International Journal for Advanced Research

Journal homepage: https://journal.outlinepublisher.com/index.php/ijar

Research Article

The Impact of Minimum Wage and Population Growth on Poverty Levels in Sumatera Utara (2016–2025)

Era Sulastri Hutasoit[1]*, Marshanda Siburian[2], Cheresentia Situmorang[3]

[1,2,3] Universitas Negeri Medan, Indonesia

*Correspondence: erahutasoit26@gmail.com

Keywords:

Economic development, Growth Rate, Minimum Wage, Poverty.

Abstract

Economic development in North Sumatra was challenged by persistent fluctuations in poverty levels, indicating structural constraints in achieving inclusive growth. This study examined the effects of minimum wage and population growth rate on the number of people living in poverty in North Sumatra during the 2016–2025 period. The research employed a quantitative approach using secondary time-series data obtained from official statistical publications. Multiple linear regression analysis was conducted, supported by classical assumption tests, to ensure the validity of the model. The results showed that the minimum wage had a negative and statistically significant effect on poverty, indicating that increases in wages contributed to improving purchasing power and reducing the number of poor people. In contrast, the population growth rate did not show a statistically significant partial effect on poverty, suggesting that demographic changes alone were not the primary determinant of poverty levels. However, when analyzed simultaneously, minimum wage and population growth rate had a significant combined effect, explaining 72.8% of the variation in poverty levels. These findings highlighted that poverty reduction in North Sumatra was more strongly influenced by economic policy related to income distribution rather than demographic factors alone. The study emphasized the importance of integrated policy approaches that combine wage regulation with effective population management to achieve sustainable poverty alleviation.

INTRODUCTION

Economic development in a region is fundamentally a series of planned efforts aimed at improving societal welfare and alleviating poverty (Todaro & Smith, 2015). A low poverty rate consistently serves as a primary indicator of inclusive macroeconomic growth, as it reflects equitable income distribution and broader access to employment opportunities. However, the Province of North Sumatra continues to face significant structural challenges in reducing poverty levels. Based on data from the Central Bureau of Statistics (BPS), the number of poor people in this region has exhibited fluctuating dynamics throughout the 2016–2025 period. After reaching 1.45 million people (10.27%) in 2016, the figure gradually declined but surged again during the pandemic crisis of 2020–2021 to 1.35 million people. Although the local government managed to reduce it to 1.11 million people (7.19%) by September 2024, the poverty trend has once again increased and stagnated at

around 1.12 million people in early 2025. This fluctuating condition reflects underlying structural constraints, where the economic system has not yet been fully effective in absorbing the labor force, leaving communities vulnerable to falling back into poverty (Arsyad, 2010).

At the macro level, poverty alleviation efforts are strongly influenced by labor market policy interventions, one of which is the Provincial Minimum Wage (UMP) regulation. Theoretically, this wage floor policy functions as a social safety net to ensure that workers receive a subsistence level of income deemed adequate for living (Ricardo, 1817). An increase in the minimum wage is expected to enhance purchasing power and stimulate worker productivity (Stiglitz, 1984), which in turn can help lift individuals out of poverty (Keynes, 1936). Empirically, the minimum wage in North Sumatra has shown a relatively consistent upward trend, rising from IDR 1,811,875 in 2016 to IDR 2,710,493 in 2023. Nevertheless, a gap persists between theoretical expectations and empirical realities; this steady increase in minimum wages has not always been accompanied by a linear decline in poverty rates. This suggests that, under certain conditions, wage escalation may impose additional operational costs on businesses, potentially leading to stagnation in formal sector employment absorption.

On the other hand, poverty issues cannot be separated from demographic pressures, as represented by the Population Growth Rate. Within the framework of classical population theory, Malthus argued that population growth, which progresses geometrically, may outpace the growth of economic resources, which increases only arithmetically. This imbalance becomes a root cause of economic pressure. In North Sumatra, the population has continued to expand from 14.1 million in 2016 and is projected to reach 15.7 million by 2025. Furthermore, the population growth rate has increased from approximately 1.27% (pre-2020) to 1.43% per year during the 2020–2023 period. This growing demographic burden may trigger a phenomenon known as "economic dilution," whereby regional economic growth must be distributed across an increasingly large population. Consequently, the positive effects of rising minimum wages are often offset by high dependency ratios and intensified competition in the labor market.

