



The Impact of MSME's on Employment, Investment, and Income

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North Sumatra, a key economic region in Indonesia outside of Java, continues to face persistent challenges such as high unemployment, the dominance of the informal sector, and uneven economic growth. Within this context, Micro, Small, and Medium Enterprises (MSMEs) serve as a cornerstone of the regional economy, particularly through their role in labor absorption and income generation. Despite their significance, MSMEs in North Sumatra still face substantial obstacles, including limited access to financing, inconsistent investment growth, and inadequate policy implementation—factors that hinder their full potential in driving inclusive development. This study examines the dynamic relationship between MSME growth, workforce participation, and Gross Regional Domestic Product (GRDP) in North Sumatra, employing a simultaneous equation model with time-series data from 2009 to 2023. The Two-Stage Least Squares (2SLS) method addresses endogeneity and simulates the effects of policy interventions projected for the 2025–2030 period. The findings indicate that MSME development is significantly influenced by policy instruments such as tax incentives and minimum wage regulations. Increases in wages and tax reductions enhance labor absorption, stimulate MSME performance, and promote GRDP growth. The study provides practical policy insights for strengthening the resilience and sustainability of MSMEs within North Sumatra's evolving economy.

INTRODUCTION

Economic growth, typically measured by Gross Regional Domestic Product (GRDP), reflects the expansion of a region's production of goods and services over time. As a key indicator, GRDP assesses economic performance and the effectiveness of development policies (Berlianantiya, 2017). However, sustaining growth requires collaborative efforts among governments, businesses, and communities to design inclusive strategies that address structural challenges and harness available opportunities (Safitri *et al.*, 2020).

The Micro, Small, and Medium Enterprises (MSME) sector is one of the most significant contributors to regional economic development. MSMEs promote economic resilience by facilitating innovation, generating diverse employment opportunities, and supporting equitable development. By nature, MSMEs are agile and capable of adapting to changing market conditions, often serving as a buffer against economic shocks. These enterprises are instrumental in fostering socio-economic stability in developing regions, particularly in North Sumatra, where MSMEs have emerged as a central driver of economic transformation. According to Dimas *et al.* (2021), MSMEs contribute to economic stability and growth by

reducing poverty, creating employment, and promoting diversification. Their resilience, adaptability, and capacity to operate across various sectors make them indispensable to the regional economy (Azulaidin, 2025).

In North Sumatra, the importance of MSMEs as a pillar of economic growth is evident. Over the past decade, the number of MSMEs in the province has increased steadily, highlighting their growing role in employment generation and economic diversification (Novitasari, 2022). In 2023, North Sumatra recorded a 20.23% increase in MSMEs, indicating the sector's expanding influence and potential to drive future economic growth. This increase is partly attributed to the implementation of Law No. 20 of 2008, which regulates MSME operations and seeks to create a more supportive business environment, particularly for small and medium-sized enterprises.

This policy has proven effective in advancing the regional economy by strengthening the capacity of MSMEs to operate, innovate, and expand. In addition, the government and private sector collaboration has played a key role in supporting MSME growth through improved market access, training programs, and financial support (Anggraeni & Haryatiningsih, 2022). These joint efforts are essential for establishing a sustainable and stable economic ecosystem.

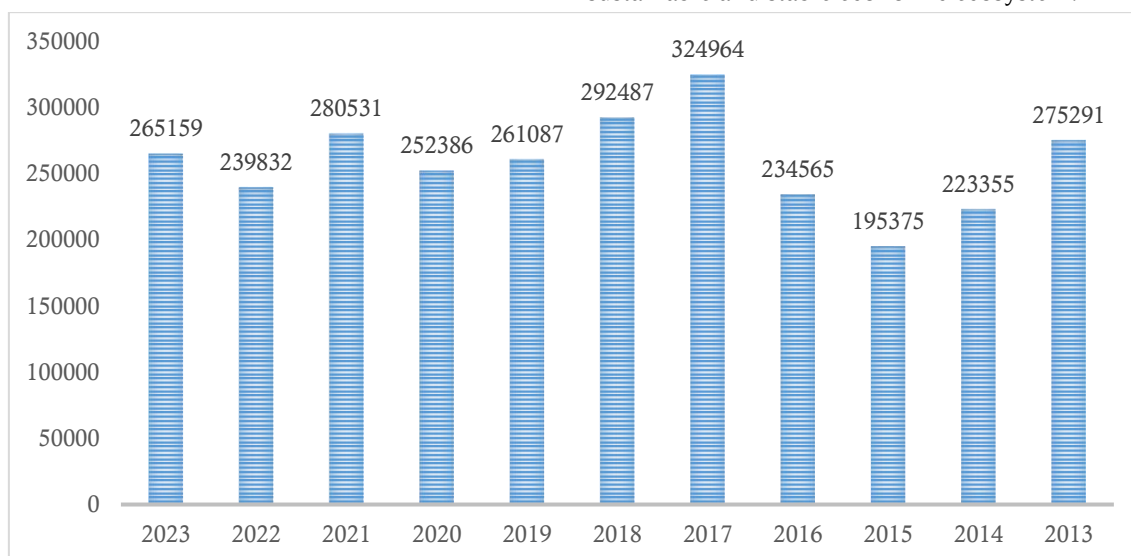


Figure 1. Number of Micro, Small, and Medium Enterprises (in Units of People)

Source: Badan Pusat Statistik, 2024

This research's urgency lies in the need to understand and strengthen the role of Micro, Small, and Medium Enterprises (MSMEs) in addressing persistent employment and income disparities at the regional level, particularly in provinces such as North Sumatra. In recent years, North Sumatra has consistently recorded a relatively high open unemployment rate (*Tingkat Pengangguran Terbuka*, TPT), reaching 5.92% in 2022, according to national labor statistics. Concurrently, the province's labor market is characterized by a substantial informal sector, with over 60% of MSMEs operating informally. This dual challenge—high unemployment and widespread informality—renders the region especially vulnerable to socio-economic shocks, while simultaneously highlighting the strategic role of MSMEs as a platform for inclusive economic participation and job creation.

