

## Research Article

# Variables Affecting Poverty Rate in East Java, Indonesia

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**ORCID**Inayati Nuraini Dwiputri: <https://orcid.org/0000-0002-2083-2408>**Abstract.**

Poverty is one of the fundamental problems faced by various countries, including Indonesia. The objective of this study is to identify the variables that have an effect on poverty rate in East Java Province. Applying panel data and regression analysis method, this study compares the three models – the common effect, fixed effect, and random effect. Using Chow Test and Hausman Test, this study found that the best model is Fixed Effect. The empirical outcomes show that education, unemployment, population, dependency ratio, and health insignificantly affect poverty. Variables of Gross Regional Domestic Product (GRDP) per capita, and per capita expenditure has a significant effect on poverty. The higher per capita expenditure tends to increase the poverty level. Then, the higher GRDP per capita tends to lower the poverty in East Java especially.

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## 1. Introduction

Poverty is described as a lack of income to meet the basic needs of life or the minimum needs, namely clothing, food, housing, education and health. In a broad sense, multidimensionally poverty is the inability to achieve diverse human needs, viewed through various aspects. According to Giovanni (2018) poverty can include poor assets, insufficient participation in socio-political organizations, and limited knowledge and skills. At the same time, the secondary dimensions include poor social networks, low financial resources and limited information. One of the goals of a country in tackling and overcoming poverty aims to advance the welfare of its people. In this case, when a region wants to develop or experience growth, it needs to carry out development both in economic development and human resource development. Improvements in the condition of poverty can be provided by assessing the sources that are the issue

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in poverty. Therefore, it is necessary to conduct research by examining various factors that can affect the level of poverty.

The data from Statistics Indonesia noted that of the six provinces on the Java Island with the highest poverty level was DI Yogyakarta (11.70%), followed by Central Java (10.80%) and East Java (10.37%). Additionally, West Java, Banten and DKI Jakarta have the %age of 6.91%, 5.09%, 3.47%, respectively. The earth's resources cannot keep up with the needs of a growing population. As a result, unlimited human wants are inversely proportional to the number of natural resources used to satisfy people's needs and wants. This fact pushes people closer to the poverty line due to competition in meeting their needs and wants.

Several previous studies have the exact scope of discussion or are relevant to this research. For example, a prior study by Wahyuni and Damayanti (2014) adopted variables of education, economic power, life expectancy, literacy rate, the average length of schooling, per capita expenditure, and the number of poor people. The finding indicates that the variables of education and life expectancy have a positive influence, while economic power, literacy rate, the average length of schooling, and per capita expenditure negatively impact poverty in Papua Province.

In addition, Seran (2012) found that only the inflation variable has a positive and insignificant effect, while other variables have a negative and significant effect on poverty. Meanwhile, Puspita (2015) remarked that unemployment and population variables had a positive and significant effect, whilst Gross Regional Domestic Product (GRDP) had a significant negative effect, and literacy rates had an insignificant negative effect on poverty in Central Java Province. Another study by Misdawita & Sari (2013) revealed that the health variable had a positive and significant effect, while the education variable had a significant negative effect, and the subsidy variable had an insignificant negative effect on poverty in Indonesia. Furthermore, Kumalasari (2011) engaged the variables of population, economic growth rate, life expectancy, literacy rate, the average length of schooling, per capita expenditure, and poverty level. The result shows that variables of population, life expectancy, per capita expenditure had a significant negative effect, and the economic growth rate had an insignificant negative effect. In contrast, the variables of literacy rate and the average length of schooling have no significant positive effect on poverty in Central Java.

Some of these studies have not shown the consistency of the variables that can affect the poverty level. In the current condition, poverty in society is also influenced by several factors other than population, education and health. Thus, further research is needed on the factors that cause poverty, including GRDP per capita, expenditure per

capita, and dependency ratio. Accordingly, further analysis and assessment are required on what factors can influence the poverty level in this case. This research is expected to address questions related to what variables can affect the level of poverty, especially in all districts/cities in East Java Province.

## 2. Literature Review

Poverty and income inequality are global issues that have been concerned in several countries. In the identification of the poverty variable, Ratifah, Pratiwi & Respatiwulan (2019) incorporated with the independent variables the open unemployment rate, the Gini index, the school enrollment rate aged 16-18 years, the population aged ten years and over with the highest education graduating from junior high school and below, and poor people. The findings indicate that the variable of the open unemployment rate has an insignificant positive effect, and the variable of the population aged ten years and over with the highest education completed has a significant positive effect. While the Gini index variable has a significant negative effect, the school participation rate variable aged 16-18 years has an insignificant negative effect on poverty in East Java Province.