Based on these phenomena, poverty dynamics in North Sumatra are shaped by the interplay between Minimum Wage policies (X1) and the pressures of Population Growth Rate (X2). This complexity is further highlighted by an existing research gap; certain studies have identified significant effects consistent with established theoretical frameworks (Sari & Wahyuni, 2022; Nasution & Lubis, 2021), whereas others report contradictory results due to regional contextual variations (Prasetyo & Kurniawan, 2023; Hidayat et al., 2022). Building on these literature gaps and empirical anomalies, this research aims to analyze the partial and simultaneous impacts of the Minimum Wage and Population Growth Rate on the total poor population in North Sumatra from 2016 to 2025. The selection of this pivotal period, spanning from the pre-pandemic era to the economic recovery phase, is intended to provide a robust empirical basis for the formulation of more precise regional poverty reduction strategies.

HYPOTHESES DEVELOPMENT

The Impact of Minimum Wage on the Total Poor Population (H1)

Theoretically, the nexus between the minimum wage and poverty is elucidated through labor market theory, where wage increments bolster the income and purchasing power of the lower-tier workforce. The resulting rise in household consumption subsequently enhances economic welfare and contributes to a significant decline in poverty rates. This argument is further corroborated by empirical evidence from Lenher et al. (2025), which demonstrates that a one-dollar increase in the minimum wage can reduce poverty rates by 0.3 to 0.7 percent within the working-age population and alleviate the prevalence of food insecurity among low-wage workers.

The Impact of Population Growth Rate on The Total Poor Population (H2)

Theoretically, Malthusian Theory (1798) postulates that a population explosion outpacing production capacity generates economic pressures that trigger poverty. The underlying mechanism suggests that a surge in the labor force, when unmatched by the expansion of formal employment, leads to increased unemployment and a

heightened dependency on low-income informal sectors. This framework is highly relevant to the rising population growth trend in North Sumatra (1.43%) amidst limited labor absorption capacity. Empirically, findings by Kevin et al. (2020) and Putri & Nurwati (2021) further corroborate the positive and significant influence of population growth on the escalation of poverty rates.

The Simultaneous Impact of Minimum Wage and Population Growth Rate on the Total Poor Population (H3)

Poverty constitutes a multidimensional phenomenon governed by the simultaneous interplay between wage policies and demographic dynamics. Minimum wage increments (X1) aimed at strengthening purchasing power are frequently countered by the pressures of the population growth rate (X2), which intensifies the demand for employment opportunities. Consequently, the effectiveness of poverty alleviation is highly contingent upon the synergy between decent wage standards and demographic burden management. Thus, a simultaneous analysis is pivotal to comprehensively and accurately mapping the determinants of poverty in North Sumatra Province.

Based on the theoretical framework and previous empirical studies discussed above, the hypotheses of this study are formulated as follows:

H_1: The Minimum Wage has a negative and significant effect on the Number of Poor Population in the Province of North Sumatra during the 2016–2025 period.

H_2: The Population Growth Rate has a positive and significant effect on the Number of Poor Population in the Province of North Sumatra during the 2016–2025 period.

H_3: Minimum Wage and Population Growth Rate simultaneously have a significant effect on the Number of Poor Population in the Province of North Sumatra during the 2016–2025 period.

METHOD

This study employs a quantitative approach aimed at objectively examining the relationships among variables through numerical data analysis. According to Creswell (2014), quantitative research is an approach used to test theories by measuring relationships between variables using instruments and analyzing them through statistical procedures. This is in line with Sugiyono (2019), who states that quantitative methods are based on numerical data and are used to test hypotheses.

