

Determinants of poverty rate in Java Island: Poverty alleviation policy

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Abstract: Poverty is currently a major problem that must be resolved in various regions in Indonesia, including areas in Java. Java Island is the island with the highest number of poor people compared to other islands in Indonesia. The aim of this study was to determine the determinants of poverty levels in Java and formulate policy recommendations that can be implied to overcome poverty. Research variables have used secondary data from six provinces in Java sourced from the Central Statistics Agency, namely poverty level data, Human Development Index (HDI), inflation rate data, open unemployment rate data, and Regional Minimum Wage data (UMR). The data was compiled into panel data and analyzed using OLS Model. The analysis showed that the determinants of poverty levels in Java were inflation rates, Human Development Index, Regional Minimum Wages, and open unemployment rates, so that all determinants need to be considered properly to formulate policy recommendations that able to overcome poverty in Java.

Keywords: panel data, poverty, Java Island

JEL Classification: P36, P47

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1. INTRODUCTION

Poverty is a major problem for developing countries, with no exception Indonesia. Poverty has become an ongoing problem in Indonesia that has not been solved since before independence until now. Poverty has various views on economic, social, political, cultural and so on. From an economic point of view, Harlik et al. (2013) said that poverty is a condition that is often associated with needs, difficulties and shortcomings in various living conditions. Poverty drives a person to fail to fulfill his basic needs (Prasodjo, 2017). Poverty that occurs is not because the poor want it but because it cannot be avoided by existing strengths (Sanjaya et al., 2018).

Java Island is the island with the busiest economic activity in Indonesia which attracts the attention of people outside Java to try their luck on this island. However, the data stated that more than half of Indonesia's poor are in Java. As many as 14.83 million people or around 53 percent of the poor population are concentrated in Java from the total poor population in 2016. The second largest number of poor people are in Sumatra, which is 6.21 million people or around 22.4 percent in the same period (BPS, 2016).

In accordance with the ideals of national development contained in the 1945 Constitution of the Republic of Indonesia paragraph four, namely the creation of a just and prosperous society, poverty alleviation is still an important part today. According to Kurniawan (2017), local government policies which are oriented towards poverty alleviation should be based on factors that influence the conditions of poverty. The factors that cause poverty in each region have different

characteristics. During the last few years, there have been many studies conducted to determine the determinant factors of poverty level in an area. Tisniwati (2012) was conduct research on the factors that affect poverty levels in Indonesia by using independent variables of population, real GDP per capita, literacy rates, and life expectancy rates in 1990 to 2009 and analyzed using multiple linear regression methods. These results indicate that real GDP per capita, and life expectancy significantly influence poverty levels. Other than that, Zuhdiyati & Kaluge (2017) conducted a study using panel data of 33 provinces in Indonesia to know the factors that affecting poverty levels. The variables used were economic growth, the level of open unemployment, and the Human Development Index (HDI) of 2011-2015. Research result showed that the HDI had a negative effect on poverty levels that occur in Indonesia (Zuhdiyati & Kaluge, 2017). The research of Tonapa et al. (2015) concerning the factors affecting poverty levels in Jayapura in 2004-2013 concluded that literacy rates had a significant effect on poverty levels.

Based on previous studies that have been carried out, research related to factors affecting poverty levels is only done at the national or provincial level and there is no research that explains the phenomenon of poverty at the regional level of Java. Therefore, research with the scope of the island of Java is an interesting topic to be studied. In addition, the use of data for the years 2004-2018 will produce more relevant data to formulate policy recommendations in accordance with the factors affecting poverty that occur in Java. The high number of poor people in Java demands integrated policies and strategies so it is also necessary to know the poverty determinants in Java so that they can provide recommendations to the government in formulating policies appropriately. The aim of the research was to find out the determinants of poverty levels in Java and formulating policy recommendations in overcoming poverty in Java.

