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Research Article

The Effect of the Human Development Index (HDI) and the Provincial Minimum Wage (PMW) on the Percentage of Poor Population in North Sumatra during the 2018–2025 Period

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Abstract

Poverty is one of the main problems in economic development that is still faced by various regions in Indonesia, including North Sumatra Province. This study aims to analyze the effect of the Human Development Index (HDI) and the Provincial Minimum Wage (PMW) on the Percentage of Poor Population in North Sumatra during the period 2018-2025. This research uses a quantitative approach by utilizing secondary data obtained from official publications of the Central Statistics Agency. The analytical method used is multiple linear regression with the assistance of SPSS version 25 software. Before conducting regression analysis, the data were first tested through classical assumption tests including normality, multicollinearity, heteroscedasticity, and autocorrelation tests. The results show that partially the Human Development Index has a negative and significant effect on the percentage of poor population with a t-value of -3.174 and a significance level of 0.025. The Provincial Minimum Wage also has a negative and significant effect on the percentage of poor population with a t-value of -10.178 and a significance level of 0.000. Simultaneously, the Human Development Index and Provincial Minimum Wage have a significant effect on the percentage of poor population with an F-value of 62.130. The coefficient of determination value of 0.961 indicates that 96.1% of the variation in the percentage of poor population can be explained by these two variables. These findings indicate that improving the quality of human development and implementing appropriate minimum wage policies can contribute to reducing poverty levels in North Sumatra.

INTRODUCTION

Poverty remains one of the fundamental problems in economic development that continues to be faced by many developing countries, including Indonesia. This term refers to a condition in which individuals or groups of people are unable to fulfill their basic needs, both food and non-food, such as education, health services, and adequate housing. As stated by the World Bank (2012), poverty is closely related to limited income and asset ownership, which prevents individuals from achieving a decent standard of living in terms of food,

clothing, shelter, education, and health. Therefore, poverty alleviation has become a strategic priority in economic development planning across many parts of the world.

Indonesia, as a developing country, still faces complex poverty-related problems. Poverty is not only caused by low levels of income but is also influenced by various other factors such as limited employment opportunities, low quality of human resources, and unequal development across regions. Poverty is multidimensional in nature because it is associated with various aspects of life, including education, health, and employment opportunities. This is consistent with the view of Nasir (2008), cited in (Rahmawati, 2022), who states that poverty is a complex and multidimensional problem influenced by both economic and social factors.

The phenomenon of poverty remains a major obstacle in the process of economic development in Indonesia, particularly in certain regions. Although several provinces possess abundant natural resources, poverty rates in these areas remain relatively high. This reality indicates that ongoing economic development has not yet fully succeeded in creating equitable and comprehensive social welfare. For instance, in the island of Sumatra there are still provinces with relatively high poverty rates despite their rich natural resources. This condition reinforces the argument that poverty is not merely caused by scarcity of resources but is also influenced by various structural factors that are complex and interconnected.

The Human Development Index (HDI) is one of the important determinants influencing poverty levels. As an indicator of human development, HDI measures achievements in three fundamental dimensions: education, health, and a decent standard of living. Essentially, HDI represents the quality of human resources within a particular region. When the HDI value of a region increases, it indicates an improvement in the quality of its human resources, which in turn can enhance productivity and increase community income. This increase in income subsequently contributes to the reduction of poverty rates. This logic is consistent with the theory of human capital, which emphasizes that investment in education and health can improve individual productivity and overall societal welfare.

In addition to the Human Development Index, the minimum wage is another variable that influences poverty levels. The minimum wage is defined as the lowest wage level established by the government to ensure that workers receive adequate income. This policy aims to improve workers' welfare and reduce income inequality among different social groups. An increase in the minimum wage is expected to enhance purchasing power and improve the quality of life for low-income communities. When workers' income increases, the likelihood of escaping the cycle of poverty also becomes greater.

Based on income distribution theory, an increase in the minimum wage has the potential to improve the income structure of society, allowing lower-income groups to gain stronger purchasing power. If the minimum wage policy is implemented appropriately, it can contribute to reducing poverty rates because people receive more adequate income to meet their daily needs. Therefore, minimum wage policy is often used by governments as an instrument to reduce poverty levels.