The data utilized in this study are secondary data in the form of a time series covering the period 2016–2025, obtained from official publications of the Central Bureau of Statistics (BPS) of North Sumatra Province. These data include the Provincial Minimum Wage, Population Growth Rate, and the Number of Poor Population. Data collection was conducted using documentation techniques, namely by gathering data from reports, archives, and official publications as described by Arikunto (2014). Furthermore, data analysis was carried out using multiple linear regression with the assistance of SPSS version 25 to determine the effect of independent variables on the dependent variable. Prior to hypothesis testing, classical assumption tests were conducted, including tests of normality, multicollinearity, heteroskedasticity, and autocorrelation, to ensure that the model satisfies the BLUE (Best Linear Unbiased Estimator) criteria as proposed by Ghozali (2018). Hypothesis testing was conducted using the t-test to examine partial effects, the F-test to assess simultaneous effects, and the coefficient of determination (R^2) to measure the model's ability to explain the variation in the dependent variable.

RESULTS AND DISCUSSION

Result

Classical Assumption Test
Normality Test

Table 1
Normality Test (Kolmogorov-Smirnov)

Keterangan	Nilai
N	10
Mean	0,000
Std. Deviation	53235,845
Test Statistic	0,186
Asymp. Sig	0,200

If the Asymp. Sig. value is greater than 0.05, it can be concluded that the residuals are normally distributed, and vice versa. Based on the results of the normality test using the Kolmogorov–Smirnov method, the obtained value is 0.200, indicating that the data are normally distributed.

Multicollinearity Test

Table 2
Multicollinearity Test

Variable	B	Std.Error	t	Sig.	Tolerance	VIF
Constant	1921885,694	352296,413	5,455	0,001	-	-
Minimum Wage	-0,225	0,058	-3,871	0,006	0,850	1,176
Population Growth Rate	-81009,056	292100,590	-0,277	0,790	0,850	1,176

Criteria:
1. If the Tolerance value is greater than 0.10, it indicates that multicollinearity does not occur.
2. If the VIF value is less than 10.00, it indicates that multicollinearity does not occur.

Based on the results of the multicollinearity test, the Tolerance value is 0.850 and the VIF value is 1.176, indicating that there is no multicollinearity in the model.

Heteroskedasticity Test
Glejser Test

Table 3
Heteroskedasticity Test

Variable	B	Std.Error	t	Sig.
Constant	-79701,316	170386,230	-0,468	0,654
Minimum Wage	-0,021	0,028	-0,739	0,484
Population Growth Rate	132730,441	141272,850	0,940	0,379

The results of the heteroskedasticity test using the glejser test indicate that there is no significant relationship between all independent variables and the absolute residual values, as evidenced by Sig. values greater than 0.05. This means that the model is free from heteroskedasticity.

Autocorrelation Test

Table 4
Autocorrelation Test

R	R Square	Adjusted R Square	Std.Error	DW
0,853	0,728	0,650	60363,774	2,089

With n = 10 and k = 2, the following values are obtained:

dL = 0.697
dU = 1.641

4 - dU = 4 - 1.641 = 2.359
Test: dU < DW < 4 - dU?
1.641 < 2.089 < 2.359

Since the Durbin–Watson (DW) = 2.089 lies within the range dU < DW < 4-dU (1.641 < 2.089 < 2.359), it can be concluded that there is no autocorrelation. Therefore, the regression model is free from autocorrelation problems.

Multiple Linear Regression Test
Multiple linear regression is a data analysis method used to examine the mathematical relationship between two or more independent variables (X_1, X2) and a dependent variable (Y) simultaneously, which is expressed in the form of a mathematical equation.

