

# Influence of Poverty and HDI on Economic Growth Through Unemployment in Sulawesi, 2011–2023

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## Abstract

This study investigates the influence of poverty and the Human Development Index (HDI) on economic growth, with unemployment serving as a mediating variable, across five provinces in Sulawesi from 2011 to 2023. Economic growth remains a critical indicator for regional development, and understanding the role of socioeconomic factors such as poverty, education, health, and labor dynamics is essential for policy formulation. The study employs a quantitative research design using panel data analysis, integrating path analysis techniques and the Sobel test to identify both direct and indirect effects among the variables. The empirical results show that poverty has no statistically significant effect on either the unemployment rate or economic growth, indicating that poverty alone may not directly influence macroeconomic performance in this context. Conversely, HDI exhibits a significant influence on both unemployment and economic growth, reinforcing the crucial role of education, health, and overall human development in shaping economic outcomes. However, the unemployment rate does not mediate the relationship between either poverty or HDI and economic growth, suggesting that other mechanisms may be more relevant in translating human development into economic progress. These findings emphasize the limited mediating role of unemployment and highlight the strategic importance of investing in human capital. As such, policy recommendations should prioritize improving access to quality education and healthcare services, while also promoting job creation programs. These initiatives are essential to foster inclusive, resilient, and sustainable economic growth across Sulawesi's diverse provinces.

## 1. Introduction

Economic growth is one of the most critical indicators used to evaluate a country's development and economic performance. In general, economic growth refers to the increase in a nation's capacity to produce goods and services over time. In Indonesia, economic growth has played a strategic role in shaping national development policies. Since gaining independence, the government has implemented various policies to promote sustainable economic growth. Initially, the country faced numerous challenges, including inadequate infrastructure and limited human resources. Over time, however, a series of economic reforms—such as economic liberalization, increased investment, and modernization of key sectors like agriculture, industry, and services—have contributed to more stable and resilient economic growth.

Indonesia has demonstrated its ability to maintain economic stability despite facing major crises, such as the 1997–1998 monetary crisis. These challenges prompted structural

reforms that helped restore and strengthen the country's economic foundations. Today, the Indonesian government continues to prioritize infrastructure development, human capital improvement, and economic diversification to enhance national competitiveness.

A similar situation can be observed in the Sulawesi region, which faces persistent economic challenges, including limited infrastructure and regional disparities. Addressing these issues is essential to achieving balanced and inclusive development across provinces. Several socioeconomic factors influence economic growth in the region, including the Human Development Index (HDI), poverty levels, and unemployment. HDI reflects the overall quality of life, poverty influences income distribution and purchasing power, and unemployment impacts labor productivity and regional growth potential.

Unemployment remains a significant barrier to human development. According to Todaro and Smith (2012), unemployment occurs when individuals who are willing and



able to work are unable to find suitable employment. High unemployment rates can contribute to increased poverty and reduced quality of life, which in turn affect household income, access to education and healthcare, and ultimately, HDI.

The World Bank (2020) emphasizes that poverty is a multidimensional issue—not only characterized by low income but also by limited access to essential services and reduced participation in economic and social life (Marsuni, 2024). Addressing poverty and unemployment simultaneously is essential for enhancing human development and achieving sustainable growth.

Although previous studies have examined the relationships among HDI, poverty, and unemployment, limited research has explored how unemployment mediates the relationship between poverty and HDI on economic growth, particularly in the context of Sulawesi. Therefore, this study aims to analyze the direct and indirect effects of poverty and HDI on economic growth, using unemployment as a mediating variable. By focusing on five provinces in Sulawesi from 2011 to 2023, this study contributes new insights into regional development strategies in Indonesia.

## 2. Theoretical Review

### 2.1 Poverty

According to Prawoto (2009), if poverty is not addressed promptly, communities may remain trapped in a cycle of poverty. This aligns with the theory of the vicious circle of poverty proposed by Ragnar Nurkse, which suggests that low income leads to low savings, resulting in low investment, limited capital, reduced productivity, and ultimately perpetuating low income and poverty. This cycle hinders long-term economic development, especially in underdeveloped regions.

### 2.2 Human Development Index

The Human Development Index (HDI), as formulated by the United Nations Development Programme (UNDP), is a composite measure of a country's achievements

in health, education, and income (Yuniana, 2019). A higher HDI indicates a population with better capabilities, which can contribute positively to economic growth by enhancing labor productivity and creativity. Mahroji and Nurhasanah (2019) also emphasize that HDI reflects basic components of productivity that aim to improve individuals' quality of life. HDI has become a critical tool for policymakers in evaluating development strategies. However, critics argue that HDI simplifies the complexity of human development into only three dimensions, thus overlooking important social factors such as gender inequality, human rights, and political dynamics (Fukuda-Parr, 2019). Scholars have also proposed the inclusion of environmental sustainability and governance quality as additional dimensions to better capture holistic human welfare (Todaro & Smith, 2020).