Results from various previous studies indicate that HDI and minimum wages are closely related to poverty levels. (Rahmawati, 2022) in her study found that HDI has a negative and significant effect on the number of poor people, indicating that improvements in human development achievements will be followed by a decrease in poverty. Meanwhile, findings from other studies reveal that minimum wage policies also influence the level of public welfare and can become one of the driving factors in reducing poverty rates.

Thus, two key aspects play an important role in poverty alleviation efforts, namely improving the quality of human resources through human development and implementing appropriate minimum wage policies. Therefore, a study on the effect of the Human Development Index and Minimum Wage on the percentage of poor population, particularly in North Sumatra Province, needs to be conducted. This research is expected to reveal the magnitude of the impact of these two factors on poverty in the region.

HYPOTHESES DEVELOPMENT

The Effect of HDI on the Percentage of Poor Population (H1)

Theoretically, the relationship between the Human Development Index (HDI) and poverty can be understood through the human development approach and human capital theory. An increase in HDI indicates an improvement in the quality of human resources in a particular region. People with higher levels of education and better health conditions generally have higher work productivity and broader access to employment opportunities. Consequently, this leads to increased income, which enables people to meet their basic needs more easily. The fulfillment of these needs ultimately contributes to improved welfare and results in a reduction in poverty rates. A study conducted by (Ningru, 2017) shows that every 1 percent increase in HDI can reduce the number of poor people.

The Effect of Minimum Wage on the Percentage of Poor Population (H2)

Theoretically, the relationship between minimum wage and poverty can be understood from the perspective of the labor market and worker welfare theory. When income increases, people are more capable of accessing basic needs such as food, education, and health services. This condition ultimately improves the standard of living of the community and has the potential to reduce poverty levels. Furthermore, if the minimum wage is set at a level equal to or higher than the decent living standard, this policy can help workers escape the poverty trap. Research conducted by (Hapsari Wiji Utami and Siti Umajah Masjkuri, 2018) indicates that an increase in the minimum wage by 1 rupiah can lead to a decrease in the number of poor people by 4.51×10^{-2} individuals.

The Effect of HDI and Minimum Wage on the Percentage of Poor Population (H3)

Poverty is a complex problem influenced by various economic and social factors, such as the quality of human resources and the level of community income. The Human Development Index (HDI) is one of the indicators that reflects the quality of life of the population through three main dimensions, namely health, education, and a decent standard of living. An increase in HDI indicates improvements in the quality of human resources, which in turn can enhance labor productivity and create greater opportunities for people to obtain employment and higher income. This condition gradually improves social welfare and reduces poverty levels.

Therefore, in order to obtain a more comprehensive understanding of the factors that collectively influence changes in the percentage of poor population in North Sumatra Province, it is necessary to examine the effect of these two variables simultaneously.

Based on the theoretical review and the results of previous empirical studies, the research hypotheses are formulated as follows:

H1: The Human Development Index has a negative and significant effect on the Percentage of Poor Population in North Sumatra from 2018 to 2025.

H2: Minimum Wage has a negative and significant effect on the Percentage of Poor Population in North Sumatra from 2018 to 2025.

H3: The Human Development Index and Minimum Wage simultaneously have a significant effect on the Percentage of Poor Population in North Sumatra from 2018 to 2025.

METHOD

This study employs a quantitative approach by utilizing secondary data obtained from official publications of the Badan Pusat Statistik (BPS). According to Sugiyono (2019), as cited in (Sembiring dkk, 2024), secondary data refers to data that are not collected directly by the researcher from the research subjects or objects, but are obtained from existing official sources. The focus of this study is the analysis of the variables of the Human Development Index, Minimum Wage, and the Percentage of Poor Population in North Sumatra Province during the period from 2018 to 2025.

To examine the simultaneous influence of the independent variables on the dependent variable, this research applies the multiple linear regression analysis technique as proposed by Sugiyono (2017), cited in (Sembiring dkk, 2024). Before conducting the regression analysis, classical assumption tests were carried out, including the normality test, multicollinearity test, and heteroscedasticity test. These tests aim to ensure that the

regression model used meets the required statistical assumptions. Once the model satisfies the classical assumptions, the next step is to conduct hypothesis testing in order to determine the significance of the influence of each independent variable on the dependent variable.