Kumalasari (2011) engaged the variables of population, economic growth rate, life expectancy, literacy rate, the average length of schooling, per capita expenditure, and poverty rate in Central Java, with a period of 2005-2009. The same variables are education (literacy rate and average length of schooling), population, health (life expectancy), and per capita expenditure. The variables that differ from this research are the rate of economic growth and the level of poverty. Another difference is in the period and the object of research.

Unemployment has an insignificant effect in poverty of East Java, as the high level of family income can still cover living expenditures for family members who are still unemployed. In poverty, unemployed household members do not automatically become poor since other family members earn enough to keep their families above the poverty line (Amalia, 2012). According to Dwiputri, Kusufi, and Allo (2019), the number of unemployed residents in the community directly or indirectly links with the annual rise in the resident population. When the unemployment rate, which is constantly increasing, is not controlled correctly, it accumulates an even more significant number of unemployed. A high unemployment rate will lead economic challenges, social problems such as poverty and income inequality.

Comparing these some earlier studies, Puspita (2015) involved the independent variables of poverty are unemployment, GRDP, population (total population), literacy rate, and the number of poor people in 2008-2012 with the scope of research in Central Java Province. From these variables, the same as the research is the unemployment variable. The different variables are GRDP, population (number of people), literacy rate, and poor people. In addition, the research time is also different, in which this research was conducted in 2014-2018 with the scope of the Regency / City of East Java Province.

Misdawita & Sari (2013) found that education has a detrimental influence on poverty. The Labor Force Participation Rate (LFPR) for elementary, junior, and high school graduates in East Java is relatively high compared to the (LFPR) for university education. In general, university education can reduce the number of poor people in East Java to a reasonable level. Wirawan & Arka (2015) conducted research and discovered that GRDP per capita has a negative and significant effect on poverty.

Ningtiyas & Anwar (2021), revealed that per capita expenditure had a positive and significant effect on poverty. Consumption expenditure on a per capita rate also contributes to rising poverty. This occurs when extremely high public consumption expenditures exceed per capita income. Concerning the high level of family consumption, when a business begins to reduce output and raise prices, it will eventually force individuals to purchase these essentials at inflated costs. This might increase the burden of fees or expenses incurred by a household in indirectly meeting its daily demands. As a result, the community's increasing cost burden pushes them closer to poverty.

Todaro (2003) argues that GRDP per capita is a proxy for development achievement. The development objective is to raise people's incomes to the point where income growth is a barometer of development progress. GRDP per capita is also used as a proxy for a region's population's degree of welfare. The gross domestic product per capita of an area indicates the average ability of people's income to meet their necessities. The fulfilment of a community's fundamental needs is a barometer of welfare in terms of equal regional revenue distribution. Poverty is related to earning capabilities and the distribution of income within a community (Todaro, 1997).

### 3. Research Method

This study employed a quantitative methodology. According to Sugiyono (2015:8), quantitative research methods can be defined as those based on the positivist philosophy, which is used to examine specific populations or samples, collect data using research instruments, and analyze data quantitatively or statistically with the goal of

testing hypotheses. The factors studied in this study are unemployment (X1), education (X2), population (X3), and GRDP per capita (X4), as well as health (X5), per capita expenditure (X6), and dependence ratio (X7). According to Sugiyono (2015:80), the population is a classification area comprised of items or subjects with specified features and characteristics chosen by researchers to be investigated and conclusions reached. In this study, the population is comprised of the entire research subjects, meaning all districts/cities in East Java Province.

The type of data used in this study is panel data, and the data sources are secondary. The data gathering technique used in this study is recording archival data from publications and academic studies held by the Central Statistics Agency (BPS). As defined by Pujoalwanto (2014: 55), panel data regression is a type of regression approach that mixes time series with cross-section data.

