PAPER – OPEN ACCESS

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DOI : 10.32734/lwsa.v9i1.2741
Electronic ISSN : 2654-7066
Print ISSN : 2654-7058

Volume 9 Issue 1 – 2026 TALENTA Conference Series: Local Wisdom, Social, and Arts (LWSA)

LWSA Conference Series 09 (2026)
TALENTA Conference Series
Available online at https://talentaconfseries.usu.ac.id

Effect Of Unemployment, Poverty and Stunting On The Human Development Index In North Sumatera

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Abstract

This study aims to determine the extent of the influence of Unemployment, Poverty and Stunting, both partially and simultaneously, on the Human Development Index (HDI) in North Sumatra. The type of research used is the Quantitative Method, which is an approach based on the results of econometric and statistical estimates. The population used in this study was 33 Regencies and Cities in North Sumatra in 2014-2023. The data used in this study are secondary data with data collection techniques in the form of literature studies obtained from Journals, Scientific Articles, Publications from the Badan Pusat Statistik (BPS), Kementerian Kesehatan (KEMENKES), and other credible sources relevant to the researcher. The results obtained from this study are that Poverty and Stunting have a negative and significant effect on the Human Development Index (HDI) in North Sumatra in 2014-2023. The poverty variable has a negative but not significant effect.

Keywords: HDI; Poverty; Unemployment; Prevalence Stunting.

1. Introduction

The Human Development Index (HDI) is an important indicator for assessing the quality of human development in a region, as it covers three main dimensions: health, education, and decent living standards. The concept of human development according to the United Nations Development Programme (UNDP) emphasizes that development is not only about economic growth, but also about expanding human choices and capabilities to live better lives [1]. In this context, the HDI becomes an important evaluation tool for the success of development, especially in regions that still face structural challenges such as North Sumatra.

North Sumatra has shown stable growth in its human development index, reaching 75.13 in 2023 and falling into the “high” category [2]. However, behind this achievement lies significant disparity among districts/cities, particularly in terms of access to education, healthcare services, and economic well-being. This disparity reflects unresolved multidimensional issues, namely unemployment, poverty, and stunting.

The open unemployment rate (TPT) in North Sumatra in 2023 was recorded at 5.89%, higher than the national figure of 5.32% [3]. A high OUR indicates a lack of job opportunities and low productivity, directly impacting the ability of the population to meet basic needs and improve their standard of living. This indicates a negative contribution of unemployment to the human development index.

Poverty also remains a crucial issue. Although the aggregate poverty rate in North Sumatra declined to 8.15% in 2023, several regions such as West Nias and North Nias still recorded poverty rates above 20% [4]. High poverty hinders people's access to education and health care, which are key components in calculating the human development index.

In addition, stunting, or growth failure in children due to chronic malnutrition, also has a serious impact on long-term human development. In North Sumatra, the prevalence of stunting decreased from 30.11% in 2019 to 18.9% in 2023, but there are still districts/cities with rates above 30% [5]. Stunting not only affects children's health and cognition, but also impacts the quality of future human resources, which in turn affects regional productivity and competitiveness.

These various issues are interrelated and contribute to the lag in human development. Therefore, a deep and data-driven understanding is needed of how unemployment, poverty, and stunting simultaneously and partially affect human development index achievements in North Sumatra. This study aims to address these challenges by providing empirical analysis that can serve as a basis for consideration in the formulation of inclusive and sustainable development policies.

Selection and peer-review under responsibility of Event of Young Researcher and Economics Students (EVEREST) IX
p-ISSN: 2654-7058, e-ISSN: 2654-7066, DOI: 10.32734/lwsa.v9i1.2741

2. Literature Review

2.1 Human Development Index

The Human Development Index concept was developed by the UNDP as a composite indicator that reflects achievements in three basic dimensions of human development: long life and healthy living, knowledge, and decent living standards [6]. in his theory of human capital explains that investment in education and health increases individual productivity and drives long-term economic growth [7]. Meanwhile, emphasizes the importance of the capability approach, which is to expand human freedom and capabilities as the ultimate goal of development [8].

2,2 Unemployment

Unemployment occurs due to a lack of aggregate demand in the economy. When demand for goods and services declines, production also declines, leading to a reduction in the workforce [9]. High unemployment has an impact on reducing people's purchasing power, limiting access to education and health care, and slowing the improvement of the human development index.