North Sumatra was selected as the focus of this study because it is one of the most populous and economically dynamic provinces outside of Java. Its diverse economy—encompassing agriculture, manufacturing, and trade—offers a representative context for analyzing the impact of MSME-related policies on labor absorption, investment, and income generation. Importantly, North Sumatra serves as a microcosm of broader national development dynamics, making the findings from this study potentially applicable to MSME policy strategies across other Indonesian regions. The province's strategic location—supported by the Port of Belawan and extensive inter-regional trade networks—further underscores the economic significance of MSMEs in this area.

The role of MSMEs in North Sumatra is particularly evident in their capacity to absorb labor, with employment in the sector increasing yearly. Between 2010 and 2023, MSME-related labor absorption grew by 3.5% in 2023, underscoring the sector's substantial contribution to regional employment (Figure 1). This positive trend is especially crucial in mitigating unemployment, ensuring that the benefits of economic growth are more equitably distributed across various societal segments, including informal and marginalized labor groups. Since

formal employment creation has not always kept pace with population growth, MSMEs serve as a critical buffer, absorbing surplus labor while fostering grassroots economic activity.

Policy frameworks such as Bank Indonesia Regulation No. 14/22/PBI/2012 have played a pivotal role in shaping the financial landscape for MSMEs. This regulation requires that at least 20% of total credit disbursed by financial institutions be allocated to MSMEs, thereby ensuring access to capital essential for their growth and expansion. Nevertheless, despite such policy instruments, MSMEs continue to encounter persistent challenges in obtaining adequate financing. A significant portion of MSME funding originates from personal capital or informal sources, often insufficient to support meaningful business development. As a result, many MSMEs pursue external financing such as bank loans, but face high rejection rates due to a lack of collateral, weak financial documentation, and limited financial literacy (Suaib et al., 2023).

Investment remains a key determinant of MSME growth and regional economic development. Investment in the sector increases production capacity, enhances operational efficiency, and facilitates job creation. In 2018, for example, investment in North Sumatra's MSME sub-sector rose significantly by 8.04%, reflecting strong optimism about the sector's future. However, this upward trend was disrupted by the COVID-19 pandemic, which led to a 3.77% decline in investments in 2020. This fluctuation demonstrates the vulnerability of MSMEs to external shocks and emphasizes the importance of designing adaptive and resilient investment policies that support MSMEs during periods of crisis.

Labor, as an essential element of economic development, directly influences the productivity and sustainability of MSMEs. In many cases, the persistent rise in population is not matched by a corresponding increase in formal employment opportunities, exacerbating labor-related challenges in economic development (Sari et al., 2021). Labor dynamics within MSMEs are complex and multifactorial, shaped by variables such as investment levels, policy incentives,

market demand, and productivity trends. Although increased investment typically correlates with higher employment, this relationship is non-linear and can be moderated by structural conditions, including labor regulations, market rigidities, and education mismatches.

This study is therefore timely and essential in its attempt to explore the implications of MSME policies on workforce dynamics, investment behavior, and income levels in North Sumatra Province. Specifically, the objectives of this research are twofold: (1) to identify and analyze the key factors influencing workforce participation, MSME performance, and income distribution in the province, and (2) to forecast the potential impact of MSME policies on labor absorption, investment growth, and income from 2025 to 2030.

A key novelty of this study lies in applying a Two-Stage Least Squares (2SLS) estimation model to empirically investigate these relationships. The 2SLS model is particularly relevant in this context due to the likely presence of endogeneity problems, especially between variables such as labor participation and investment, which may be simultaneously determined. Traditional regression approaches may yield biased estimates in the presence of such reverse causality or omitted variable bias. Using 2SLS allows for incorporating instrumental variables to obtain more consistent estimators, thereby offering stronger empirical validity in modeling the structural relationships among MSME-related variables in North Sumatra.

This study aims to produce meaningful insights and actionable policy recommendations that inform government strategies, development agencies, and MSME stakeholders by integrating regional economic theory, empirical policy analysis, and robust quantitative modeling. It contributes to Indonesia's broader discourse on inclusive economic growth and sustainable development. The findings are expected to strengthen the regional policy framework and provide a replicable model for other provinces seeking to leverage MSMEs as catalysts for development (Novitasari, 2022).

RESEARCH METHODS

In the context of this research, a model is commonly defined as a simplified representation or abstraction of a system, concept, or phenomenon that facilitates understanding, analysis, and prediction (Koutsoyiannis, 1977). Econometric models, as described by Ekananda (2019), are a specific type of algebraic model that incorporates stochastic elements, allowing them to capture the uncertainty and variability in real-world systems. These models are beneficial when studying the relationships between different economic variables, especially in complex settings like regional economic analysis. By carefully constructing an econometric model based on existing frameworks and a thorough literature review, this study aims to model and predict the impact of various factors on the economic dynamics of North Sumatra Province.

