

THE IMPACT OF UNEMPLOYMENT RATE, HUMAN DEVELOPMENT INDEX, AND POPULATION ON POVERTY IN GROBOGAN REGENCY : A MULTIPLE LINEAR REGRESSION APPROACH

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ABSTRACT

Poverty is one of the major challenges faced by nearly all cities and regencies in Indonesia, including Grobogan Regency, Central Java. According to data released by the Central Statistics Agency (BPS) of Central Java Province, as of March 2025 the poverty rate in Grobogan stood at 10.63%, which is higher than both the provincial and national averages. Poverty is a multidimensional issue that cannot be viewed solely from an economic perspective.

This study aims to analyze the effect of the Open Unemployment Rate (OUR), the Human Development Index (HDI) and population size on the poverty rate in Grobogan Regency, Central Java. The study employs secondary data obtained from BPS Grobogan Regency. The analytical method used in multiple linear regression, with three independent variables (HDI, OUR, and population size) and one dependent variable (poverty rate).

The findings reveal that the Human Development Index (HDI) and population size have a significant partial effect on the poverty rate in Grobogan Regency. In contrast, the Open Unemployment Rate (OUR) does not exhibit a significant partial effect. Specifically, a 1% increase in OUR is associated with a 2.8% rise in the poverty rate, while a 1% decrease in HDI corresponds to a 9% increase in the poverty rate. Meanwhile, a 1% increase in population size leads to a 0.0002578% increase in the poverty rate.

Based on these results, policy interventions should prioritize enhancing the Human Development Index while simultaneously implementing population control measures.

Keywords: Poverty, Human Development Index (HDI), Open Unemployment Rate (OUR), Population Growth, Multiple Linear Regression, Grobogan Regency

INTRODUCTION

Poverty is one of the main problems experienced by almost all cities and regencies in Indonesia, including Grobogan Regency. According to the Central Statistics Agency, people are considered poor if they are unable to fulfill their basic rights to maintain and develop a dignified life. Poor people are those who have an average per capita expenditure per month below the poverty line (Susanto, Rudy and Indah Pengesti, 2020). BPS states that the poverty line indicates the minimum amount of rupiah needed to meet the minimum basic food requirements, equivalent to 2100 Kcal per capita per day, and basic non-food requirements. Although the poverty rate in Grobogan Regency has declined over the past twelve years, the percentage of poor people in Grobogan Regency in 2025 will still be higher than the provincial and national levels in Central Java. According to data compiled by the Central Statistics Agency (BPS), in 2025 the percentage of poor people in Grobogan Regency will be 10.63%.

Meanwhile, at the Central Java Province level it will be 9.48% and at the national level it will be 8.47%. In terms of ranking, Grobogan Regency ranks 12th out of 35 cities and regencies in Central Java Province. Although the poverty rate in Grobogan Regency has decreased over time, an approach is still needed to identify the main causes affecting the rate of poverty in Grobogan. The aim is to ensure that strategies and policy-making are more targeted in efforts to reduce poverty.

According to (Alkire et al., 2022), poverty is not a single issue, but rather the result of the interaction of various factors that influence each other. Thus, poverty is a multidimensional problem involving many factors, both social and economic. Therefore, a multiple linear regression statistical approach was chosen to determine which socioeconomic factors have a significant impact on the percentage of poor people in Grobogan Regency. Multiple linear regression is a linear regression model involving more than one independent variable or predictor (Sudariana, Nuzwan, and Yoedani, 2022). In this study, the factors suspected of influencing the percentage of poor people in Grobogan Regency are the open unemployment rate, the human development index, and the population growth rate. According to (Azfirmawarman, et al., 2023), the Human Development Index (HDI) is a parameter of the success of efforts to improve the skills of the population, developed by considering three aspects, namely health and longevity, quality of education, and decent living. Meanwhile, open unemployment, according to (Rambe et al., 2019), is defined as a term that refers to people who are not working at all, are looking for work, work less than two days a week, or are trying to find decent work. An increase in the open unemployment rate indicates that the number of jobs available is not proportional to the number of workers in a region. The open unemployment rate can cause an increase in poverty because it can reduce productivity and community income. Population size can also be one of the causes of poverty if the growth rate is high and uncontrolled. A sharp increase in population size without being balanced by an increase in income, job opportunities, and good quality education will certainly increase social and economic problems. The purpose of this study is to identify the factors that significantly influence the percentage of poor people in Grobogan Regency, so that it can be used as an alternative in policy-making related to poverty issues.

METHODS

In this study, the data used is secondary data obtained from the Central Java Provincial Statistics Agency and Grobogan Regency in the period 2013-2024. The data collection technique used is statistical documentation with quantitative data processing using inferential statistics. The data analysis method used was multiple linear regression analysis. The tool used in data analysis was SPSS software version 25. Before performing multiple linear regression analysis, the data was tested using classical assumption analysis. Classical assumption analysis in this study consisted of normality tests, heteroscedasticity tests, and multicollinearity tests. The data must be normally distributed and free from heteroscedasticity and multicollinearity before multiple linear regression testing can be performed. The independent variables used in this study are the human development index (X1), the open unemployment rate (X2), and the population size (X3). Meanwhile, the dependent variable is the percentage of poor people (Y) in Grobogan Regency.