### 2.3 Unemployment

Unemployment remains a persistent socioeconomic problem in many countries, including Indonesia. As the population grows annually, the number of job seekers increases, outpacing available employment opportunities. Sukirno (2006), as cited in Hartanto (2017), defines unemployment as a condition in which individuals who are part of the labor force and willing to work are unable to find employment. High unemployment rates can negatively affect poverty levels, economic productivity, and overall social welfare.

### 2.4 Economic growth

Economic growth refers to the increase in a country's production of goods and services over a specific period. It is commonly measured by changes in Gross Regional Domestic Product (GRDP) and is expressed as a percentage (Dewi, 2015, in Utami & Putri, 2020). Sustainable economic growth indicates a productive economy that generates more income for its population. It reflects the successful utilization of production factors such as labor, capital, and technology.

### 3. Research Methods

This study employs a quantitative descriptive approach to examine the relationship among poverty, human development index (HDI), unemployment, and economic growth in five provinces in Sulawesi from 2011 to 2023. The research utilizes secondary data obtained from the official website of the Indonesian Central Statistics Agency (BPS). The dataset consists of time series panel data, with the most recent updates as of 2023.

The analytical method used in this study is path analysis, which is an extension of multiple linear regression. Path analysis allows for the measurement of both direct and indirect effects of independent variables on dependent variables, particularly when intervening variables are involved (Lapebesi et al., 2021). The process includes formulating hypotheses, constructing structural equations, estimating path coefficients, and testing the model's goodness-of-fit. The interpretation focuses on understanding the causal relationships among variables within the framework of the proposed model (Arofah & Rohimah, 2019).

Additionally, panel data regression analysis is conducted to ensure model robustness. This includes the Chow test, Hausman test, t-test (partial significance), F-test (simultaneous significance), and coefficient of determination test ( $R^2$ ). All analyses are performed using EViews 12 Student Version, a statistical software that facilitates accurate interpretation of complex data and supports the formulation of valid conclusions.

#### Research Hypotheses:

1. H1: Poverty (X1) significantly affects Unemployment (Z).
2. H2: HDI (X2) significantly affects Unemployment (Z).
3. H3: Poverty (X1) significantly affects Economic Growth (Y).
4. H4: HDI (X2) significantly affects Economic Growth (Y).
5. H5: Unemployment (Z) significantly affects Economic Growth (Y).

6. H6: Poverty (X1) significantly affects Economic Growth (Y) through Unemployment (Z).
7. H7: HDI (X2) significantly affects Economic Growth (Y) through Unemployment (Z).

### 4. Results and Discussion

#### Panel Data Regression Test

##### Model Determination

In doing A research with use panel data regression, especially formerly things to do done is test or determine what model it will be used in study with use panel data regression. The following This is description from results determination of the model to be used.

Testing	Results	Conclusion
<b>Chow Test</b>	Prob > 0.05	CEM
	Prob. < 0.05	FEM
<b>Hausman test</b>	Prob. > 0.05	BRAKE
	Prob. < 0.05	FEM
<b>Lagrange Multiplier Test (LM Test)</b>	Prob. > 0.05	CEM
	Prob. < 0.05	BRAKE

#### Chow Test

Redundant Fixed Effects Tests  
Equation: Untitled  
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.696706	(4,57)	0.0024
Cross-section Chi-square	18.516758	4	0.0010

Based on from The output results of the chow test above can be known that the prob. value is 0.0000 (<0.05). So from the results of the chow test can concluded The discussion is about the selected model is the Fixed Effect Model (FEM).

#### Hausman test

Correlated Random Effects - Hausman Test  
Equation: Untitled  
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.369423	3	0.0248



Based on from output results of the hausman test above , can known that the prob. value is 0.0248 (<0.05). So from hausman test results the can concluded The discussion is about the selected model is the Fixed Effect Model (FEM).

### Results Of Recapitulation of Panel Data Regression Model Determination

Testing	Results	Conclusion
<b>Chow Test</b>	Prob > 0.05	CEM
	Prob. < 0.05	FEM
<b>Hausman Test</b>	Prob. > 0.05	BRAKE
	Prob. < 0.05	FEM
<b>Lagrange Multiplier Test (LM Test)</b>	Prob. > 0.05	CEM
	Prob. < 0.05	BRAKE

Based on from results model testing panel data regression , it is known that the Fixed Effect Model (FEM) is the best model For used in study this . So from that, for performing Path Analysis test can using the Fixed Effect Model (FEM).