The key variables in this study include investment, per capita income, micro, small, and medium enterprises (MSMEs), and the Gross Regional Domestic Product (GRDP) of North Sumatra from the previous year. These variables are expected to influence the province's current GRDP. The following equation can represent the econometric model:

$$GRDP_t = a_0 + a_1 INV_t + a_2 PDK_t + a_3 MSMEs_t + a_4 PDRB_{t-1} + \mu_1 \dots \dots \dots (1)$$

According to equation one, investment parameters (INV_t), per capita income per year (PDK_t), micro, small, and medium enterprises ($MSMEs_t$), and last year's gross regional domestic product ($GRDP_{t-1}$) have a positive influence on gross regional domestic product ($GRDP_t$).

In the previous year, several exogenous variables were estimated to affect North Sumatra Province micro, small, and medium enterprises (MSMEs), including taxes, workforce, gross regional domestic product, and MSMEs.

$$MSMEs_t = b_0 + b_1 PJ_t + b_2 AK_t + b_3 GRDP_t + b_4 MSMEs_{t-1} + \mu_2 \dots \dots \dots (2)$$

The second, micro, small, and medium enterprises equation is hypothesized to be

negative towards taxes (PJ_t). Conversely, it is hypothesized to be positive towards the labor force (AK_t), gross regional domestic product ($GRDP_t$), and micro, small, and medium enterprises last year ($MSMEs_{t-1}$). The variables expected to influence the workforce of North Sumatra Province are the regional minimum wage of North Sumatra Province, the population of North Sumatra Province, MSMEs, and the workforce from the previous year. The exogenous variables that influence are as follows:

$$AK_t = c_0 + c_1UMR_t + c_2JPP_t + c_3MSMEs_t + c_4AK_{t-1} + \mu_3 \dots\dots\dots(3)$$

The labor force equation (AK_t) is hypothesized to have a positive relationship with population (JPP_t), regional minimum wage (UMR_t), micro, small, and medium enterprises ($MSMEs_t$), and the previous year's labor force (AK_{t-1}). These variables are expected to influence labor dynamics by shaping both the supply and demand sides of the labor market. An increase in population typically leads to a larger labor force, while higher regional minimum wages can incentivize labor force participation. Similarly, the presence and growth of MSMEs contribute to labor absorption, and the persistence of labor force trends from the previous year often carries forward into the current period.

Gujarati (2003) emphasized that model identification is a critical component of econometric analysis, especially in the context of simultaneous equation models (SEMs). It ensures that each equation in the system is appropriately specified and the variables are correctly linked, allowing for valid interpretation and estimation. A model is considered identified when the number of endogenous variables equals the number of equations, a condition that permits the derivation of consistent and unbiased estimates derivation.

Within this framework, endogenous variables (G) are those whose values are determined within the system of equations. Each equation contains a subset of endogenous variables (g) that must be logically related to the others in the system. Predetermined variables (K), which include

exogenous variables and lagged endogenous variables, serve as inputs that influence outcomes without being contemporaneously affected by them. A subset of these predetermined variables (k) is specific to each equation, providing additional structure and ensuring that identification conditions are met.

$$(G-g) + (K-k) > (G-1) \text{ or } (K-k) > (g-1) \dots\dots\dots(4)$$

The impact model of SMEs includes three structural equations: investment, income, and employment in North Sumatra. This model has five current endogenous variables, three lagged endogenous variables, and three exogenous variables.

The impact model of MSMEs includes three main structural equations: investment, income ($GRDP$), and employment (workforce) in North Sumatra. This model considers five endogenous current variables, three endogenous lag variables, and three exogenous variables. By incorporating these variables, the model provides a comprehensive understanding of the factors influencing MSME performance and their role in driving economic growth, employment generation, and regional income distribution. This research adopts a simultaneous equation modeling approach to estimate the relationships between investment, workforce dynamics, MSME performance, and regional economic growth. Using a system of equations, this model captures the interdependencies between key economic variables, offering valuable insights into the effects of policy changes and external factors on MSME growth and employment outcomes in North Sumatra.

RESULTS AND DISCUSSION

This study analyzed the impact of Micro, Small, and Medium Enterprises (MSMEs) on employment, investment, and income in North Sumatra Province using a simultaneous equation model (SEM) estimated with the Two-Stage Least Squares (2SLS) method. The results of model identification confirm that the model is over-identified, meeting the criteria for identification as outlined by Gujarati (2003). The

endogenous variables of Gross Regional Domestic Product (GRDP), MSMEs, and the workforce (AK), along with the exogenous variables such as regional minimum wage (UMR), per capita income (PDK), taxes (PJ), and population (JPP), satisfy the over-identification condition, confirming that the model is suitable for estimation and analysis.

Table 1. Identification Impact Model of SMEs includes three structural equations: Investment, Income, and Employment in North Sumatra.

No	Equality	M	K-M	G-1	Decision	
1	$GRDP_t = a_0 + a_1 INV_t + a_2 PDK_t + a_3 MSME_{st} + a_4 GRDP_{t-1}$	5	4	>	2	over
2	$MSME_{st} = b_0 + b_1 PJ_t + b_2 AK_t + b_3 GRDP_t + b_4 MSME_{st-1}$	5	4	>	2	over
3	$AK_t = c_0 + c_1 UMR_t + c_2 JPP_t + c_3 MSME_{st} + c_4 AK_{t-1}$	5	4	>	2	over

Source: Processed data, 2024

The model was estimated using secondary data from North Sumatra Province from 2006 to 2023, sourced from the Central Statistics Agency, the Ministry of Manpower and Transmigration, the National Development Planning Agency, and the Investment Coordinating Board. The final model specification included only the most relevant and statistically significant variables, and several variables were excluded due to lack of significance or misalignment with the hypotheses.

