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DETERMINANTS OF POVERTY IN EAST KALIMANTAN: A PANEL DATA APPROACH

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ABSTRACT

The purpose of this study was to determine the effect of per capita gross domestic product (GDP), poverty line, and open unemployment rate on the number of poor people in East Kalimantan using panel data regression analysis. The data used is secondary data from 2015-2022. The results of the analysis show that the best model in this case is the random effects model. All the dependent variables simultaneously have a significant effect on the number of poor people. Partially, GRDP per capita and the open unemployment rate have no significant effect. Meanwhile, the poverty line has a significant positive effect on the number of poor people in East Kalimantan

Keywords : *panel data; poverty; east kalimantan*

INTRODUCTION

Poverty is one of the fundamental issues still faced by Indonesia, including in Kalimantan Province. Poverty is not merely an economic problem but also closely related to social issues such as low levels of education, access to healthcare services, and inadequate infrastructure. This condition is exacerbated by the unequal distribution of income, which further deepens the wealth gap across various regions. East Kalimantan Province, known for its rich natural resources, especially in the mining and energy sectors, has a high Gross Regional Domestic Product (GRDP) per capita, even being one of the highest in Indonesia. This can be seen in Figure 1.

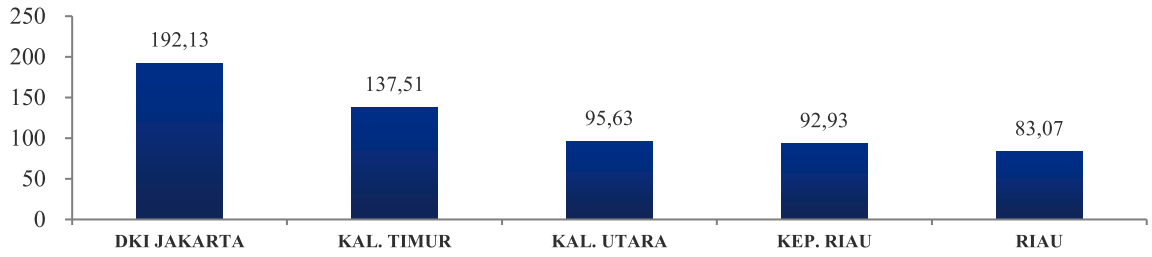

Figure 1. Province GRDP
Source: BPS (2023)

However, this phenomenon does not directly correlate with a decrease in poverty levels. In 2023, although East Kalimantan experienced an economic growth of 4.48% (Bappenas, 2023), the poverty rate in the province remains significant. This indicates an inequality in income distribution and a reliance on certain economic sectors that contribute less to the creation of widespread employment, especially for the local population with low levels of education. When looking at Indonesia's Gini ratio, the figure reached 0.388 (BPS, 2023), which is not a low number. In addition to GRDP per capita, the unemployment rate and poverty line are also important factors that can influence poverty levels. The high unemployment rate, reaching 5.31% in East Kalimantan in 2023, is an indicator of the limited access of the population to adequate job opportunities (Bappenas, 2023). This high unemployment rate directly affects income levels, which in turn contributes to increased poverty, consistent with research indicating that unemployment has a significant impact on poverty (Dabla-Norris et al., 2015; Ianchovichina & Lundstrom, 2009). The poverty line reflects the minimum expenditure needed to meet basic living requirements (Todaro & Smith, 2015). This poverty line is divided into the Poverty Line for Food (GKM) and the Poverty Line for Non-Food (GKNM), both of which are crucial indicators for determining poverty levels in a region (Ravallion,

2012). The poverty line provides a clear threshold for identifying individuals or households below the basic welfare standard (World Bank, 2021).

Numerous factors influence poverty levels, such as labor productivity, economic growth, per capita income, income inequality, and access to healthcare facilities and services. Additionally, nutrition, disease outbreaks, infant mortality rates, and the lack of education facilities, as well as irrelevant curricula, also contribute to the problem of poverty (Todaro & Smith, 2003). This study will focus on GRDP per capita, unemployment, and the poverty line have significant relationships with poverty. Research by Wirawan and Arka (2015) indicates that an increase in GRDP per capita leads to a reduction in poverty levels through improved purchasing power. Similarly, Wiguna and Sakti (2012) found a positive relationship between GRDP per capita and poverty reduction, suggesting that higher GRDP per capita signals a decrease in poverty levels. However, these findings often show different results when applied in a local context, as observed in East Kalimantan (Kuncoro, 2013).Therefore, this study aims to analyze the impact of GRDP per capita, unemployment rates, and the poverty line on the number of poor people in East Kalimantan Province. By employing panel data analysis, this research is expected to provide a clearer picture of the factors influencing poverty levels in the province, thus serving as a basis for policymaking in poverty alleviation efforts (Baltagi, 2005).