2. LITERATURE REVIEW

Economic growth is an indicator to see the success of development and is a necessary condition for reducing poverty levels. The condition of sufficiency is economic growth which is effective in reducing poverty (Harlik et al., 2013). Theoretically, there is a strong role of economic growth in reducing poverty. Research results of Afandi et al. (2017) where economic growth as measured by GDP in Indonesia does not lead to a reduction in the number of poor people which does not play an important role in improving social welfare in line with opinion Suliswanto (2010) which considers that GRDP in each province is not too large in reducing poverty in Indonesia, but different results in research Rusdarti & Sebayang (2013) using GRDP data where increasing GRDP can reduce poverty levels in Central Java so that in its implementation, economic growth in each region has a different effect on poverty levels.

Determination of factors that affect poverty levels can also use various variables, Suliswanto (2010) used the Gross Regional Domestic Product (GRDP) of each province and the Human Development Index (HDI) which is analyzed by panel data regression. Pratama (2014), human development index which reflect the level of human development quality which has a very important role in reducing poverty. Whole human development from both mental, physical and intelligence aspects is the basic capital for a nation to escape poverty. HDI which is a measurement for the quality of human development, becomes an important variable for an area in alleviating poverty.

Rusdarti & Sebayang (2013) used unemployment and public spending data to analyze the factors that affect poverty levels in Central Java. Unemployment has no effect on poverty and an increase in public spending causes low priorities in public services which can have a significant effect on poverty. The inflation factor is also closely related to the poverty level where the results study of Afandi et al. (2017) said that there is a positive correlation between inflation and poverty in the short run where the price increase impacts on lower purchasing power (real wages).

3. MATERIALS AND METHODS

This research has used secondary data from the Central Statistics Agency (BPS). These data include poverty rate data, Human Development Index (HDI), inflation rate data, open

unemployment rate data and Regional Minimum Wage data (UMR). In detail, the data used in this study can be seen in Table 1 as follows.

Variables	Mean	Std. Dev.	Unit of	Source	
Vallables	Iviedii	Slu. Dev.	Measurement		
Poverty Rate (PR)	11.59	5.43	Percent	BPS	
Inflation Rate (INF)	6.38	2.45	Percent	BPS	
Human Development Index (HDI)	70.23	5.07	Index	BPS	
Open Unemployment Rate (OUR)	8.37	3.75	Percent	BPS	
Regional Minimum Wage (RMW)	1,051,788.00	656,887.90	IDR	BPS	

Table 1. Variable Description

Data were analyzed using panel data regression models. The regression model of panel data analysis is a regression model using data both time series and cross section data. The use of this model can explain two kinds of information, namely information between units and between times (Lestari & Setyawan, 2017). Time series data in the form period of 2004-2018, and sample data of six provinces in Java Island (D.I. Yogyakarta, Banten, East Java, Central Java, West Java, and DKI Jakarta) was the form of cross section data.

The data in Table 1 were analyzed using panel data regression model. There were three estimation approaches in panel data regression model, namely fixed effect (FEM), common effect (CEM) and random effect models (REM). The most appropriate panel data regression estimation model among the models is based on the following tests (Astuti et al., 2017; Prasada & Masyhuri, 2019):

3.1. Chow Test

To determine the best model between CEM and FEM, the chow test was performed with the hypothesis and statistic test is presented as follows:

 $H_0: \alpha_1 = \alpha_2 = ... = \alpha_N$ (common effect)

 H_1 : there is at least one $\alpha_i \neq \alpha_N$ (fixed effect)

$$F = \frac{\left[R_{LSDV}^2 - R_{Pooled}^2\right]/N - 1}{\left[1 - R_{LSDV}^2\right]/(NT - N - K)}$$
(1)

Where: R^2_{LSDV} is R^2 for fixed effect, R^2_{Pooled} is R^2 for common effect, N is the numbers of cross section units, T is the numbers of time series units, and K is the numbers of independent variables. H₀ is rejected if $F_{statistic} > F_{(N-1,NT-N-K;\alpha)}$, then the estimated regression equation model is the fixed effect model.