### Path Analysis Equation 1

Dependent Variable: Z  
 Method: Panel Least Squares  
 Date: 10/14/24 Time: 17:35  
 Sample: 2011 2023  
 Periods included: 13  
 Cross-sections included: 5  
 Total panel (balanced) observations: 65

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	24.30745	3.627492	6.700897	0.0000
X1	0.166619	0.133460	1.248459	0.2169
X2	-0.295585	0.048860	-6.049583	0.0000

#### Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.793279	Mean dependent var	4.880308
Adjusted R-squared	0.771894	S.D. dependent var	1.654158
S.E. of regression	0.790032	Akaike info criterion	2.467954
Sum squared resid	36.20075	Schwarz criterion	2.702119
Log likelihood	-73.20851	Hannan-Quinn criter.	2.560347
F-statistic	37.09532	Durbin-Watson stat	1.862597
Prob(F-statistic)	0.000000		

### Path Analysis Equation 2

Dependent Variable: Y  
 Method: Panel Least Squares  
 Date: 10/14/24 Time: 17:37  
 Sample: 2011 2023  
 Periods included: 13  
 Cross-sections included: 5  
 Total panel (balanced) observations: 65

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	69.67429	16.44530	4.236729	0.0001
X1	-0.530595	0.460305	-1.152702	0.2538
X2	-0.798831	0.212383	-3.761266	0.0004
Z	-0.839765	0.446914	-1.879032	0.0654

#### Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.466328	Mean dependent var	6.898615
Adjusted R-squared	0.400789	S.D. dependent var	3.473700
S.E. of regression	2.688947	Akaike info criterion	4.930994
Sum squared resid	412.1349	Schwarz criterion	5.198611
Log likelihood	-152.2573	Hannan-Quinn criter.	5.036586
F-statistic	7.115299	Durbin-Watson stat	2.177170
Prob(F-statistic)	0.000004		

### Path Analysis Equation

$$Z = 24.3074473486 + 0.166619016851 * X1 - 0.295585399741 * X2 + 0.228106$$

$$Y = 69.6742922458 - 0.530594949766 * X1 - 0.798830907976 * X2 - 0.839765021634 * Z + 0.599211$$

Based on the results of the path analysis test from Equation 1 and Equation 2, the following conclusions can be drawn:

1. The direct effect of the Poverty variable (X1) on Unemployment (Z) is 0.1666.
2. The direct effect of the Human Development Index (HDI) variable (X2) on Unemployment (Z) is -0.2956.
3. The influence of other variables on Unemployment (Z), aside from Poverty (X1) and HDI (X2), is 0.2281.
4. The direct effect of the Poverty variable (X1) on Economic Growth (Y) is -0.5306.
5. The direct effect of the HDI variable (X2) on Economic Growth (Y) is -0.7988.
6. The direct effect of the Unemployment variable (Z) on Economic Growth (Y) is -0.8398.
7. The effect of other variables on Economic Growth (Y), aside from Poverty (X1), HDI (X2), and Unemployment (Z), is 0.5992.
8. The indirect effect of the Poverty variable (X1) on Economic Growth (Y) through Unemployment (Z) is -0.1399.
9. The indirect effect of the HDI variable (X2) on Economic Growth (Y) through Unemployment (Z) is 0.2482.



## Hypothesis Test Results

### T-Test Results ( Partial )

Equality	Track	t-Statistic	Probability
Equation 1	X1 => Z	1.248459	0.2169
	X2 => Z	-6.049583	0.0000
Equation 2	X1 => Y	-1.152702	0.2538
	X2 => Y	-3.761266	0.0004
	Z => Y	-1.879032	0.0654

Based on the partial t-test results of path analysis Equation 1 and Equation 2 presented in the table above, the following conclusions regarding the partial influence between the independent and dependent variables can be drawn:

1. The variable X1 (Poverty) has a t-statistic value of 1.248459 with a probability value of 0.2169 ( $>0.05$ ). Therefore, it can be concluded that X1 (Poverty) does not have a significant influence on variable Z (Unemployment), meaning Hypothesis H1 is rejected.
2. The variable X2 (Human Development Index) has a t-statistic value of -6.049583 with a probability value of 0.0000 ( $<0.05$ ). Therefore, it can be concluded that X2 (HDI) has a significant influence on variable Z (Unemployment), meaning Hypothesis H2 is accepted.
3. The variable X1 (Poverty) has a t-statistic value of -1.152702 with a probability value of 0.2538 ( $>0.05$ ). Thus, it can be concluded that X1 (Poverty) does not have a significant influence on variable Y (Economic Growth), meaning Hypothesis H3 is rejected.
4. The variable X2 (HDI) has a t-statistic value of -3.761266 with a probability value of 0.0004 ( $<0.05$ ). Therefore, it can be concluded that X2 (HDI) has a significant influence on variable Y (Economic Growth), meaning Hypothesis H4 is accepted.
5. The variable Z (Unemployment) has a t-statistic value of -1.879032 with a

probability value of 0.0654 ( $>0.05$ ). Thus, it can be concluded that Z (Unemployment) does not have a significant influence on variable Y (Economic Growth), meaning Hypothesis H5 is rejected.