2.3 Poverty

The Poverty Cycle Theory proposed by Ragnar Nurkse states that poverty is cumulative and cyclical. Poor communities have low purchasing power, resulting in limited demand for goods and services, low production, limited investment, and ultimately limited job creation, forming a vicious cycle of poverty [10].

2.4 Stunting

The theory of health capital states that health is a form of human capital that affects a person's productivity and income [11]. Stunting, as an indicator of chronic malnutrition that occurs during childhood, hinders brain development and physical growth. Children who experience stunting tend to have lower educational attainment and limited productivity in the future, which ultimately impacts the decline in human resource quality and the human development index.

3. Research Method

This study uses secondary data, which is data that has been processed beforehand. The data was collected from statistical datasets, government reports, academic publications, and relevant statistical databases. The statistical data used in this study was obtained from the online pages of the Badan Pusat Statistik (BPS) and Kementerian Kesehatan (KEMENKES). The data analysis technique used in this study is panel data regression, which is a combination of cross-sectional and time series data. The cross-sectional data in this study covers 33 districts and cities in North Sumatra, while the time series data used in this study spans from 2014 to 2023. This study uses one dependent variable and three independent variables. The dependent variable in this study is the Human Development Index (HDI), while the independent variables are Unemployment (UNEMP), Poverty (POV), and Stunting (STUNT).

$$\mathbf{HDIit = \beta_0 + \beta_1 UNEMPTit + \beta_2 POVit + \beta_3 STUNTit + eit}$$

Information:
HDI = Human Development Index
Unempt = Unemployment / Open Unemployment Rate (%)
Pov = Poverty / Poverty Rate (%)
Stunt = Stunting / prevalence of stunting (%)
i = cross section
t = time series
β_0 = Intersect / Constant
β_1 - β_3 = Regression coefficient
e = Error

4. Results and Discussion

To determine which regression model is chosen between fixed effect or common effect in this study, the Chow Test is required. The following are the results of the Chow Test:

Table 1. Result of Chow Test

CHOW TEST	
Number of obs	330
Prob > F	0.0000

Source: Researcher Processed Data Stata 12

Based on the results of testing with the Chow test in Table 1. with a sample size of 330, it can be seen that from a significance level of 0.05, a probability value of 0.0000 was obtained, which means that 0.0000<0.05. Based on the Chow test, it can be concluded that the selected model is the Fixed Effect Model (FEM).

After conducting the Chow test, the next step is to conduct the Hausman test to select the best method between the Fixed Effect Model (FEM) and Random Effect Model (REM). The following are the results of the Hausman Test:

Table 2. Result of Hausman Test

HAUSMAN TEST	
Test Sumamary	Probability
Random-Effects GLS Regression	0.0000

Source: Researcher Processed Data Stata 12

Based on Table 2. Hausman Test, it can be concluded that the probability value is 0.0000, which means 0.0000<0.05. Based on the Hausman Test that has been conducted, the selected model is the Fixed Effect Model (FEM). Based on the results of the Chow test and Hausman test, the best model selected is the Fixed Effect Model (FEM), so the Lagrange Multiplier (LM) test is not necessary.

Classical assumption tests conducted in panel data regression using Normality Test, Multicollinearity Test, Heteroscedasticity Test, and Autocorrelation Test.

Table 3. Result of Normality Test

NORMALITY TEST					
Shapiro-Wilk W test for normal data					
Variabel	Obs	W	V	z	
e	330	0.99293	1.640	1.166	0.12173

Source: Researcher Processed Data Stata 12

Based on the Shapiro-Wilk test results in Table 3. above, a probability value of 0.12173 (> 0.05) was obtained, which means that the residuals from the regression model are normally distributed. This indicates that there is no deviation from the assumption of residual normality. Additionally, to support the numerical test results, a Normal Probability Plot (Q-Q Plot) was also used.