The independent variables in this structural model is provided as follows.

$$L_n Y_{it} = \beta_0 + \beta_1 L_n X_1 + \beta_2 L_n X_2 + \beta_3 L_n X_3 + \beta_4 L_n X_4 + \beta_5 L_n X_5 + \beta_6 L_n X_6 + \beta_7 L_n X_7 + \epsilon_{it}$$

Y = Poverty

B = Constant

$\beta_{1,2,3,4,5,6,7}$  = Regression coefficient

X1 = Unemployment

X2 = Education

X3 = Total Population

X4 = GRDP per capita

X5 = Health

X6 = Per capita expenditure

X7 = Dependency Ratio

i = Cross Section (District / City)

t = Time Series (2014 - 2018)

$\epsilon$  = Error

According to Firdaus (2018), a model without individual impact (Common Effect Model/CEM) is an estimate that integrates (pooled) time series and cross-section data and estimates the parameters using the OLS (Ordinary Least Squares) method. This is referred to as the Common Effects estimation model, the most straightforward regression technique for estimating panel data by only combining Time Series and Cross-Section data. Fixed Effect Model (FEM) model technique, referred to as the Fixed Effect or Least Square Dummy Variable model, involves using a dummy variable. According to

Pangestika (2015), the Fixed Effect Model assumes that the slope coefficient is constant while the intercept is not. The Random Effect Model (REM) is the third approach to panel data modelling. The error in the random-effects model includes parameters that vary between regions and over time. As a result, the random-effects model is sometimes referred to as the error component model.

The Chow and Hausman tests were utilized to estimate the Panel Data in this study. The Chow test is used to assess if a Fixed Effect or Common Effect model is the most appropriate for estimating panel data. If the estimated F-value is greater than the F-critical, the null hypothesis is rejected, indicating that the Fixed Effect technique is the proper model for panel data regression. The Hausman test is a statistical test used to determine whether to adopt a Fixed Effect or Random Effect model. If the Hausman statistic is greater than the critical value of Chi-Squares, the Fixed Effect model is the suitable model for panel data regression.

## 4. Results and Discussion

Prior to doing the classical assumption test, it is required first to validate the model. Model selection aims to identify some of the best models for panel data regression. In panel data regression, two models are used: the Chow Test and the Hausman Test. The Chow Test is one way to test the Common Effect model or Pooled Least Squares (PLS) with the Fixed Effect method, which is the most suitable method for estimating panel data (Widarjono, 2013). The Fixed Effect (FEM) model is applied in this study, which still involves the application of standard assumption testing procedures such as the Normality Test, Multicollinearity Test, Heteroscedasticity Test, and Autocorrelation Test.

The R-squared is 0.492 or 49.2% in the Common Effect Model. These findings indicate that unemployment (X1), education (X2), population (X3), GRDP per capita (X4), health (X5), per capita expenditure (X6), and the dependency ratio (X7) are all capable of explaining 49.2% of the probability of poverty (Y). In comparison, the remaining 50.8% is explained by variables not included in this regression equation model. The Fixed Effect Model's R-squared value is 0.989, or 98.9%. These findings indicate that unemployment (X1), education (X2), population (X3), GRDP per capita (X4), health (X5), per capita expenditure (X6), and the dependency ratio (X7) are all-sufficient to explain 98.9% of the probability of poverty (Y). In comparison, the remaining 1.1% is explained by variables not included in this regression equation model. The Random Effect Model's R-squared score is 0.661, or 66.1%. These findings indicate that unemployment (X1), education (X2),

TABLE 1: Estimation Results for Variables Affecting East Java Province's Poverty Levels.

Variable	CEM	FEM	REM
Ln_Unemployed	0.0000*** (0.058)	0.750 (0.019)	0.477 (0.018)
Ln_Education	0.0007*** (0.262)	0.116 (0.277)	0.000*** (0.219)
Ln_Population	0.3553 (0.038)	0.394 (0.682)	0.986 (0.067)
Ln_GDP Per Capita	0.2886 (0.041)	0.000*** (0.071)	0.000*** (0.054)
Ln_Health	0.0000 (0.872)	0.344 (1.257)	0.416 (1.026)
Ln_Per capita expenditure	0.0395** (0.131)	0.025** (0.139)	0.001*** (0.093)
Ln_Dependency Ratio	0.1356 (0.332)	0.648 (0.085)	0.462 (0.085)
R <sup>2</sup>	0.492	0.989	0.661
N	190	190	190

Note: Standard Error in parentheses.  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

population (X3), GRDP per capita (X4), health (X5), per capita expenditure (X6), and the dependency ratio (X7) are all capable of explaining 66.1% of the probability of poverty (Y). In comparison, the remaining 33.9% is performed by variables not included in this regression equation model.