Table 5
Multiple Linear Regression Test

Model		Unstandardized Coefficients B	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1921885,694	-	5,455	0,001
	Minimum Wage	-0,225	-0,828	-3,871	0,006
	Population Growth Rate	-81009,056	-0,059	-0,277	0,790

With a constant value (a) of 1921885,694 and regression coefficients of (-0,225) for variable X_1 and (-0,81009,056) for variable X2, the multiple linear regression equation can be formulated as follows:

$$Y = a + b\,X_1 + bX2 + e$$

$$Y = 1921885{,}694 + (-0{,}225)\,X_1 + (-81.009{,}056)\,X2 + e$$

The interpretation of the multiple linear regression equation above can be elaborated as follows:

a) The constant value (a) of 1921885,694 indicates that when variables X_1 and X2 are equal to zero, the value of variable Y is 1921885,694.
b) The regression coefficient for variable X_1 (minimum wage) of (-0,225) indicates that every one-unit increase in X_1 leads to a decrease of 0,225 units in variable Y (the number of people living in poverty). This negative sign reflects an inverse relationship, meaning that an increase in X_1 is associated with a decrease in Y (the number of people living in poverty), assuming other variables remain constant.
c) The regression coefficient for variable X2 (population growth rate) of (-81009,056) indicates that every one-unit increase in X2 results in a decrease of 81009,056 units in variable Y (the number of people living in poverty). This negative coefficient signifies an inverse relationship, whereby an increase in X2 is associated with a corresponding decrease in Y (the number of people living in poverty), ceteris paribus.

Partial Test (t-test)

This partial test is conducted to determine the significance of the effect of each independent variable (X1 and X2) individually on the dependent variable (Y). Based on the results of the partial test above, the following conclusions can be drawn:

a) The significance value for variable X1 (minimum wage) = 0,006 < 0,05, indicating that X1 has a statistically significant effect on variable Y (the number of people living in poverty). The calculated t_{value} is -3.871, which exceeds the critical t_{table} at $\alpha = 0{,}05$ with df = n-k-1 (df = 10-2-1 = 7) which is

1.895. Since t_{value} (3.871) > t_{table} (1.895), H0 is rejected. This means that variable X1 (minimum wage) has a significant effect on variable Y (the number of people living in poverty).

b) The significance value for variable X2 (population growth rate) = 0,790 > 0,05, indicating that X2 does not have a statistically significant effect on variable Y (the number of people living in poverty). The calculated t_{value} is (-0.277), which does not exceed the critical t_{table} at α = 0,05 with df = n-k-1 (df = 10-2-1 = 7) which is 1.895. Since t_{value} (0.277) < t_{table} (1.895), H0 accepted. This means that variable X2 (population growth rate) does not have a significant effect on variable Y (the number of people living in poverty).

Simultaneous Test (F-test)

The simultaneous test is conducted to examine whether the independent variables X1 and X2 jointly have a significant effect on the dependent variable Y.

Table 6
Simultaneous Test

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	68136003008,244	2	34068001504,122	9,350	0,011
Residual	25506496991,756	7	3643785284,537	-	-
Total	93642500000,000	9	-	-	-

The table above indicates that, in the simultaneous test (F-test) of the multiple regression model, the calculated F_{value} is 9.350, while the critical F_{table} value at α = 0,05 with df = n-k (df = 10-2 = 8) is 4.459. Since F_{value} (9.350) > F_{table} (4.459), H0 is rejected. This suggests that the independent variables X1 (minimum wage) and X2 (population growth rate) jointly have a statistically significant effect on the dependent variable Y (the number of people living in poverty). This conclusion is further supported by the significance value of 0,011 < 0,05, which confirms that, simultaneously, all independent variables exert a significant influence on variable Y (the number of people living in poverty).

Coefficient of Determination Test

Table 7
Coefficient of Determination Test

R	R Square	Adjusted R Square	Std.Error
0,853	0,728	0,650	60363,774

The table above indicates that there is a positive and significant relationship between variable X1 (minimum wage) and variable X2 (population growth rate) on variable Y (the number of people living in poverty). With a correlation coefficient (R = 0,853), it can be concluded that the relationship is very strong. Furthermore, the coefficient of determination (R Square) = 0,728 implies that 72,8% of the total variation or changes in variable Y (the number of people living in poverty) can be explained by variables X1 (minimum wage) and X2 (population growth rate), while the remaining 27,2% is influenced by other factors or variables outside this regression model.