3.2. Hausman Test

Hausman test conducted to determine whether the fixed effect model is better used than the random effect model, the hypothesis and statistic test is presented as follows:

 $H_0: corr (X_{it}, \mathcal{E}_{it}) = 0 (random effect)$ $H_0: corr (X_{it}, \mathcal{E}_{it}) \neq 0 (fixed effect)$

$$W = [\beta_{FEM} - \beta_{REM}]^T [var(\beta_{FEM}) - var(\beta_{FEM})]^{-1} [\beta_{FEM} - \beta_{REM}]^T$$
(2)

Where: H_0 is rejected if $W > X_{(K,\alpha)}^2$ or *p*-value < α then the estimated regression equation is the fixed effect model.

On the basis of several tests that have been carried out, the best model in estimating panel data regression was the fixed effect model or FEM. FEM equation can be seen as follows (Gujarati,

2004):

$$Y_{it} = \beta_{0i} + \sum_{k=1}^{p} \beta_k X_{kit} + \varepsilon_{it}$$
(3)

Where: Y_{it} is the dependent variable for the i,t unit and t-time, X_{kit} is the *k* i,t independent variables for the i,t individual unit and t-time unit, β_{0i} is the intercept for the *i*-individual unit, β_k is joint slope for all units, ε_{it} is the error for the i,t individual and time, *i* is 1,....,N for individual units, and *t* is 1,....,T for time.

3.3. The Regression Model

This study used the econometric principle with a regression model of panel data to determine the factors that affecting poverty level in Java. The model used in this research was:

$$PR_{i,t} = \alpha_0 + \alpha_1 INF_{i,t} + \alpha_2 HDI_{i,t} + \alpha_3 OUR_{i,t} + \alpha_4 RMW_{i,t} + e_{i,t}$$

$$\tag{4}$$

Expected estimation mark α_1 , $\alpha_3 > 0$; α_2 , $\alpha_4 < 0$

Where: PR is poverty rate (%); INF is inflation rate (%); HDI is human development index; OUR is open unemployment rate (%); and RMW is regional minimum wage (IDR); *i* is 1,....,N for individual units, and *t* is 1,....,T for time; and *e* is error term.

4. RESULTS AND DISCUSSION

There are several steps that must be taken to get the right estimation results in this study. The first stage is to test the stationarity for each variable. After that, it is necessary to test the panel data regression model using the Chow test, and the Hausman test to select the best model. Then, a diagnostic test is carried out on the best model using the classical assumption test. After the classical assumptions are fulfilled, the panel data regression results can be interpreted. The results of the stationarity test for the research variables can be seen in Table 2 as follows.

Variable	Stage	Levin, Lin & Chu Statistic	Prob.	Information
PR	First Difference	-7.1842	0.0000	Stationary
INF	Level	-1.9132	0.0279	Stationary
HDI	Second Difference	-3.8159	0.0001	Stationary
OUR	Level	-4.8283	0.0000	Stationary
RMW	First Difference	-1.9783	0.0239	Stationary

Table 2. Results of Stationarity Test

Source: Analysis of Secondary Data, 2020

Based on Table 2, it can be seen that the variables used in this study have different levels of stationarity. The PR and RMW variables are stationary at the 1st difference level, the HDI variable is stationary at the 2nd difference level and the INF and OUR variables are stationary at the level. Stationarity test is required in this analysis to avoid spurious regression on the model used (Chamalwa & Bakari, 2016). After the stationarity test is carried out, the next step is to determine the best panel data regression model. Tests were carried out using the Chow test and the Hausman test. The Chow test is carried out to compare the best model between the common effects model and the fixed effects model. The results of the Chow test can be seen in Table 3.