Based on the results of the Chow test, it is known that the value of the F-statistic is 182.1563 and the probability value is 0.0000. Therefore, the result of determining the panel data regression model with the Chow test is to choose the Fixed Effect Model (FEM) model than Common Effect Model. The Hausman test findings indicate that the Chi-square statistic equals 36.7953 and the probability equals 0.0000; thus, the result of identifying the panel data regression model using the Hausman test is to choose the Fixed Effect Model (FEM) model than Random Effect Model. The Chow and Hausman tests indicate that the Fixed Effect Model is the most appropriate estimate strategy for this investigation (FEM). The model still requires traditional assumption testing, which includes the Normality Test, Multicollinearity Test, Heteroscedasticity Test, and Autocorrelation Test.

Based on the normality test results, the Jarque-Bera test value is 4.095317, and the probability value is 0.129037, as determined by the Normality test findings. The conclusion is the error term had normally distributed. The Multicollinearity test determines that each of the seven independent variables has a correlation coefficient less than 0.80 or 80%. According to the statistical evaluation, there is no evidence of multicollinearity between the independent variables. Thus, the assumption test for the absence of multicollinearity can be fulfilled in this study. The Heteroscedasticity test indicates that all

variables have a probability value greater than  $\alpha = 0.05$ , indicating that the residuals have homogenous variance (constant), or in other words, there are no symptoms of heteroscedasticity. Durbin-Watson coefficient was 2.159 in this study. Considering that the Durbin-Watson (DW) test value is 2.159; the condition of no autocorrelation is fulfilled.

According to Table 1, the effect of unemployment (X1) on poverty is insignificant. The influence of Education (X2) on poverty is insignificant at  $\alpha = 5\%$ , indicates that education do not have a significant effect on poverty. The effect of the total population (X3) on poverty is insignificant. It indicates that increasing the population will not affect in reducing poverty. Furthermore, GDP per capita (X4) has a significant effect on poverty at  $\alpha = 5\%$ . This suggests that GDP per capita affects poverty or that as GDP per capita increases, poverty will decrease. Additionally, the contribution of Health (X5) on poverty is insignificant at  $\alpha = 5\%$ . This indicates that either health has a minor effect on poverty or that when health improves, poverty has a negligible effect. The effect of per capita expenditure (X6) on poverty is statistically significant at  $\alpha = 5\%$ . This means that either per capita expenditure has a major effect on poverty or that as per capita expenditure increases, poverty increases significantly. The effect of dependency ratio (X7) on poverty is insignificant at  $\alpha = 5\%$ . This indicates that poverty cannot be significantly influenced by the dependency ratio.

According to the analysis results, indicating that unemployment has an insignificant effect on poverty. This study corroborates with Puspita (2015), who indicated that unemployment had a beneficial effect on poverty in Central Java. The findings of this study also confirm prior research conducted by Amalia (2012), which revealed that unemployment had an insignificant influence on poverty in the region. Additionally, according to research conducted by Ebunoluwa & Yusuf (2018), unemployment positively affects poverty in Nigeria. A high unemployment rate, corruption, and insufficient education and health systems may be contributing to the fact that economic progress has not resulted in the predicted reduction in poverty. The research indicating that education has an insignificant effect on poverty. Education is examined in this study through the lens of the education index. The findings of this study corroborate Kurniawan (2018), which concluded that education has a negative and insignificant influence on poverty. The analysis indicating that the variable expenditure per capita had a significant effect on poverty. This study corroborates previous research by Ningtiyas & Anwar (2021), which revealed that per capita expenditure had a positive and significant effect on poverty.

Table 2 illustrates that the community workforce in East Java Province is significantly larger for residents with elementary, junior, and high school education levels than for individuals with college degrees. Thus, the low level of education in districts/cities in East



TABLE 2: Population Aged 15 Years and Over, 2018 by Highest Level of Education Achieved and Type of Activity During the Previous Week.

Highest Level of Education Achieved	Workforce	
	Working	Unemployed
No Schooling	3,846,427	56,624
Elementary school	5,600,901	103,796
Junior High School	3,743,697	160,250
Senior High School	5,252,542	418,581
College	2,006,382	111,223

Source: Central Bureau of Statistics, data processed, 2021

Java Province does not always correlate with poverty. This demonstrates that people with low levels of education will always attempt to fulfil their needs requirements through work. In this instance, employment in agriculture and other informal sectors that do not demand a high level of education is appropriate.