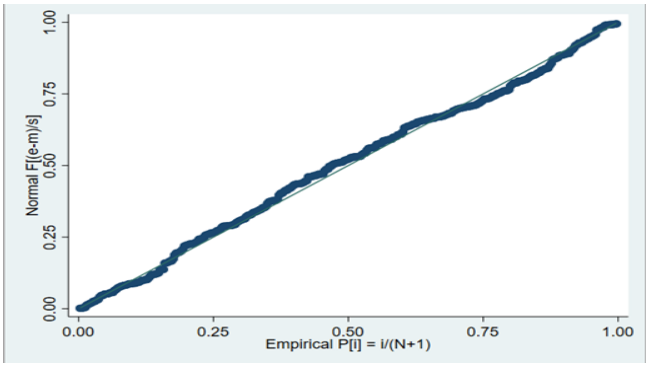

Figure 1. Probability Normality test-P Plot (Q-Q Plot)
Source: Researcher Processed Data Stata 12

Based on the Q-Q Plot graph in Figure 1. it can be seen that the residual points are scattered along a diagonal line, supporting the conclusion that the residuals are normally distributed. Thus, it can be concluded that the panel regression model in this study has fulfilled the assumption of residual normality.

Table 4. Result of Multicolinearity Test

MULTICOLINEARITY TEST		
Variable	Collinearity Statistics	
	VIF	1/VIF
Stunt	1.15	0.872149
Pov	1.11	0.901338
Unemp	1.10	0.906816
Mean VIF	**1.12**	

Source: Researcher Processed Data Stata 12

Based on Table 4. of the multicollinearity test, it can be seen that the VIF values for all independent variables (stunting, poverty, and unemployment) are below 10, with the highest VIF value being 1.15 for the stunting variable. The average VIF value for this model is 1.12. Therefore, based on the results of the multicollinearity test, there is no multicollinearity between the independent variables in the regression model.

Table 5. Result of HeterocedasticityTest

HETEROCEDASTICITY TEST			
Cross-sectional time-series FGLS regression			
Coefficients	GLS	Log Likelihood	-837.6762
Panels	Homoskedastic	Wald Chi	554.79
Correlation	No autocorrelation	Prob	0.0000

Source: Researcher Processed Data Stata 12

Table 5. shows a probability value of 0.0000 < 0.05, which means that there is no heteroscedasticity in this model. This is clarified by the explanation in the heteroscedasticity results that the panel data in this study is homoscedastic. Thus, it can be concluded that there is no heteroscedasticity in the data and the classical assumptions are fulfilled in the regression method.

An autocorrelation test was conducted to determine whether there was scorrelation between variables in a regression model. The autocorrelation test in this study was conducted using the Generalized Least Square (GLS) method. The results of the autocorrelation test are shown in Table 5. which states that in the "no autocorrelation" model, there was no autocorrelation, so the classical assumption was fulfilled in this model.

Based on data processing using Stata, the results of the author's research estimates are as follows:

Table 6 Result of HeterocedasticityTest

Variable	Notation	Coefficient	t-Statistict	Probability
Constant	C	77.50224	107.76	0.000
Unemployment	UNEMP	-0.1065554	-1.31	0.192
Poverty	POV	-0.2155413	-3.86	0.000
Stunting	STUNT	-0.1238359	-10.54	0.000

Source: Researcher Processed Data Stata 12

The above equation can be explained as follows:

1. The constant value of 77.502 shows the HDI value when all independent variables are constant. This is the baseline HDI of the model.
2. Value The unemployment coefficient value (-0.106) means that every 1% increase in the unemployment rate will reduce the HDI by 0.106 points, although this is not statistically significant (p=0.192). This means that the effect is not strong enough to be conclusively determined from the data.
3. Value The poverty coefficient value (-0.215) means that every 1% increase in the poverty rate will reduce the HDI by 0.215 points. This effect is statistically significant (p = 0.000), indicating a negative relationship between poverty and human development.

The results of statistical tests conducted to interpret the author's research, namely using the F-test (F-test), R2 test (coefficient of determination), and t-test.

Table 7. Result of F-statistic Test

F-statistic TEST	
F-statistic	49.80
Probability > (F-statistic)	0.0000

Source: Researcher Processed Data Stata 12

Based on the F-test results in Table 7. the F-statistic value is 49.80 with a probability value of 0.0000 (< 0.05), which means that the regression model is simultaneously significant at the 95% confidence level, indicating that the variables of Unemployment, Poverty, and Stunting simultaneously have a significant effect on the Human Development Index (HDI).