Discussion

The Effect of Minimum Wage on the Number of People Living in Poverty

Based on the results of the partial statistical test (t-test), the minimum wage variable (X1) is proven to have a negative and statistically significant effect on the number of people living in poverty (Y). This is quantitatively evidenced by a calculated t_{value} of (-3.871) with a significance level of 0.006. Since this probability value is well below the standard significance level (α = 0.05), the hypothesis stating that minimum wage influences

poverty can be accepted. Furthermore, the negative regression coefficient of (-0.225) indicates an inverse relationship, meaning that any policy intervention in the form of increasing the minimum wage will have a tangible effect in reducing the number of people living in poverty within the observed region.

This finding is consistent with the theory of economic capability and purchasing power. Conceptually, the establishment of a minimum wage functions as a crucial social safety net to enhance the disposable income of lower-income workers. This increase in income directly improves their purchasing power in meeting basic needs, such as food, housing, healthcare, and education, which ultimately contributes to lifting them out of poverty. These findings are also supported by previous studies, such as Asyari et al. (2023) and Siregar & Wahyuni (2021), which consistently demonstrate that regional minimum wage policies constitute one of the most precise and significant macroeconomic instruments for reducing multidimensional poverty

The Effect of Population Growth Rate on the Number of People Living in Poverty

Based on the results of the partial statistical test (t-test), the population growth rate variable (X2) is found to have no statistically significant effect on the number of people living in poverty (Y). This is quantitatively evidenced by the calculated t_{value} of -0.277 with a significance level of 0.790. Since this probability value far exceeds the standard significance level ($\alpha = 0.05$), it can be concluded that the dynamics of population growth in the observed region are not a primary determinant influencing changes in poverty levels.

This lack of significance is consistent with the theory of demographic transition and the concept of the demographic dividend. Conceptually, population growth does not necessarily trigger or exacerbate poverty if the increase in population is dominated by the productive-age group that is effectively absorbed into the labor market. This finding is supported by various empirical studies, including research by Sadiyah et al. (2024), which concludes that population growth rate does not have a statistically significant effect on the percentage of the population living in poverty. The absence of a direct impact is generally attributable to the fact that poverty alleviation in the region is more strongly influenced by economic indicators that directly affect purchasing power, such as minimum wage policies, rather than mere fluctuations in population size.

The Effect of Minimum Wage and Population Growth Rate on the Number of People Living in Poverty

Based on the results of the simultaneous statistical test (F-test), the minimum wage variable (X1) and the population growth rate variable (X2) are jointly proven to have a significant effect on the number of people living in poverty (Y). This is quantitatively demonstrated by the calculated F_{value} of 9.350, which exceeds the critical F_{table} (4.459), along with a significance value of 0.011, which is below the standard threshold ($\alpha = 0.05$). In addition, the model yields a coefficient of determination (R Square) of 0.728. This indicates that 72.8% of the variation or fluctuation in the number of people living in poverty within the study area can be comprehensively explained by the interaction of these two variables, while the remaining 27.2% is influenced by other external factors beyond the scope of this model.

These findings are strongly aligned with macroeconomic theories of population and welfare. Poverty levels essentially represent the outcome of the interaction between a region's economic capacity and its demographic burden. The interplay between minimum wage policies, as a stimulus that enhances income and purchasing power, and population dynamics, as an indicator of dependency burden and labor market competition, jointly serves as a critical determinant of societal welfare. This conclusion is further reinforced by prior empirical literature, such as studies by Sari (2021) and Syahbana et al. (2025), which consistently confirm that the combination of labor policy instruments (regional wages) and demographic indicators significantly contributes to modeling and controlling poverty levels within a given region.