The research determined that the variable population has no significant effect on poverty. The population has a negative but insignificant effect on poverty. The findings of this study corroborate prior research by Agustina, Syechalad & Hamzah (2018), which concluded that the population had an insignificant effect on poverty in the area. Additionally, Kumalasari (2011) indicates that population (number of people) has a negative effect on poverty. The population variable has an insignificant effect on poverty in East Java Province because the population is continually increasing, while poverty tends to decrease even though it is still far above the national poverty average. The basic rationale is that the success of the family planning program has been evident since the results of the 2000 Population Census, such that the productive ages of the population pyramid currently dominate, and the population distribution resembles an inverted barrel. At the moment, the inverted barrel structure is regarded as ideal by most social-economic observers since it emphasizes the productive age, which provides a large workforce to stimulate economic development.

The FEM model indicating that the variable GRDP per capita has a significant effect on poverty. It can be concluded that GRDP per capita has a significant negative effect on poverty. The findings of this study corroborate those of Wiguna (2013), who found that GRDP per capita had a negative and substantial influence on poverty in the area. The study indicating that the health variable had no statistically significant effect on poverty. According to Widodo, Waridin & Maria (2011), health is a fundamental requirement of society; it is a constitutionally protected right for every citizen. The findings of this study

corroborate those of Pramesti & Bendesa (2018), who found that life expectancy had a beneficial but not statistically significant effect on poverty in Bali Province from 2000 to 2016. Additionally, Misdawita & Sari (2013) conducted research and discovered that life expectancy (health) had a detrimental effect on poverty.

In this study, health is measured by life expectancy, which has an insignificant effect on poverty. While someone of working age is likely to have good health and a high level of education, there are still those who have not found work owing to insufficient skills, leaving them without money, eventually increasing the number of poor people. Additionally, numerous government-sponsored health insurance programs, such as BPJS Health cards and the Indonesian government's (Healthy Indonesia Cards) make it easier for people to acquire and obtain adequate health care. Additionally, infrastructure development and the expansion of health sector institutions such as integrated service posts, health clinics, and hospitals in East Java facilitate community access to these health facilities. So that individuals do not feel financially constrained when seeking treatment. Furthermore, the insignificance of health to poverty stems from the fact that life expectancy does not guarantee an individual's ability to work productively and earn a high salary. The health of an individual is not just determined by their life expectancy. When someone is of working age but is unable to work due to a disease, it will be difficult for him/her to earn enough money to satisfy his/her daily necessities. As a result, increasing life expectancy does not ensure poverty reduction.

The research indicating that the dependency ratio variable had an insignificant effect on poverty. The dependency ratio has a positive but insignificant effect on poverty. The findings of this study confirm those of Hatta & Azis (2017), who concluded that the dependency ratio had a positive but insignificant influence on poverty in Indonesia. Additionally, Yustie (2020) conducted research in which she discovered that the dependency ratio positively affected poverty. This is aligned with Mantra (2004), which holds that the higher the dependence ratio, the worse the situation for the population's dependents, as some of the revenue gained must be spent on the needs of those who are not already productive. The Indonesian government contributes to poverty reduction by lowering the dependence ratio and birth rate through an increased public interest in family planning initiatives. According to Kominfo (2018), social assistance programs for the general public include the Smart Indonesia Program, the National Health Insurance Program, the Family Hope Program, and Rastra Social Assistance, a form of non-cash food assistance. The government's commitment to accelerating poverty reduction is shown in the growth of the social assistance program. This is highlighted by the fact that the poverty rate decreased from 11.22 percent in

2015 to 9.82 percent in 2018. Additionally, the Gini coefficient declined from 0.408 in 2015 to 0.389 in 2018. Simultaneously, the human development index climbed to 70.81 in 2017 from 68.90 in 2014. At the moment, both district and city areas are experiencing rapid population increase and economic development. The productive age population in the regency or city area must be absorbed into employment to raise the district or city community's per capita revenue.

## 5. Conclusion

Based on the problem statement of problems, the results of analysis, and the testing of hypotheses in the preceding chapter, and the research conducted, it can be concluded that the variables that have a significant effect on the poverty level in East Java Province when panel data regression analysis is used are GRDP per capita and per capita expenditure.  $R^2$  (coefficient of determination) is 0.989, this suggests that 98.9% of the poverty variable will be influenced by the independent variables, namely unemployment (X1), education (X2), population (X3), gross regional domestic product (GRDP) per capita (X4), health (X5), expenditure per capita (X6), and the dependence ratio (X7). By contrast, the remaining 1.1% variable poverty will be influenced by additional variables not discussed in this study.

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