### F Test Results ( Simultaneous )

Equality	F-Statistic	Probability
Equation 1	37.09532	0.000000
Equation 2	7.115299	0.000004

Based on the table above, it can be seen that the probability value in the F-test for Equation 1 is 0.000000 ( $<0.05$ ). Therefore, it can be concluded that, simultaneously, variable X1 (Poverty) and variable X2 (Human Development Index/HDI) have a significant influence on variable Z (Unemployment). Meanwhile, in the F-test for Equation 2, the probability value is 0.000004 ( $<0.05$ ). Thus, it can be concluded that variables X1 (Poverty), X2 (HDI), and Z (Unemployment) have a significant simultaneous influence on variable Y (Economic Growth).

### Coefficient Test Results Determination ( $R^2$ )

Equality	Adj. R Squared
Equation 1	0.771894
Equation 2	0.400789

Based on the results of the coefficient of determination test shown in the table above, it can be seen that the Adjusted R-Square value for Equation 1 is 0.771894 or 77.18%. This indicates that the variables Poverty and Human Development Index (HDI) explain 77.18% of the variation in Unemployment, while the remaining 22.82% is influenced by other variables not included in this study. In Equation 2, the Adjusted R-Square value is 0.400789 or 40.07%, which means that the variables Poverty, HDI, and Unemployment collectively explain 40.07% of the variation in Economic Growth. The remaining 59.93% is influenced by other factors outside the scope of this research.

## Sobel Test

### Sobel Test Calculation Results : Influence Variable X1 Against Variable Y Through Variable Z (Intervening)

Input:	Test statistic:	Std. Error:	p-value:
a 0.166619	Sobel test: -1.03985784	0.13455763	0.29840595
b -0.839765	Aroian test: -0.95064858	0.14718457	0.3417828
s <sub>a</sub> 0.133460	Goodman test: -1.16005206	0.12061597	0.24602761
s <sub>b</sub> 0.446914	Reset all	Calculate	

Based on the results of the Sobel test for Equation 1, the obtained p-value is 0.29840595 ( $>0.05$ ), with a Sobel test statistic of -1.03985784. Therefore, it can be concluded that the variable X1 (Poverty) does not have a statistically significant indirect effect on the variable Y (Economic Growth) through the mediating variable Z (Unemployment). In other words, Unemployment (Z) is not able to mediate the influence of Poverty (X1) on Economic Growth (Y), and thus, Hypothesis H6 is rejected.

### Sobel Test Calculation Results : Influence Variable X2 Against Variables Y Through Variable Z (Intervening)

Input:	Test statistic:	Std. Error:	p-value:
a -0.295585	Sobel test: 1.79446365	0.13832653	0.0727392
b -0.839765	Aroian test: 1.77251423	0.14003946	0.07630924
s <sub>a</sub> 0.048860	Goodman test: 1.8172492	0.13659213	0.06917896
s <sub>b</sub> 0.446914	Reset all	Calculate	

Based on the results of the Sobel test for Equation 1, the obtained p-value is 0.0727392 ( $>0.05$ ), with a Sobel test statistic of 1.79446365. Therefore, it can be concluded that the variable X2 (Human Development Index/HDI) does not have a statistically significant indirect effect on the variable Y (Economic Growth) through the mediating variable Z (Unemployment). In other words, Unemployment (Z) is not able to mediate the influence of HDI (X2) on Economic Growth (Y), and thus, Hypothesis H7 is rejected..

## 5. Closing

### 5.1 Conclusion

Based on the results of the research, it can be concluded that the level of poverty in the five provinces of Sulawesi does not have a significant influence on either the unemployment rate or economic growth. On the other hand, the Human Development Index (HDI) has a significant effect on both

unemployment and economic growth. This clearly highlights the importance of improving the quality of human resources in reducing unemployment and accelerating economic growth. However, unemployment is not able to mediate the influence of HDI and poverty on economic growth. Therefore, improvements in the education and health sectors, as components of HDI, are crucial for achieving sustainable economic growth in the five provinces of Sulawesi.

## 5.2 Suggestion

Based on the research results, the researcher recommends that the governments of the five provinces in Sulawesi place greater focus on improving the quality of education and healthcare, as reflected in the Human Development Index (HDI), which has been proven to significantly influence economic growth. In addition, efforts to create more employment opportunities are necessary to reduce the unemployment rate, which can indirectly support economic growth. Furthermore, policies aimed at addressing poverty should be further developed in order to create a greater impact on improving public welfare.

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