Table 8. Result of R^2 (Koefisien Determinan) Test

F-statistic TEST	
R-squared (Within)	0.3369
R-squared (Between)	0.6965
R-squared (overall)	0.5273

Source: Researcher Processed Data Stata 12

Based on the results of the R^2 coefficient of determination as shown in Table 8. an R-squared (Within) value of 0.3369 was obtained. This means that approximately 33.69 percent of the variation or change in HDI over time in each district and city in North Sumatra can be explained by the three main variables in this study, namely unemployment, poverty, and stunting.

Table 9. Result of HeterocedasticityTest

Variable	Notation	Coefficient	t-Statistict	Probability
Konstan	C	77.50224	107.76	0.000
Unemployment	UNEMP	-0.1065554	-1.31	0.192
Poverty	POV	-0.2155413	-3.86	0.000
Stunting	STUNT	-0.1238359	-10.54	0.000

Source: Researcher Processed Data Stata 12

Based on Table 9. t-test above, unemployment (UNEMP) has a coefficient of -0.1065554 with a t-statistic value of -1.31 and a probability (p-value) of 0.192. Since the p-value is greater than 0.05, the results indicate that the null hypothesis (Ho) is accepted and the alternative hypothesis (H1) is rejected, meaning that, partially, the unemployment variable does not have a significant effect on Human Development (HDI). In the context of North Sumatra, the absence of a significant effect can be explained by the Neo-Liberal and Social Democracy Theory, which suggests that within certain development frameworks (particularly neoliberal), economic growth and human development can proceed without equitable labor absorption [12]. The results of this study are consistent with a previous study in West Nias Regency, which showed that the unemployment rate does not significantly affect the HDI, possibly due to high hidden unemployment [13]. Similar findings were also reported in West Sulawesi, where open unemployment did not significantly affect the HDI [14]. that although the TPT coefficient showed a positive direction toward log(HDI), its effect was not statistically significant [15].

Poverty (POV) shows a coefficient of -0.2155413 with a t-statistic of -3.86 and a p-value of 0.000. Since the p-value is < 0.05, Ho is rejected and H1 is accepted, indicating that the poverty variable has a significant partial effect on the dependent variable. The results of this study are in line with previous research conducted. In that study, the results showed a poverty coefficient of -0.2410 and was significant at a 99.99% confidence level [16]. Additionally, it is consistent with research conducted where the results of the descriptive analysis stated that poverty is closely related to and influences the development process that prioritizes community participation [17].

Stunting (STUNT) has a coefficient of -0.1238359, a t-statistic of -10.54, and a p-value of 0.000. With a p-value < 0.05, Ho is rejected and H1 is accepted, which means that the stunting variable has a significant partial effect on the dependent variable. This aligns research, which states that the way out of the stunting trap is by focusing policies and including long-term investments in nutrition [18].

5. Conclusions

Based on the analysis of the study on the Impact of Unemployment, Poverty, and Stunting on the Human Development Index (HDI) in North Sumatra from 2014 to 2023. From the results of the statistical tests conducted, the following conclusions can be drawn:

1. The open unemployment rate (TPT) has no significant effect on the Human Development Index (HDI) in North Sumatra from 2014 to 2023. This is likely because the labor force from families that are not poor but do not yet have jobs is also included in the open unemployment category, so the calculation does not produce significant results.

2. The poverty variable (Percentage of Poor Population) has a negative and significant effect on the Human Development Index (HDI) in North Sumatra from 2014 to 2023. Therefore, the level of poverty is one of the causes of the Human Development Index (HDI), such that an increase in the percentage of the poor population leads to a decrease in the HDI figure.
3. The stunting variable (stunting prevalence) has a negative and significant effect on the Human Development Index (HDI) in North Sumatra from 2014 to 2023. Therefore, the level of stunting is one of the causes of the Human Development Index (HDI), such that an increase in stunting prevalence will result in a decrease in the Human Development Index.
4. Unemployment, poverty, and stunting have a negative and significant impact on the Human Development Index (HDI) in North Sumatra from 2014 to 2023. Although unemployment is not significant individually, its presence in combination with poverty and stunting still contributes significantly to variations in the Human Development Index (HDI).

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