The estimation results for the GRDP equation (Table 2) show that investment (INV), per capita income (PDK), the number of MSMEs, and last year's GRDP have a positive and significant impact on the current GRDP in North Sumatra. Specifically, (a) a 10-unit increase in MSMEs leads to a 7.8% increase in GRDP, (b) a 10-unit increase in investment results in a 1.9% increase in GRDP, (c) a 10-unit increase in per capita income contributes to a 0.8% rise in GRDP, and (d) an increase of 10

units in last year's GRDP leads to a 4.3% rise in current GRDP.

These findings emphasize the significant role of investment, MSMEs, and historical economic performance in shaping regional economic outcomes. The coefficient of determination ($R^2 = 0.9371$) confirms that the model explains 93.71% of the variation in GRDP, and the F-statistic value (Prob > F = 0.0001) indicates that the explanatory variables collectively and significantly account for the variation in GRDP.

Elasticity analysis was conducted to assess the responsiveness of GRDP to changes in explanatory variables. In the short term, the elasticity of both investment and MSMEs was inelastic, meaning that their responses to changes in explanatory factors were limited. However, in the long term, these variables exhibit elastic behavior, indicating a more significant response to changes in GRDP. This suggests that sustained investment and MSME growth are critical for long-term economic resilience and growth.

Table 2. Results of the Parameter Estimation of the Gross Regional Domestic Product Equation of MSMEs in North Sumatra Province, 2015-2023.

No	Variable	Estimation Parameters	Standard Error	Prob. t	Real level	Elastisitas SR	Elastisitas LR
1	GDRP						
	Interp	-4.645281	26.671636	0.8321			
	INV	0.192934	0.042155	-0.0007	**	0.45	1.67
	PDK	0.089885	0.049785	-0.0029	**	0.27	0.91
	MSMEs	0.786219	0.04021	0.0522		0.34	1.87
	LGRDP	0.436816	0.145663	-0.0062	**	0.33	0.98
$R^2 = 0.9371$; Adj. R-SQ = 0.9266; DW = 2.018 Prob> F = 0.0001							

Table 3 presents the results of the MSME equation, which explores the factors influencing the performance of MSMEs in North Sumatra. The results show a positive relationship between MSMEs and key explanatory variables such as regional taxes (PJ), the workforce (AK), the previous year's MSMEs (LMSMEs), and GRDP. However, the labor force (AK) negatively correlates with MSME performance, contradicting theoretical expectations. This suggests that an increase in the labor force may not always translate into higher MSME growth, possibly due to structural challenges or

inefficiencies within the sector. (a) A 10-unit increase in MSME taxes leads to an 8.3% growth in MSMEs. (b) An increase of 10 units in the number of MSMEs from the previous year results in a 6.1% growth in the current MSMEs. (c) A 10-unit increase in GRDP results in a 0.5% increase in MSMEs.

The coefficient of determination ($R^2 = 0.4941$) indicates that the included variables explain nearly half of the variation in MSME performance. The F-statistic value (Prob > F = 0.0019) confirms that the model is statistically significant.

Table 3. Estimation Results of the MSME Equation in North Sumatra Province, 2015–2023.

Variable	Parameter Estimate	Standard Error	Prob. t	Significance Level	Short-Term Elasticity (SR)	Long-Term Elasticity (LR)
Intercept	-841.57667	695.53387	0.2381	-	-	-
PJ	0.834416	0.423176	0.0603	*	0.45	1
AK	-0.27948	0.485661	0.5703	-	-	-
GRDP	0.058717	0.068478	0.3997	-	-	-
LMSMEs	0.610704	0.187365	0.0033	**	0.53	1.78
$R^2=0.4941$; Adjusted $R^2=0.4098$; DW = 1.508; Prob > F = 0.0019						

Note: ** = Significant at $\alpha = (1-10\%)$

Table 4 presents the estimation results for the labor force equation, which assesses the impact of various factors on the workforce in North Sumatra. The results show that the workforce is positively influenced by the population size (JPP), MSMEs, and the previous

year's workforce. Conversely, the regional minimum wage (UMR) has a negative effect on the workforce, which is consistent with the hypothesis that higher wages may reduce labor force participation, as individuals may choose to work less once wages exceed certain thresholds.

(a) A 10-unit increase in the regional minimum wage (UMR) leads to a 42.55% reduction in the workforce. (b) A 10-unit increase in the population results in a 4.67% increase in the workforce. (c) A 10-unit increase in MSMEs leads to a 9.1% increase in the workforce.

The coefficient of determination ($R^2 = 0.9830$) indicates that 98.30% of the variation in the workforce is explained by the explanatory variables, with a highly significant F-statistic ($\text{Prob} > F = 0.0001$).