Data processing was carried out using IBM SPSS Statistics 25 to ensure the accuracy and efficiency of the analytical process. Through this methodological approach, it is expected that a comprehensive understanding can be obtained regarding the direct contribution of each independent variable to the dependent variable, and that the findings generated will be accurate and reliable as a basis for evidence-based decision making.

RESULTS AND DISCUSSION

Result

Classical Assumption Test

Normality Test

The normality test is conducted to determine whether the research data are normally distributed or not.

Table 1
One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		8
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	12.05398106
Most Extreme Differences	Absolute	.173
	Positive	.173
	Negative	-.091
Test Statistic		.173
Asymp. Sig. (2-tailed)		.200[c,d]

Based on the table above, the Asymp. Sig. (2-tailed) value is 0.200 > 0.05. Therefore, the residuals of the regression model of the Human Development Index (HDI) and Minimum Wage on the Percentage of Poor Population are normally distributed.

Multicollinearity Test

The multicollinearity test aims to examine whether there is a correlation or relationship among the independent variables in the regression model. The presence of multicollinearity can be detected by analyzing the correlation matrix among the independent variables.

Table 2
Multicollinearity Test

Collinearity Statistics	
Tolerance	VIF
.983	1.017
.983	1.017

The Tolerance values for X1 and X2 are 0.983 > 0.10, and the VIF values for X1 and X2 are 1.017 < 10. This indicates that there is no multicollinearity in the data.

Heteroskedastisitas Test

The purpose of this test is to detect the possibility of heteroskedasticity, which is a condition where the variance of the residuals is not constant. This condition can affect the accuracy of the estimates in the regression model. If heteroskedasticity is not found, the regression model is considered more valid because it satisfies the required classical assumptions.

Table 3
Heteroscedasticity Test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-14.389	23.460		-.613	.566
	IPM	.001	.001	.505	1.381	.226
	UMP	5.864E-6	.000	.235	.643	.548

a. Dependent Variable: ABS_RES

The significance value for X1 is 0.226 and for X2 is 0.548, both of which are greater than 0.05. This indicates that heteroskedasticity does not occur in the regression model.

Autokorelasi Test

This test aims to detect the presence of correlation between the residuals of one observation and those of another observation, particularly in time series data or data that have a sequential order. This test is important to ensure that the assumption of residual independence is satisfied, as the presence of autocorrelation can reduce the accuracy of the estimates and affect the validity of the regression model.

Table 4
Autokorelasi Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.980[a]	.961	.946	14.26246	2.303

a. Predictors: (Constant), UMP, IPM

b. Dependent Variable: PPM

The Durbin–Watson (DW) value of 2.303 lies between 1.45 and 2.40, indicating that there is no autocorrelation in the data.

Coefficient of Determination Test (R-Square Test)

This test aims to measure the extent to which the regression model can explain the variability of the dependent variable. The coefficient of determination (R^2) ranges from 0 to 1. The closer the value is to 0, the more limited the influence of the independent variables on the dependent variable. Conversely, the closer the value is to 1, the greater the contribution of the independent variables, indicating that the model is more accurate in predicting changes in the dependent variable.

Tabel 5
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.980[a]	.961	.946	14.26246

a. Predictors: (Constant), UMP, IPM

The R value in the multiple regression Model Summary table is 0.980, which indicates that the relationship between the Human Development Index (X1) and the Minimum Wage (X2) with the Percentage of Poor Population (Y) is very strong. Meanwhile, the R Square value is 0.961, meaning that 96.1% of the variation in the Percentage of Poor Population can be explained by the variations in the Human Development Index and Minimum Wage variables. The remaining 3.9% is influenced by other variables that were not examined in this study.

Simultaneous Multiple Regression Test (F-Test)

The F-test aims to examine the significance of the simultaneous effect of all independent variables on the dependent variable in the regression model. The testing criteria state that if the calculated F-value (F-statistic) is greater than the F-table value or if the significance value (sig.) is less than 0.05, then the regression model is considered statistically significant.

Tabel 6
ANOVA[a]

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25276.786	2	12638.393	62.130	.000[b]
	Residual	1017.089	5	203.418		
	Total	26293.875	7			

a. Dependent Variable: ppm
b. Predictors: (Constant), UMP, IPM

The degrees of freedom (df) are calculated as df = n-k-1 = 8-2-1 = 5. Therefore, the F-table value is 5.79.