One approach to understanding the determinants of poverty is through panel data analysis. Gujarati (2004) explains that panel data is a combination of time series data and cross-sectional data. The advantage of panel data lies in its ability to control for individual heterogeneity and provide richer, more varied information with lower collinearity and higher degrees of freedom. This approach allows for a more comprehensive understanding of the relationships between variables in both spatial and temporal contexts. By employing panel data regression analysis, this study aims to contribute to a deeper understanding of the determinants of poverty in East Kalimantan. The findings of this research are expected to serve as a foundation for policymakers in formulating more effective strategies for poverty alleviation and ensuring that economic growth is more equitably distributed across all segments of society.

Based on the above explanation, this study will utilize panel data regression modeling to analyze the impact of GRDP per capita, the poverty line, and the open unemployment rate on the number of poor people in East Kalimantan. It is hoped that the results of this research will provide valuable insights for policymakers in determining effective strategies for poverty alleviation in the province of East Kalimantan.

METHODOLOGY

The methods used in this study are descriptive and quantitative analyses. Descriptive analysis is employed to explain the variables included in the model of the study. Meanwhile, the quantitative analysis used is panel data regression to identify the determinants of poverty levels in East Kalimantan.

The data for this research is secondary data obtained from BPS East Kalimantan, with the research scope limited to 10 districts/cities in East Kalimantan Province from 2015 to 2023. The variables used in this study are those hypothesized to influence the number of poor people, including GRDP per capita, the poverty line, and the open unemployment rate. The statistical tool employed is Eviews version 10.

Descriptive statistical analysis aims to describe or illustrate the data based on the results obtained from respondents' answers to each measurement indicator of the variables. The results of the analysis conducted can be seen in Table 1.

RESULTS AND DISCUSSION

3.1. Descriptive Statisctical Analysis

Table 1. Descriptive Statisctical Analysis Result

Variable	Mean	Standard Deviation
Number of Poor People	22414.13	16455.70
GRDP per Capita	140.3239	77.95387
Poverty Line	540776.9	90595.73
Unemployment Rate	6.461875	2.350544

Source: Authors calculations

Based on Table 1, it can be seen that from 2015 to 2023, the average number of poor people was 22,414.13 individuals, with a standard deviation of 16,455.70 individuals. The average GRDP per capita was 140.3239 million rupiahs, with a standard deviation of 77.95387 million rupiahs. The average poverty line was 540,776.9 rupiahs, with a standard deviation of 90,595.73 rupiahs. The average unemployment rate was 6.46%, with a standard deviation of 2.35%..

3.2. Model Selection

3.2.1. Chow Test

The Chow test is used to determine the best approach between the Common Effect Model (CEM) and the Fixed Effect Model (FEM) for estimating panel data. The decision criteria are as follows:

1. If the probability value for the cross-section F > 0.05, then the null hypothesis (H0) is accepted, indicating that the most appropriate model is the Common Effect Model (CEM).
2. If the probability value for the cross-section F < 0.05, then the null hypothesis (H0) is rejected, indicating that the most appropriate model is the Fixed Effect Model (FEM).

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

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2340.366409	(9,67)	0.0000
Cross-section Chi-square	460.301646	9	0.0000

Figure 2. Chow Test Result Analysis
Source: Authors calculatios

The results of the Chow test show that the probability value for the cross-section F is 0.0000 < 0.05, meaning that the null hypothesis (H0) is rejected. Therefore, the most appropriate model for estimating the regression equation is the Fixed Effect Model (FEM).

3.2.2. Hausman Test

The Hausman test is used to determine the more appropriate model between the Fixed Effect Model (FEM) and the Random Effect Model (REM). The hypotheses for the Hausman test are as follows:

1. If the probability value for the cross-section random > 0.05, then the null hypothesis (H0) is accepted, indicating that the most appropriate model is the Random Effect Model (REM).
2. If the probability value for the cross-section random < 0.05, then the null hypothesis (H0) is rejected, indicating that the most appropriate model is the Fixed Effect Model (FEM).

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

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.445148	3	0.9308

Figure 3. Hausman Test Result Analysis
Source: Authors calculatios

The results of the Hausman test show that the probability value for the cross-section random is 0.9308 > 0.05, meaning that the null hypothesis (H0) is accepted. Therefore, the most appropriate model for estimating the regression equation is the Random Effect Model (REM).