To further explore the implications of MSME policies on economic outcomes in North Sumatra, several policy scenarios were simulated for the period 2025–2030. These scenarios included changes to the regional minimum wage (UMR), taxes, and investment levels, to understand their potential impact on GRDP,

MSMEs, and the workforce. (a) Scenario 1: A 10% increase in the regional minimum wage results in a 2.1% increase in GRDP but a 0.7% decrease in MSMEs and a 0.28% decrease in the workforce. (b) Scenario 2: A 5% reduction in MSME taxes leads to a 0.42% decline in GRDP, a 38.43% increase in MSMEs, and a 0.20% increase in the workforce. (c) Scenario 3: A 10% increase in investment leads to a 1.52% increase in GRDP, a 2.62% increase in MSMEs, and a 0.49% increase in the workforce. Additional combined scenarios provided insights into the complex interplay of these policy measures. For example, combining the 10% increase in the regional minimum wage with a 5% reduction in taxes resulted in a slight reduction in GRDP (-0.18%), but a significant increase in MSMEs (1.93%) and a marginal decline in the workforce (-0.05%).

Table 4. Estimation Results of Labour Force Parameters (2015–2023)

Variable	Parameter Estimate	Standard Error	Probability (t)	Significance Level	Short-Term Elasticity	Long-Term Elasticity
Intercept	5107.43256	1420.2987	0.0014	-	-	-
UMR	-4.25576	1.39524	-0.0055	**	0.32	-
JPP	0.467575	0.221743	0.0452	*	0.87	1.65
MSMEs	0.908813	0.041166	-0.0001	**	0.54	1.23
LAK	0.435665	0.187365	0.0148	*	0.53	1.78

$R^2=0.9830$; Adjusted $R^2=0.9823$; DW = 2.520; Prob > F = 0.0001

Note: ** = have a real impact on level $\alpha = (1-10\%)$; * = have a real impact level $\alpha = (1-20\%)$

The labor force in North Sumatra Province demonstrates a positive relationship with explanatory variables such as population size, MSMEs, and the previous year's labor force. However, it is negatively associated with the regional minimum wage (UMR), as Kaodilichukwu (2022) noted. The estimated parameters indicate that both population size and the number of MSMEs from the previous year significantly influence the labor force, with statistical significance levels of $\alpha = 1-10\%$ and $\alpha = 1-20\%$, respectively, as reported by Putra, S.Z., et al. (2023).

The estimation results reveal that a 10-unit increase in the regional minimum wage leads to a 42.55% reduction in the labor force, which

aligns with the findings of Lovelace et al. (2020). In contrast, a 10-unit increase in population size corresponds to a 4.67% increase in the labor force. The coefficient of determination (R^2) is 0.9830, indicating that the explanatory variables explain 98.30% of the variation in the labor force. Additionally, the F-statistic probability value of 0.0019 further confirms the joint significance of the predictors.

To ensure the appropriateness of the simulation model, it undergoes validation before executing the scenario. Various statistical criteria, including MSE (Mean Squared Error), RMSE (Root Mean Squared Error), RMSPE (Root Mean Squared Percent Error), U-Theil, and R^2 , are employed for this validation process.

The MSE, RMSE, RMSPE, and U-Theil values are expected to be small, close to zero, while R^2 should approach one. The validation results indicate that the relationship model, which

explores the impacts of MSMEs, investment, income, and employment in North Sumatra, is highly suitable for the simulation analysis, as detailed in Table 5.

Table 5. Results of the Validation of the MSME Impact Model: Employment, Investment, and Income in North Sumatra, 2025-2030.

Endogenous Variables	Basic Simulation		RMSE	RMSPE	U-Theil
	Current	Predicted			
GRDP	4572	4565	7.6754	2.6397	0.0131
MSMEs	1654	1646	8.765	1.2607	0.0062
AK	508	505.9818	2.0182	0.1872	0.0009

The following scenario was designed to assess the potential impacts of changes in Micro, Small, and Medium Enterprise (MSME) policy before implementation. These changes significantly affect workforce dynamics, investment patterns, and income levels in North Sumatra Province. To provide a clear understanding of the potential outcomes, various policy measures were simulated in line with the development goals of the province. The forecasting process for 2025–2030 aims to facilitate the effective implementation of the North Sumatra Provincial Government's development policies. The following policy scenarios were presented for analysis: Scenario 1: A 10% increase in the regional minimum wage (UMR). Scenario 2: A 5% reduction in taxes for MSMEs. Scenario 3: A 10% increase in investment in the MSME sector. Scenario 4: A combined scenario of a 10% increase in the regional minimum wage and a 5% reduction in taxes, with several variations to examine

different policy objectives. Scenario 5: A combined scenario of a 5% reduction in taxes and a 10% increase in investment, aimed at assessing the synergistic effects on MSME growth and regional economic development. These scenarios involve key policy instruments, such as adjustments to the regional minimum wage, taxes, and investment levels, which the government can leverage to stimulate MSME growth. All the proposed scenarios are expected to influence a range of endogenous variables, including UMR, taxes, and investment, with the impact forecasted for 2025–2030.

The results of these policy simulations are expected to provide valuable insights into the potential effects of MSME policy changes on employment, investment, and income in North Sumatra. The following table (Table 6) presents the predicted outcomes for these scenarios, highlighting the expected changes in the key variables and offering a basis for evaluating the efficacy of the proposed policies.