Based on the ANOVA table, the results of the significance test of the multiple regression coefficients or the simultaneous test (Hypothesis 3) show that the calculated F-value is 62.130, while the F-table value at $\alpha = 0.05$ with df1 = 3 and df2 = 5 is 5.79. Since the F-value (62.130) is greater than the F-table value (5.79), H_0 is rejected.

Partial Regression Test (T-Test)

The partial test (t-test) is used to analyze the effect of each independent variable individually on the dependent variable, assuming that the other independent variables in the model are held constant (ceteris paribus). This test aims to determine the significance of each regression coefficient separately in explaining the variation in the dependent variable.

Tabel 7
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1404.534	50.871		27.609	.000		
	IPM	-.007	.002	-.282	-3.174	.025	.983	1.017
	UMP	.000	.000	-.903	-10.178	.000	.983	1.017

a. Dependent Variable: PPM

The degrees of freedom (df) are calculated as df = n-k-1= 8-2-1=5. Therefore, the t-table value is 2.01505.

n the B column, the constant value is 1404.534, the regression coefficient for HDI is -0.007, and the regression coefficient for Minimum Wage is 0.000. Therefore, the regression equation can be written as:

$Y = 1404.534 - 0.007X_1 + 0.00X_2$.

Interpretation of the Multiple Linear Regression Equation

1. The constant value is 1404.534, meaning that if the independent variables (X_1) and (X_2) are equal to 0, then the dependent variable (Y) is 1404.534.
2. The regression slope is -0.007, meaning that if there is an increase of 1 unit in the Human Development Index (X_1), it will increase the predicted Percentage of Poor Population (Y) by 0.7%. The negative regression coefficient indicates that the higher the Human Development Index, the lower the Percentage of Poor Population tends to be.
3. The regression slope is 0.000, meaning that if there is an increase of 1 unit in the Minimum Wage (X_2), it does not cause any change in the Percentage of Poor Population (Y).

Significance Test (Partial Hypothesis Test)

1. In the Coefficients table for HDI (X_1), the calculated t-value is -3.174, while the t-table value at $\alpha = 0.05$ and df = 5 is 2.01505. Since t-count (-3.174) > t-table (2.01505) and the significance value is 0.025 < 0.05, H_0 is rejected.
2. In the Coefficients table for Minimum Wage (X_2), the calculated t-value is −10.178, while the t-table value at $\alpha = 0.05$ and df = 5 is 2.01505. Since t-count (−10.178) > t-table (2.01505) and the significance value is 0.000 < 0.05, H_0 is rejected.

CONCLUSION

The conclusion of this study indicates that both the Human Development Index (HDI) and the Provincial Minimum Wage (PMW) have a positive and significant effect on the Percentage of Poor Population in North Sumatra during the 2018-2025 period. Based on empirical evidence, the t-value for HDI is -3.174 and for PMW is -10.178, both of which exceed the critical t-table value of 2.01505 at a 95% confidence level. The results of the quantitative analysis show that the coefficient of determination (R^2) reaches 0.961, indicating that the combination of these two independent variables is able to explain 96.1% of the variation in the Percentage of Poor Population. The multiple regression equation $Y = 1404.534 - 0.007X_1 + 0.00X_2$ illustrates the contribution of each factor. It indicates that every one percent increase in HDI reduces the Percentage of Poor Population by 0.007 percent, while a similar increase in PMW does not produce a measurable change (0.000 percent). Furthermore, the simultaneous correlation coefficient of 0.980 confirms a very strong and significant relationship between the two predictor variables and the Percentage of Poor Population. These findings are consistent with various theoretical perspectives and previous empirical studies that emphasize the importance of holistic human resource development, encompassing education, health, and adequate income guarantees, as a foundation for creating a productive, independent, and poverty-resilient society. The practical implication of this study highlights the importance of synergistic integration between policies aimed at improving the Human Development Index (HDI) and the establishment of a fair Provincial Minimum Wage (PMW) in the regional development strategy of North Sumatra for the 2018-2025 period. A development approach that combines improvements in basic human quality through investments in education and health with adequate income guarantees through the Provincial Minimum Wage has been shown to significantly contribute to reducing the percentage of poor population in North Sumatra. This contribution is expected to support the achievement of inclusive and sustainable regional economic development targets, particularly in realizing the vision of a prosperous and advanced North Sumatra, while also contributing to the national development agenda toward Indonesia Emas 2045.

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