3.3. Classical Assumption Test for Panel Data Regression

If the selected model is the Random Effect Model (REM), some classical assumption tests are not necessary. This is because the Random Effect Model uses the Generalized Least Squares (GLS) method (Handarini, 2014). Some researchers also state that classical assumption tests are only necessary if the chosen model is the Common Effect Model or the Fixed Effect Model (Setyandari, 2010). Similarly, Setyadi (2014) mentions that when using the REM with the GLS method, violations of classical assumption tests can be disregarded.

However, testing for multicollinearity is still required. The purpose of the multicollinearity test is to check for high or perfect correlation among independent variables in the regression model. A good regression model should not exhibit correlation among independent variables. Multicollinearity among variables can be identified using the correlation values between independent variables. According to Ghozali (2013), the decision criteria are as follows:

1. If the correlation value > 0.80, the null hypothesis (H0) is rejected, indicating the presence of multicollinearity.
2. If the correlation value < 0.80, the null

hypothesis (H0) is accepted, indicating no multicollinearity issues.

Correlation				
	LNJPM	LNPDRBK	LNGK	TPT
LNJPM	1.000000	0.229370	-0.012914	0.034729
LNPDRBK	0.229370	1.000000	-0.084529	0.415564
LNGK	-0.012914	-0.084529	1.000000	-0.142726
TPT	0.034729	0.415564	-0.142726	1.000000

Figure 4. Multicollinearity Test Result
Source: Authors calculatios

The results of the multicollinearity test show that the correlation values among the independent variables (GRDP per capita, Poverty Line, and Open Unemployment Rate) are less than 0.80, meaning that the null hypothesis (H0) is accepted. Therefore, it can be concluded that there are no issues of multicollinearity among the independent variables in the regression model.

3.4. Panel Data Regression Analaysis

Based on the selection of the regression estimation model using the Chow and Hausman tests, the Random Effect Model (REM) is the best model for the panel data regression equation. Below are the estimation results of the Random Effect Model:

Figure 5. Panel Data Regression Analysis Result

Dependent Variable: LNJPM
Method: Panel EGLS (Cross-section random effects)
Date: 05/28/23 Time: 17:26
Sample: 2015 2022
Periods included: 8
Cross-sections included: 10
Total panel (balanced) observations: 80
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNPDRBK	0.024481	0.053530	0.457330	0.6487
LNGK	0.331348	0.057668	5.745758	0.0000
TPT	0.003935	0.003658	1.075840	0.2854
C	5.212126	0.988452	5.273019	0.0000

Effects Specification	S.D.	Rho
Cross-section random	1.014497	0.9977
Idiosyncratic random	0.048790	0.0023

Weighted Statistics			
R-squared	0.405682	Mean dependent var	0.165319
Adjusted R-squared	0.382222	S.D. dependent var	0.061023
S.E. of regression	0.047963	Sum squared resid	0.174834
F-statistic	17.29255	Durbin-Watson stat	0.828243
Prob(F-statistic)	0.000000		

Source: Authors calculatios

Based on the estimation results, the regression model obtained from the Random Effect Model is expressed as follows:

y_{it} = 5,212126 + 0,024481x_{1it} + 0,0331348x_{2it} + 0,003935x_{3it}

From the estimation results, the Random Effect Model can be described by the following equation:The constant term of 5.212126 indicates that, in the absence of the effects of GRDP per capita, the poverty line, and the open unemployment rate, the number of poor people would be 5.212126 thousand individuals.The regression coefficient for GRDP per capita is 0.024481, which means that for each unit increase in GRDP per capita, the number of poor people increases by 0.024481 thousand individuals.The regression coefficient for the poverty line is 0.0331348, indicating that each unit increase in the poverty line raises the number of poor people by 0.0331348 thousand individuals.The regression coefficient for the open unemployment rate is 0.003935, meaning that each unit increase in

the open unemployment rate results in an increase of 0.003935 thousand poor individuals.

3.5. Testing the Significance of Panel Data Regression Parameters

3.5.1. Simultaneous Test (F-Test)

The F-test aims to determine the joint effect of all predictor variables on the response variable. The hypotheses for the F-test are as follows:

1. If the p-value < 0.05, then the independent variables collectively affect the dependent variable.
2. If the p-value > 0.05, then the independent variables collectively do not affect the dependent variable.The results of the F-test show a p-value of 0.0000, which is less than the significance level of 0.05 (0.0000 < 0.05). This means that at the $\alpha = 0.05$ level, GRDP per capita, the poverty line, and the open unemployment rate collectively have a significant effect on the number of poor people.

3.5.2. Partial Test (t-Test)

The t-test assesses the significance of each predictor variable individually against the response variable. The hypotheses for the t-test are as follows:

1. If the p-value < 0.05, then the independent variable significantly affects the dependent variable individually.
2. If the p-value > 0.05, then the independent variable does not significantly affect the dependent variable individually.