Table 6. Results of the Policy Scenario for Increasing the Regional Minimum Wage of North Sumatra Province by 10 percent, 2025 – 2030

Endogenous Variables	Sim. Dsr PRE-DICT	Scenario / Simulation				
		1	2	3	4	5
GRDP	4516	2.2035	0,0000	2.4356	0,4354	2.1036
MSMEs	1526	-0.6898	0,0023	0,0034	0.0655	-0.5898
AK	405.55 66	-0.2753	-0.0012	-0.0008	0.5789	-0.2753

Description: (1) 10 % increase in UMR; (2) 5 % decrease in tax; (3) 10 % increase in investment; (4) Combined scenario (1) and (2); (5) Combined scenario (2) and (3)

The growth of the Gross Regional Domestic Product (GRDP) for Micro, Small, and Medium Enterprises (MSMEs) increased by 2.1036% as a result of a 10% increase in the regional minimum wage (UMR). However, this positive growth in GRDP was accompanied by a decline in the workforce and the number of MSMEs. Specifically, the number of workers in the province decreased by 0.2753%, while the number of MSMEs fell by 0.6898%. These findings are consistent with previous research by Maciej, S., *et al.* (2013), which also observed

negative consequences for employment and MSME growth following an increase in the minimum wage. This indicates that higher wages may stimulate GRDP growth but could also have unintended adverse effects on the MSME sector and the overall labor market. These results underscore the complex trade-offs associated with minimum wage policies and highlight the need for carefully balanced policy decisions that promote economic growth without hindering the expansion of MSMEs or job creation (see Table 7 for a detailed summary).

Table 7. Results of the Policy Scenario for Increasing the minimum wage of North Sumatra Province by 10% between 2025 and 2030.

Endogenous Variables	Core Values	Simulation Value	Change	
			Unit	Percentage
GRDP	4516	4611	95	2.1036
MSMEs	1526	1517	-9	-0.6898
AK	405.5566	404.4401	-1.12	-0.2753

Table 8 illustrates the impact of a 5% tax reduction on MSMEs in North Sumatra Province. The results show that, although the Gross Regional Domestic Product (GRDP) of North Sumatra declined by 0.4225% as a consequence of this tax cut, the effects on MSMEs and the workforce were largely positive. Specifically, the workforce grew by 38.43%, while the number of MSMEs increased by 0.2020%. These findings are in line with the conclusions drawn by Widyaningsih (2018), who observed that tax cuts could have a favorable

impact on the MSME sector by encouraging expansion and employment growth, even though the overall economic output, as measured by GRDP, might experience a slight decline. This suggests that tax reductions can stimulate MSME growth and increase labor force participation, although they may not always result in immediate overall economic growth. These results highlight the potential for tax policies to foster MSME development and employment in North Sumatra Province (see Table 8 for a detailed overview of these outcomes).

Table 8. Results of the North Sumatra provincial tax scenario reduced by 5%, 2025–2030.

Endogenous Variables	Core Values	Simulation Value	Change	
			Unit	Percentage
GRDP	4516	4497	-19	-0.4225
MSMEs	1526	1587	61	38.437
AK	405.5566	406.5601	1.0035	0.202

A 10% increase in investment is predicted to result in a 1.52% rise in the Gross Regional Domestic Product (GRDP) of North Sumatra Province. This finding aligns with the research conducted by Naldi *et al.* (2022), which also observed a positive correlation between increased investment and economic growth. In addition to

the growth in GRDP, the investment increase is expected to have a favorable impact on both the number of MSMEs and employment. Specifically, a 10% rise in investment would lead to a 2.62% increase in the number of MSMEs and a 0.49% increase in the workforce. These results underscore the crucial role of investment in

stimulating both MSME growth and regional economic development (see Table 9 for employment, reinforcing the importance of detailed results). policies encouraging investment to foster

Table 9. Results of the 10 % investment increase scenario, 2025–2030

Endogenous Variables	Core Values	Simulation Value	Change	
			Unit	Percentage
GRDP	4516	4586	70	1.5264
MSMEs	1526	1567	41	2.6165
AK	405.5566	407.5601	2.0035	0.4916

Suppose the scenario involves a 10% increase in the regional minimum wage and a 5% reduction in regional taxes. In that case, the overall impact on North Sumatra's economy is as follows: the Gross Regional Domestic Product (GRDP) is expected to decrease by 0.1775%. While this reduction in GRDP occurs, the number of MSMEs is projected to increase by 1.9280%, demonstrating the positive impact of tax cuts on MSME growth. However, the workforce is anticipated to experience a slight

decrease of 0.0485%. These results align with the findings of Rajeevan, N. Sulphay, M., M., & Rajasekar S. (2015), which similarly observed mixed effects on economic growth, MSME expansion, and employment when changes in minimum wage and tax policies were introduced. This suggests that while tax reductions may foster MSME growth, the minimum wage increase could dampen overall economic activity and employment (see Table 10 for detailed results).

Table 10. The results of the Regional minimum wage increase scenario of 10 % and the tax reduction of 5% between 2025 and 2030

Endogenous Variables	Core Values	Simulation Value	Change	
			Unit	Percentage
GRDP	4516	4508	-8	-0.1775
MSMEs	1526	1556	30	1.928
AK	405.5566	405.3601	-0.1965	-0.0485

The results from various policy scenarios provide valuable insights into the potential impacts of adjustments to the regional minimum wage, taxes, and investment levels on the economic performance of North Sumatra Province, especially in terms of Gross Regional Domestic Product (GRDP), MSMEs, and employment. These scenarios are grounded in prior research and provide a clearer picture of the trade-offs involved in policy decision-making.

According to the findings of Sjahruddin, H. *et al.* (2023), a 10% increase in the regional minimum wage results in a 2.10% increase in the Gross Regional Domestic Product (GRDP) of North Sumatra. However, this positive effect on GRDP is counterbalanced by a 0.69% decrease

in the number of MSMEs and a 0.28% reduction in the workforce. These outcomes suggest that while raising the minimum wage can stimulate economic output, it may inadvertently hinder the growth of MSMEs and reduce employment, particularly in labor-intensive sectors. These findings align with the research of Permadi, E., & Christanto, E. (2021), who observed similar trends in the relationship between minimum wage policies and MSME performance.