CONCLUSION

Based on the results of the multiple linear regression analysis, it can be concluded that the minimum wage variable has a negative and statistically significant effect on the number of people living in poverty. This finding indicates that an increase in the minimum wage contributes to reducing poverty levels by improving the income and purchasing power of low-income workers. Therefore, minimum wage policies can serve as an effective instrument for poverty alleviation and improving social welfare. Meanwhile, the population growth rate variable does not have a statistically significant effect on the number of people living in poverty. This result suggests that population growth does not necessarily lead to an increase in poverty, particularly when the growing population consists largely of productive-age individuals who can be absorbed into the labor market and contribute to economic activities. Simultaneously, minimum wage and population growth rate are

proven to have a significant effect on the number of people living in poverty. The coefficient of determination (R^2) of 0.728 indicates that 72.8% of the variation in poverty levels can be explained by these two variables, while the remaining 27.2% is influenced by other factors not included in the model, such as unemployment, economic growth, education, inflation, and government social policies. Therefore, policymakers should continue to optimize minimum wage policies aimed at improving workers' welfare while also promoting effective population management and productive employment opportunities. These efforts are essential to achieving sustainable poverty reduction and enhancing overall socioeconomic well-being.

References

Arikunto, S. (2014). *Prosedur penelitian: Suatu pendekatan praktik*. Rineka Cipta.

Arsyad, L. (2010). *Ekonomi pembangunan* (Edisi ke-5). UPP STIM YKPN.

Asyari, dkk. (2023). Minimum wage and poverty level: Study of policy in Indonesia. *Jurnal Administrasi Negara*.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publications.

Ghozali, I. (2018). *Aplikasi analisis multivariate dengan program IBM SPSS 25*. Badan Penerbit Universitas Diponegoro.

Hidayat, R., & Setyowati, E. (2022). Analisis faktor-faktor yang mempengaruhi tingkat kemiskinan di Provinsi Jawa Tengah. *Jurnal Ilmiah Ekonomi*, 18(1), 45–56.

Kevin, K., Putri, A. K., & Nasrun, A. (2020). Pengaruh inflasi dan laju pertumbuhan penduduk terhadap kemiskinan di Sumatera Bagian Selatan tahun 2011–2018. *Sorot*, 15(1), 33–42.

Keynes, J. M. (1936). *The general theory of employment, interest, and money*. Macmillan.

Lenher, J., et al. (2025). Minimum wage increases and their impact on poverty and food insecurity among working-age population. *Journal of Labor Economics*, 43(2), 245–278.

Malthus, T. R. (1798). *An essay on the principle of population*. J. Johnson.

Prasetyo, P. E., & Ludwina, R. (2020). The impact of minimum wage on poverty through unemployment. *Journal of Critical Reviews*, 7(15), 1845–1855.

Putri, N. C., & Nurwati, N. (2021). Pengaruh laju pertumbuhan penduduk berdampak pada tingginya angka kemiskinan yang menyebabkan banyak eksploitasi anak di Indonesia. *Jurnal Ilmu Kesejahteraan Sosial HUMANITAS*, 3(1), 1–15.

Ricardo, D. (1817). *On the principles of political economy and taxation*. John Murray.

Sadiyah, dkk. (2024). Pengaruh inflasi dan laju pertumbuhan penduduk terhadap persentase penduduk miskin di Provinsi Banten. *Taraadin: Jurnal Ekonomi dan Bisnis*.

Sari. (2021). Kontribusi upah minimum dan faktor kependudukan terhadap tingkat kemiskinan. *Equilibrium: Jurnal Ilmiah Ekonomi*.

Sari, N. P., & Priadana, M. S. (2021). Pengaruh upah minimum kabupaten/kota terhadap tingkat kemiskinan. *Jurnal Ekonomi*, 26(3), 321–335.

Siregar, A., & Wahyuni, S. (2021). Dampak peningkatan upah minimum regional terhadap kemiskinan kultural. *Gorontalo Development Review*, 9(1).

Stiglitz, J. E. (1984). Theories of wage rigidity. Dalam J. L. Yellen (Ed.), *Efficiency wage models of the labor market* (hlm. 153–206). Cambridge University Press.

Sugiyono. (2019). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.

Syahbana, dkk. (2025). Kolaborasi instrumen perburuhan dan dinamika demografi dalam memodelkan kemiskinan daerah. *Jurnal Ilmiah Wahana Pendidikan (JIWP)*.

Todaro, M. P., & Smith, S. C. (2015). *Economic development* (12th ed.). Pearson.