Based on the t-test results:

1. The per capita GRDP variable (lnPDRBK) has a t-statistic value of 0.457330, and the p-value for per capita GRDP (PDRBK) is 0.6487, which is greater than the alpha level of 0.05. This indicates that, on a partial basis, the per capita GRDP variable does not significantly affect the number of poor people. This result contradicts the findings of Wirawan and Arka (2015), who suggested that an increase in per capita income could reduce poverty. However, it aligns with the World Bank (2006) as cited in Wahyudi (2010), which indicates that economic growth has not significantly reduced poverty due to inequality in the growth pattern in Indonesia. Since 1998, growth has not only slowed down but also become more uneven. Therefore, the number of poor people cannot be significantly reduced without economic growth that benefits the poor.
2. The poverty line variable (lnGK) has a t-statistic value of 5.745758, and the p-value for the poverty line (lnGK) is 0.000, which is less than the alpha level of 0.05. This indicates that, on a partial basis, the poverty line variable has a significant positive effect on the number of poor people. Thus, any increase in the poverty line variable will lead to an increase in the number of poor people. This is consistent with the concept of the poverty line itself, which represents the minimum cost required for individuals to live a basic, acceptable standard of living, including both essential food (equivalent to 2,100 kilocalories per capita per day) and non-food needs (BPS). Therefore, if the poverty line in a region increases, the number of poor people in that region will also increase.
3. The open unemployment rate variable (TPT) has a t-statistic value of 1.057840, and the p-value for the unemployment rate (TPT) is 0.2854, which is greater than the alpha level of 0.05. This indicates that, on a partial basis, the open unemployment rate has a positive but not statistically significant effect on the number of poor people. Amalia (2012) notes that unemployment does not have a significant impact on poverty in Eastern Indonesia. Similarly, Yusuf (2020) finds a positive but non-significant effect of unemployment on poverty increase in Gorontalo. Nurkse's theory of the poverty cycle explains that poverty is caused by stagnation, market weaknesses, and a lack of capital, which leads to reduced production capacity. This reduction in production capacity results in lower income and minimal savings and investments, perpetuating backwardness.

CONCLUSIONS

Based on the analysis results, it can be concluded that both the Chow test and the Hausman test indicate that the appropriate model for analyzing the number of poor people is the random effects model. This model meets the assumptions of normality, heteroscedasticity, and multicollinearity. The panel data regression model with random effects estimation is as follows:

$y_{it} = 5{,}212126 + 0{,}024481x_{1it} + 0{,}0331348x_{2it} + 0{,}003935x_{3it}$

The variables of GDP per capita, poverty line, and open unemployment rate significantly influence the number of poor people in East Kalimantan simultaneously. However, GDP per capita does not have a significant impact on poverty levels when considered individually. The poverty line variable has a significant positive effect on the number of poor people, with a coefficient of 0.0331348. The open unemployment rate does not significantly affect the number of poor people in East Kalimantan.Based on these conclusions, the study suggests several recommendations:

1. The GRDP per capita should be increased to reduce the number of poor people. However, it is not sufficient to only increase GRDP per

capita; it must be accompanied by equitable distribution among the population to ensure that the benefits are effectively utilized.

2. Low educational attainment can be a significant factor contributing to poverty. Therefore, this can serve as a basis for formulating policies to extend compulsory education from 9 to 12 years and even beyond. However, it is not only the duration of compulsory education that should be improved, but also the quality of education. Enhancing the quality of education is essential to ensure that human resources in Indonesia are competitive in the global and international markets.

The model developed in this study is limited by the availability of data. Therefore, further research with more comprehensive methods is needed to provide valuable insights for economic development, especially in addressing poverty.

Author Contributions: For research articles with several authors, a short paragraph specifying their individual contributions could be provided. The following statements should be used "X.X. and Y.Y. conceived and designed the experiments; X.X. performed the experiments; X.X. and Y.Y. analyzed the data; W.W. contributed reagents/materials/analysis tools; Y.Y. wrote the paper." Authorship must be limited to those who have contributed substantially to the work reported.
Conflicts of Interest: Declare conflicts of interest or state "The authors declare no conflict of interest." Authors must identify and declare any personal circumstances or interest that may be perceived as inappropriately influencing the representation or interpretation of reported research results. Any role of the funding sponsors in the design of the study; in the collection, analyses or interpretation of data; in the writing of the manuscript, or in the decision to publish the results must be declared in this section. If there is no role, please state "The founding sponsors had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, and in the decision to publish the results".

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