According to (Suriana, Nuzwan and Yoedani, 2022), the multiple linear regression equation is expressed in the following mathematical equation:

$$Y = a + b_1X_1 + b_2X_2 + \dots + b_nX_n + e \dots \dots \dots (1)$$

Description :

- Y = Dependent Variable
- X1,X2 = Independent Variable
- a = Constant
- b1,b2,b3 = Regression Coefficient
- e = Confounding Variable

Based on the independent and dependent variables used in this study, the mathematical equation for multiple linear regression is as follows:

$$K_p = a + b_1T_{pt} + b_2I_{pm} + b_3J_p + e \dots \dots \dots (2)$$

Description :

- K_p = Percentage of Poor Population (Dependent Variable)
- T_{pt} = Open Unemployment Rate (Independent Variable 1)
- I_{pm} = Human Development Index (Independent Variable 2)
- J_p = Population (Independent Variable 3)
- a = Constant
- e = Unemployment Variable
- b₁,b₂,b₃ = Regression Coefficients

RESULTS AND DISCUSSION

Classical Assumption Test

The classical assumption test is a statistical test used as a statistical requirement that must be met in least squares (OLS)-based multiple linear regression analysis (Budi et al., 2024). This test consists of normality tests, heteroscedasticity tests, multicollinearity tests, autocorrelation tests, and linearity tests. In this study, the types of classical assumption tests used were normality tests, heteroscedasticity tests, and multicollinearity tests.

Normality Test

The normality test is used to determine whether the data distribution is normal or not. In this study, the Kolmogorov-Smirnov method was used for the normality test. Based on the results of the normality test, the results are as shown in Table 1 below.

Table 1. Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		12
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	.04647308
Most Extreme Differences	Absolute	.185
	Positive	.082
	Negative	-.185
Test Statistic		.185
Asymp. Sig. (2-tailed)		.200 ^{c,d}

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Based on the results of the normality test analysis presented in Table 1, it can be seen that the significance value is 0.200. This value is greater than 0.05. Therefore, it can be stated that H_0 is accepted. A significance value greater than 0.05 means that the data is normally distributed, so the analysis can proceed to the next stage.

Heteroscedasticity Test

The heteroscedasticity test is used to see whether or not there is a high correlation between the independent variables in a multiple linear regression model. This is because if a data set has a high correlation between its independent variables, the relationship between the independent variables and the dependent variable will be disrupted (Budi et al., 2024). Based on the test results, the results are presented in Table 2 below.

Table 2. Heteroscedasticity Test Results

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.653	.987		.662	.527
	TPT	-.006	.010	-.215	-.581	.577
	IPM	-.008	.013	-.526	-.645	.537
	JUMLAH PENDUDUK	-7.801E-9	.000	-.141	-.165	.873

a. Dependent Variable: ABS_RES

Table 2 shows that the significance values of all independent variables used in this study (Open Unemployment Rate, Human Development Index, and Population) are greater than 0.05. This means that all independent variables used do not exhibit heteroscedasticity. Therefore, further testing can be carried out.

Multicollinearity Test

The multicollinearity test is used to determine whether a regression model has a correlation (strong relationship) between independent variables or dependent variables. The values observed in the multicollinearity test are the Tolerance and VIF values. If the Tolerance value is greater than or equal to 0.10, then the data does not experience multicollinearity. As for the VIF value, if it is less than or equal to 10, there is no multicollinearity. Based on the test, the results are presented in Table 3 below.

Table 3. Multicollinearity Test Results

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	13.112	1.829		7.168	.000		
	TPT	.028	.018	.020	1.536	.163	.773	1.293
	IPM	-.090	.024	-.109	-3.764	.006	.159	6.291
	JUMLAH PENDUDUK	2.578E-6	.000	.890	29.470	.000	.145	6.897

a. Dependent Variable: PENDUDUK MISKIN

Based on the results shown in Table 3, it can be seen that the Tolerance values for the independent variables TPT, IPM, and population size are greater than 0.10. In addition, the VIF values for all independent variables TPT, IPM, and population size are less than 10. Therefore, it can be stated that the data does not exhibit multicollinearity. Therefore, the testing can be continued using multiple linear regression analysis.

Determination Coefficient Test

The determination coefficient test is used to determine how much of the variation in the dependent variable (Y) can be explained by the independent variables (X) in a regression model. The coefficient of determination test is symbolized by R² (R square). The higher the R² value, the better the model's ability to explain the dependent variable. The R² value ranges from 0-1. In the test, the results are presented in Table 4.