Effect Test	Statistics	d.f.	Prob.
Cross-section F	125.105471	(5.68)	0.0000
Cross-section Chi-square	181.138072	5	0.0000

Source: Analysis of Secondary Data, 2020

The probability of the cross-section F and the cross-section chi-square is $0.0000 < \alpha = 0.05$ then H₀ is rejected, which means FEM is better than CEM. Next, to choose the best model between fixed effects (FEM) and random effects (REM), Hausman test was performed.

Table 4. Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	379.051759	4	0.0000
Source: Analysis of Secondary Da	ta. 2020		

The p-value of 0.0000 < α = 0.05, H₀ is rejected, FEM is better than REM. Based on the analysis of the best model approach, FEM used to determine the factors that affecting poverty levels in Java. Before the FEM model can be interpreted, the model must pass the classical assumption test, namely the normality test, heteroscedasticity test, multicollinearity test, and autocorrelation test. The results of the FEM model normality test can be seen in Figure 1 as follows.

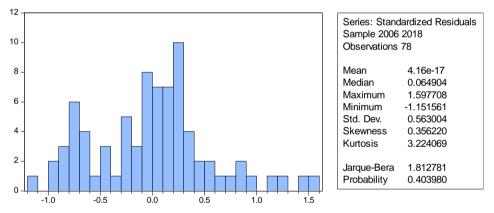


Figure 1. Normality Test

Based on Figure 1. it can be seen that the Jarque-Bera probability is 0.4040. This value is greater than the alpha 1 percent, 5 percent, and 10 percent, so it can be concluded that the regression model used in this study fulfills the normality assumption. Furthermore, the multicollinearity test results can be seen in Table 5 as follows.

HDI	RMW	OUR	Variables
-0.066041	-0.025022	1.000000	OUR
-0.100350	1.000000	-0.025022	RMW
1.000000	-0.100350	-0.066041	HDI
-0.231291	-0.055415	0.328467	INF
	-0.066041 -0.100350 1.000000	-0.025022 -0.066041 1.000000 -0.100350 -0.100350 1.000000	1.000000 -0.025022 -0.066041 -0.025022 1.000000 -0.100350 -0.066041 -0.100350 1.000000

Table 5. Multicollinearity Test

Source: Analysis of Secondary Data, 2020

Table 5 shows that all independent variables used in the research model have a correlation coefficient of less than 0.80. This shows that the regression model used has no indication of multicollinearity problems. Then to find out whether the regression model used is homoscedastic,

a heteroscedasticity test was performed. The results of the heteroscedasticity test can be seen in Table 6.

Table 6. Heteroscedasticity Test

Test Summary	Chi-Statistic	Prob.
Breusch-Pagan	0.1943	0.4406
Comment American of Commenter Date 2020		

Source: Analysis of Secondary Data, 2020

The value of Breusch-Pagan probability is 0.4406. This value is greater than 1 percent, 5 percent, and 10 percent, thus indicating that the regression model used in this study is homoscedastic. The regression model needs to be tested again whether it has an indication of an autocorrelation problem. The results of the autocorrelation test can be seen in Table 7.

Table 7. Autocorrelation Test

Variables	Statistic
dU	1.75082
dL	1.56564
dW	1.99060
(4 - dW)	2.00940
dW > dU	1.99 > 1.75
(4 - dW) > dU	2.01 > 1.75

Source: Analysis of Secondary Data, 2020

Table 7 shows that the Durbin-Watson (dW) and 4-dW values are greater than the dU values. This can provide information that the regression model in this study is protected from positive autocorrelation and negative autocorrelation. After all the classical assumption tests are fulfilled, the regression results fix effect model can be interpreted. The results of FEM analysis showed in the following table 8.

