance and Credit Accessibility. *Banks and Bank Systems*, 18(4), 105–115. [https://doi.org/10.21511/bbs.18\(4\).2023.10](https://doi.org/10.21511/bbs.18(4).2023.10)
- Kumarasamy, D., Singh, P., & Sharma, A. (2024). Financial Accessibility and MSME's Labour Productivity: Evidence From Developing Countries. *Indian Growth and Development Review*, 17(2), 186–206. <https://doi.org/10.1108/igdr-08-2023-0115>
- Mastintianto, D., Meutia, E., Wijaya, L., Ng, K. C., & Phungpumkaew, H. (2025). Crafting Digital Pathways. *International Journal of Asian Business and Information Management*, 16(1), 1–18. <https://doi.org/10.4018/ijabim.371421>
- Nallabathula, H. R., & Doraiswamy, A. (2023). The Impact of Entrepreneurial Orientation on Firm Performance: Exploring the Moderating Influence of Trust and Organizational Commitment in the Indian IT/ITE Sector. *Multidisciplinary Science Journal*, 6(10), 2024206. <https://doi.org/10.31893/multiscience.2024206>
- Noerchoidah, N., Suhardiyah, M., Nurcahyanie, Y. D., & Sawitri, A. P. (2025). Optimization of Digital Literacy Knowledge Sharing and Human Capital on Digital Economy for MSMEs Business Sustainability. *International Journal of Human Capital and Information Technology Professionals*, 16(1), 1–18. <https://doi.org/10.4018/ijhctip.368715>

- Nyoman, N., & Suasih, R. (2023). Mitigation Policies for Fashion Smes Affected by the Covid-19 Pandemic. *Qas*, 24(194). <https://doi.org/10.47750/qas/24.194.31>
- Ratnawati, R., Rokhman, M. T. N., Rochayatun, S., Meldona, & Rahayu, Y. N. (2023). Financial Attitude and Financial Performance of Export MSMEs: Financial Well-Being as a Mediating. *International Journal of Applied Economics Finance and Accounting*, 16(1), 77–85. <https://doi.org/10.33094/ijaefa.v16i1.901>
- Rauf, R., Prayuda, R., & Munaf, Y. (2023). Model of Government Development for MSMEs Through One Village One Product (OVOP) Concept by the Cooperatives and MSMEs Office in Rokan Hilir Regencym. *International Journal of Sustainable Development and Planning*, 18(2), 635–640. <https://doi.org/10.18280/ijstdp.180234>
- Royal, S., Singh, K., & Chander, R. (2023). MSME Promotion, Inequality and Decentralized Wealth Creation: A Strategic Policy Perspective. *Journal of International Commerce Economics and Policy*, 14(03). <https://doi.org/10.1142/s1793993323500163>
- Said, M., & Soi, A. B. (2025). *Expanding SME Product Export Market Through Digital Innovation in Indonesia*. 253–270. <https://doi.org/10.4018/979-8-3693-3936-7.ch012>
- Saifurrahman, A., & Kassim, S. (2023). Regulatory Issues Inhibiting the Financial Inclusion: A Case Study Among Islamic Banks and MSMEs in Indonesia. *Qualitative Research in Financial Markets*, 16(4), 589–617. <https://doi.org/10.1108/qrfm-05-2022-0086>
- Saxena, V., & Sahoo, S. (2022). What Drives Corporate Cash Holdings in MSMEs?: Evidence From India. *Managerial Finance*, 49(2), 291–314. <https://doi.org/10.1108/mf-04-2022-0184>
- Shama, S., Mazhar, S. S., Mittal, P., Rizvi, A. F., Khan, F. S., & Rehman, A. u. (2024). Exploring the Interplay of Entrepreneurs' Awareness, Perception and Intention in Driving Digitalization for Msmes: A Focused Insight Into Sidbi's Role. *Financial and Credit Activity Problems of Theory and Practice*, 3(56), 59–73. <https://doi.org/10.55643/fcaptop.3.56.2024.4374>
- Singh, S., Chamola, P., Kumar, V., Verma, P., & Makkar, N. (2022). Explaining the Revival Strategies of Indian MSMEs to Mitigate the Effects of COVID-19 Outbreak. *Benchmarking an International Journal*, 30(1), 121–148. <https://doi.org/10.1108/bij-08-2021-0497>
- Sundaro, H., Rudiarto, I., Handayani, W., & Febriyanto, A. F. (2024). Micro, Small, and Medium Enterprises (MSME) to Promote Sustainability of Urban Kampongs and Cultural Landscape in Semarang City-Indonesia: An Examination on the Typology. *Iop Conference Series Earth and Environmental Science*, 1394(1), 12014. <https://doi.org/10.1088/1755-1315/1394/1/012014>
- Talip, S. N. S. H., & Wasiuzzaman, S. (2023). Influence of Human Capital and Social Capital on MSME Access to Finance: Assessing the Mediating Role of Financial Literacy. *The International Journal of Bank Marketing*, 42(3), 458–485. <https://doi.org/10.1108/ijbm-04-2023-0214>
- Tita, A. F., & Opperman, P. (2023). Financial Inclusion and Performance of MSMEs in Eswatini. *International Journal of Social Economics*, 50(11), 1551–1567. <https://doi.org/10.1108/ijse-10-2020-0689>
- Troilo, M., Freeman, N., & Abe, M. (2025). Policies to Address Supply-Side Issues in MSME Finance: A Global Compilation. *The Journal of Entrepreneurship*, 34(1), 7–32. <https://doi.org/10.1177/09713557251315238>