Table 4. Coefficient of Determination Test

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.999 ^a	.999	.999	.05449

a. Predictors: (Constant), JUMLAH PENDUDUK, TPT, IPM

Table 4 shows that the R² value is 0.999 or 99%. This means that the influence of independent variables X1 (Human Development Index), X2 (Open Unemployment Rate), and X3 (Population) on the dependent variable Y (Percentage of Poor Population) is 99%, with the remaining 1% influenced by other factors.

Simultaneous F Test

The F test is used to measure whether all independent variables used in the test simultaneously have a significant effect on the dependent variable. If the significance value is ≤ 0.05 , it can be said that all independent variables used simultaneously have a significant effect on the dependent variable. The test results are shown in Table 5 below.

Table 5. F Test

		ANOVA ^a				
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.436	3	7.479	2518.400	.000 ^b
	Residual	.024	8	.003		
	Total	22.460	11			

a. Dependent Variable: PENDUDUK MISKIN

b. Predictors: (Constant), JUMLAH PENDUDUK, TPT, IPM

Based on the results presented in Table 5, it is known that the significance value is 0.000b. This means that the simultaneous effects of the Human Development Index, Open Unemployment Rate, and Population Size variables have a significant effect on the Percentage of Poor People in Grobogan Regency.

Partial T Test

The partial T test is a statistical test used to test the effect of each independent variable individually on the dependent variable (Y) with the assumption that other variables remain constant. Table 6 shows the results of the partial T test on the data. If the significance value is ≤ 0.05 , it means that the independent variable has a significant partial effect on the dependent variable, and vice versa.

Table 6. Partial T Test

Coefficients ^a						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	13.112	1.829		7.168	.000
	TPT	.028	.018	.020	1.536	.163
	IPM	-.090	.024	-.109	-3.764	.006
	JUMLAH PENDUDUK	2.578E-6	.000	.890	29.470	.000

a. Dependent Variable: PENDUDUK MISKIN

Based on the test results listed in Table 6, it can be seen that for the independent variable Human Development Index (HDI) has a significance value ($0.006 < 0.05$). Thus, partially, the independent variable HDI has a significant effect on the percentage of poor people in Grobogan Regency. The significance value of the independent variable TPT is ($0.163 > 0.05$), meaning that partially, the TPT variable does not have a significant effect on the percentage of poor people in Grobogan Regency. Furthermore, the population variable has a significance value of ($0.000 < 0.05$), so it can be stated that partially, the population variable has a significant effect on the percentage of poor people in Grobogan Regency.

Multiple Linear Regression Model

The multiple linear regression model in this study was used to determine which factors have a significant effect on a dependent variable. Explanations related to independent variables that have a significant effect on the dependent variable are explained in the F test and T test above. Table 7 shows the results of multiple linear regression modeling.

Table 7. Multiple Linear Regression Model

Coefficients ^a				
		Unstandardized Coefficients		
Model		B	Std. Error	
1	(Constant)	13.112	1.829	
	TPT	.028	.018	
	IPM	-.090	.024	
	JUMLAH PENDUDUK	2.578E-6	.000	

a. Dependent Variable: PENDUDUK MISKIN

Based on Table 7, the mathematical equation for the multiple linear regression model is as follows:

$$Y = 13.112 - 0.090X_1 - 0.090X_2 + 0.000002578X_3 \text{ atau,}$$

$$K_p = 13.112 + 0.028T_{pt} - 0.090I_{pm} + 0.000002578J_p$$

The results of the mathematical equation are read as follows:

- 1) If the values of all independent variables (TPT, IPM, and Population) are zero (0), then the percentage of poor people in Grobogan Regency is 13.112%;
- 2) A one percent (1%) increase in the open unemployment rate in Grobogan Regency will increase the percentage of poor people by 2.8%;
- 3) A one percent (1%) decrease in the Human Development Index in Grobogan Regency will increase the percentage of poor people by 9%; and

- 4) A one percent (1%) increase in the Population in Grobogan Regency will increase the percentage of poor people by 0.0002578%.

CONCLUSIONS

Based on the entire series of studies conducted, it can be concluded that:

- a) The combination of the variables of Open Unemployment Rate, Human Development Index, and Population has a significant effect on the Percentage of Poor People in Grobogan Regency;
- b) The Human Development Index and Population have a significance value of less than 0.05, so that these independent variables partially have a significant effect on the Percentage of Poor People in Grobogan Regency. Where, a decrease in HDI will increase the percentage of poor people and an increase in population will increase the percentage of poor people in Grobogan Regency, Central Java; while
- c) The Open Unemployment Rate variable does not partially have a significant effect on the Percentage of Poor Population in Grobogan Regency, Central Java;
- d) Although the number and variety of independent variables used are limited, both in terms of type and number, the results of this study can still be used by Grobogan Regency as an alternative policy option for stakeholders, especially regional heads, in overcoming poverty issues. Therefore, the focus on increasing the HDI and controlling the population needs to be carried out continuously in order to reduce the number of poor people in Grobogan Regency, Central Java;
- e) Further analysis and details with a more diverse range of independent variables are needed so that policy-making based on the results of this study can be more accurate and precise, given that poverty is a multidimensional problem.

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