The results of reducing MSME taxes by 5%, as analyzed by Mashita, J. *et al.* (2022), indicate a decline in GRDP by 0.42%, accompanied by a substantial increase of 38.43% in the number of MSMEs. Additionally, the workforce is expected to grow by 0.20%. These

findings suggest that tax reductions for MSMEs can significantly boost the sector's growth, even though the overall regional economic output may experience a slight dip. The positive response in terms of MSME expansion and job creation highlights the importance of fiscal policies in stimulating the small business sector, which is crucial for regional development.

A 10% increase in investment in North Sumatra is predicted to lead to a 1.52% rise in GRDP, a 26.2% increase in MSMEs, and a 0.49% growth in the workforce. These results reflect the critical role of investment in driving economic growth and expanding MSMEs, which, in turn, contribute to job creation. The findings are consistent with the research by Ilori, Emmanuel, Ile, & Isioma, U. (2018), emphasizing that investment is a key driver of economic activity and employment, particularly in the MSME sector.

According to Kumar, K. (2024), the effects are more nuanced when the regional minimum wage is increased by 10% and MSME taxes are reduced by 5%. In this scenario, GRDP is predicted to decrease by 0.18%, while MSMEs are expected to grow by 1.93%. However, the workforce would face a slight reduction of 0.05%. This scenario illustrates the potential trade-offs between stimulating MSME growth through tax reductions and the broader economic consequences, including the potential negative impact on overall economic output and employment. The modest decline in the workforce reflects the challenge of balancing minimum wage increases with the need for sustainable labor force participation.

The results of this study provide valuable insights into the impact of policy changes on the Micro, Small, and Medium Enterprises (MSMEs) sector in North Sumatra Province. These insights are based on a robust econometric model, which was developed to estimate the effects of key policy variables—such as the regional minimum wage, taxes, and investment—on the regional economic performance, MSME growth, and workforce dynamics in North Sumatra. The results presented earlier highlight significant

relationships between these variables, suggesting that policies influencing MSMEs can directly and indirectly affect the broader economy. This section discusses the implications of the findings, integrating the results with relevant literature and examining how policy changes could potentially shape the future of North Sumatra's economic development.

One of the most notable findings of this study is the effect of a 10% increase in the regional minimum wage (UMR) on various economic indicators. As expected, the increase in UMR positively affected the Gross Regional Domestic Product (GRDP) by 2.10%. This aligns with the findings of Sjahrudin, H. *et al.* (2023), who suggested that raising the minimum wage could stimulate economic output by increasing the purchasing power of workers. The wage increase boosts consumer spending, which, in turn, can fuel demand for goods and services, positively affecting overall economic activity.

However, the results also reveal some adverse effects. The workforce in North Sumatra decreased by 0.28%, and the number of MSMEs fell by 0.69%. These negative effects are consistent with the work of Permadi and Christanto (2021), who found that while higher wages can increase economic output, they can also pose challenges for MSMEs, particularly labor-intensive ones. MSMEs often operate with limited profit margins and face higher operational costs when wages increase. As a result, businesses may reduce their workforce or scale down their operations to mitigate the impact of rising labor costs.

This finding suggests that while increasing the minimum wage can lead to higher GRDP, policymakers must carefully consider the potential drawbacks for MSMEs. The reduced number of MSMEs indicates that smaller businesses may struggle to adapt to higher wage requirements, especially in regions with a high concentration of small enterprises operating in competitive, low-margin industries. These businesses often lack the financial resources to absorb higher labor costs without reducing staff or scaling back their activities. This underscores the importance of creating complementary

policies that support MSMEs in adjusting to changes in labor costs, such as tax relief, training programs, or access to affordable financing.

The second key policy scenario explored in this study was the impact of a 5% tax reduction for MSMEs. The findings indicate a slight decline in GRDP by 0.42%, but a significant increase in MSMEs by 38.43%, and a 0.20% increase in the workforce. These results align with the research by Mashita, J. *et al.* (2022), who found that tax cuts can provide substantial relief to MSMEs, enabling them to invest more in business expansion, innovation, and job creation. Reducing taxes increases the financial resources available to businesses, which can be used to improve productivity, increase production, and hire additional workers.

The increase in MSMEs and the workforce due to tax cuts highlights the potential of fiscal policies to stimulate small business growth and reduce unemployment. The results suggest that lower taxes can effectively enhance the competitiveness of MSMEs, particularly in regions where these businesses play a central role in the local economy. By providing tax relief, the government can help MSMEs expand their operations, create more jobs, and contribute to the overall economic development of the province.

However, the slight decline in GRDP due to tax cuts suggests that there may be some trade-offs between encouraging MSME growth and broader economic performance. The reduction in tax revenue could limit the government's ability to invest in infrastructure, public services, or other critical areas for long-term economic growth. This highlights the importance of balancing tax relief measures with other policy initiatives that ensure the sustainability of government finances and support broader economic development goals.

Investment is another key factor influencing the economic dynamics of North Sumatra. The results of this study show that a 10% increase in investment leads to a 1.52% rise in GRDP, a 2.62% increase in MSMEs, and a 0.49% increase in the workforce. These findings are consistent with those of Ilori, Emmanuel, Ile,

and Isioma (2018), who suggested that investment is a crucial driver of economic growth, particularly for MSMEs. Investments in infrastructure, technology, and capital goods can enhance productivity, improve the competitiveness of businesses, and create new employment opportunities.

The positive effect of investment on both MSMEs and employment highlights the importance of policies that encourage private and public sector investment. For MSMEs, increased investment can provide the resources necessary to expand their operations, invest in new technologies, and enhance their productivity. This, in turn, can lead to job creation and higher wages, contributing to the region's overall economic development. The findings suggest that the provincial government should prioritize policies that attract domestic and foreign investment and provide support for businesses to access financing for growth.

However, while the short-term impact of investment on MSME growth and employment is positive, the long-term effects of sustained investment depend on the broader policy environment, including factors such as market access, infrastructure development, and labor market conditions. Investment alone may not be sufficient to sustain long-term growth unless accompanied by policies that address these structural challenges.

The combined policy scenario, which involves increasing the regional minimum wage by 10% and reducing taxes by 5%, produced more nuanced results. The findings show that while MSMEs experienced a 1.93% increase, the workforce decreased slightly by 0.05%, and GRDP declined by 0.18%. These results suggest that combining a wage increase with tax reductions can have mixed effects on the economy. On the one hand, tax reductions boost MSME growth and employment, as seen in the positive impact on MSMEs. On the other hand, the wage increase reduces the cost competitiveness of MSMEs, leading to a slight decline in the workforce.

These findings highlight the complex interplay between minimum wage policies and

fiscal policies. While tax reductions can stimulate MSME growth, higher labor costs associated with minimum wage increases may offset these gains, particularly in regions where small businesses are susceptible to wage fluctuations. Policymakers must carefully assess these trade-offs when designing policies that support labor force participation and MSME expansion.

The results also suggest that while a combination of wage and tax policies can foster MSME growth, managing the potential negative effects on employment and broader economic performance is essential. One potential solution could be to gradually increase the minimum wage, allowing businesses time to adjust to higher labor costs while benefiting from tax relief measures.

The findings from this study underscore the critical role that MSMEs play in driving economic growth, job creation, and poverty reduction in North Sumatra. MSMEs are a vital component of the regional economy, contributing to GRDP, employment, and income distribution. The study's results suggest that targeted policy interventions, such as tax reductions and investment incentives, can significantly enhance MSME growth, which drives economic development and job creation.

However, the study also highlights the challenges of balancing policies that stimulate MSME growth with those that ensure sustainable economic development. For example, while tax reductions can stimulate MSME growth, they may limit the government's ability to invest in infrastructure and public services, which are essential for long-term economic growth. Similarly, while minimum wage increases can improve workers' purchasing power and contribute to higher GRDP, they may also negatively affect MSME expansion and employment.

Policymakers in North Sumatra should therefore consider a more holistic approach to economic development, combining measures that support MSMEs with infrastructure, education, and skills development investments. Additionally, it is essential to create an enabling environment that supports both businesses and

workers, ensuring that wage policies, fiscal measures, and investment incentives work together to promote sustainable growth.

While this study provides valuable insights into the impact of MSME policies on regional economic performance, it is important to acknowledge some limitations. The study relies on secondary data from 2006 to 2023, which may not fully capture the effects of recent policy changes or the dynamic nature of the local economy. Furthermore, the econometric model used in this study is based on several assumptions, including the assumption that the relationships between variables are linear and stable over time. Future research could explore alternative modeling approaches, such as non-linear models or dynamic panel data models, to capture more complex relationships between variables. Additionally, future studies could examine the impact of other factors, such as access to financing, technology adoption, and market access, on MSME growth and employment in North Sumatra. Understanding the broader ecosystem that influences MSME performance could provide further insights into how policies can be designed to maximize their impact on regional economic development.

The results of this study highlight the significant role of MSMEs in driving economic growth, employment, and income distribution in North Sumatra. The findings suggest that while minimum wage increases, tax reductions, and investment incentives can stimulate MSME growth, they must be carefully balanced to avoid negative impacts on employment and overall economic performance. Policymakers must consider the complex interactions between these variables and design policies that promote sustainable growth, ensure equitable development, and support the long-term viability of the MSME sector. By adopting a comprehensive approach to economic development, North Sumatra can harness the full potential of its MSMEs and build a more resilient and inclusive economy.

CONCLUSION

This research has provided valuable insights into the impact of Micro, Small, and Medium Enterprises (MSMEs) on employment, investment, and income in North Sumatra Province. The study highlights the complex relationships between these factors and their influence on regional economic development by analyzing the effects of policy variables such as the regional minimum wage, tax reductions, and investment. The findings indicate that increasing the regional minimum wage has a mixed impact. While it boosts the Gross Regional Domestic Product (GRDP), it also negatively affects MSME growth and workforce participation. Conversely, tax reductions for MSMEs lead to significant growth in the sector and job creation, although they may slightly reduce GRDP.

Additionally, investment is pivotal in driving economic growth, with increased investment positively influencing GRDP, MSMEs, and employment. This study emphasizes the importance of well-designed policies that balance wage adjustments, tax incentives, and investment promotion to support MSMEs without stifling growth. Policymakers in North Sumatra must consider these trade-offs when implementing economic policies, ensuring that measures taken to stimulate MSME growth align with broader economic goals. Overall, the results underscore the critical role of MSMEs in fostering sustainable economic development and job creation in North Sumatra, offering actionable insights for future policy planning and economic strategies.

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