Variables	Coefficient	Std. Error	t statistic	Prob.
Constant	0.6585**	0.3007	2.1901	0.0320
INF	0.1210***	0.0365	3.3161	0.0015
HDI	-1.1178***	0.3015	-3.7074	0.0004
OUR	-0.0599	0.0405	-1.4798	0.1436
RMW	-3.95E-07	3.96E-07	-0.9975	0.3221
Adjusted R ²	0.3123			
F statistic	4.8846			
F prob.	0.0000			

Table 8. Determinants of Poverty Rate in Java

Source: Analysis of Secondary Data, 2020

Where: *** significant at α =0.01

** significant at α=0.05

In the regression model, the adjusted R² value of 0.3123 means that 31.23 percent of the variation in the inflation variable, Human Development Index (HDI), open unemployment rate and Regional Minimum Wage can explain poverty levels well, the remaining 68.77 percent is explained by other variables outside the model. The value of Adj.R² is quite small due to the limited variables that can be obtained and used in this study. The results of this analysis also show that inflation, HDI, open unemployment rate and Regional Minimum Wage together can affect poverty levels in Java (F

sig. <0.05). The constant value indicates significance with an error rate of 5 percent, meaning that when the inflation value, HDI, open unemployment rate and UMR are 0 or constant, the minimum value of the poverty rate is 0.6585 percent.

Based on Table 8 the inflation variable (INF) has a significant effect on the poverty level of the population in Java. Inflation rate can be an indicator of economic conditions in a region. Inflation shows an increase in prices of goods and services during a certain period. Higher levels of inflation can disrupt economic growth in a region, and conversely inflation that is too low can also cause sluggishness in the economy that occurs in a particular region (Septiatin et al., 2016). Therefore, stable inflation needs to be maintained, so that economic growth becomes strong (Saputra & Nugroho, 2014). The economic growth of a country, including Indonesia, will not be free from inflation. The occurrence of inflation indicates the price of goods and services will increase, so that it affects the declining purchasing power of the people (Primandari, 2018). The decline in people's purchasing power can indicate the inability of the community to fulfill their needs, so that this phenomenon will cause an increase in poverty levels. This is consistent with the results obtained in Table 8 that inflation has a significant effect on poverty levels, i.e. every 1 percent increase in inflation will cause an increase in poverty of 0.1210 percent.

Inflation needs to be well maintained, especially inflation related to foodstuffs. In June 2015, the contribution of foodstuffs to general inflation was almost 61 percent. This condition has the potential to increase the number of poor people considering the allocation of food in the budget of poor households tends to be larger than the allocation of food in the budget of non-poor households (Satriawan, 2016). Poor households are particularly vulnerable to food inflation. Therefore, the volatility of food inflation must be controlled. Several strategies to reduce the volatility of foodstuff inflation are maintaining the smooth running of the food supply chain from farmers / producers to consumers. In addition, exchange rate stability in the long run also plays a role in reducing volatility in foodstuff inflation (Pratikto & Ikhsan, 2016).

In addition to the inflation variable, the Human Development Index (HDI) variable also has a significant effect on the poverty level of the population in Java. HDI can be used as a measurement or indicator of development that is able to describe the quality of human life in obtaining income, health, education, and so on. According to BPS (2019), HDI is formed by 3 basic dimensions, namely; a) long life and healthy life, b) knowledge, and c) decent standard of living. This HDI measurement can be used as an evaluation material and government performance from a regional development. It is hoped that this HDI analysis can also be used as material for consideration in formulating budget plans and formulating policies in an area.

The results showed HDI has a significant and negative effect on poverty levels in Java. From Table 8, the higher the HDI, the lower the poverty rate. The HDI variable regression coefficient which is 8.15 means that an increase in HDI by 1 unit will reduce the poverty rate by 1.1178 percent. This study is in line with and supports the research results of Syaifullah & Malik (2017) which also found evidence that HDI has a negative sign and significant effect on poverty rate. The higher HDI illustrates the better condition of the community in terms of education, health, the standard of living standards, so that it has a positive influence to decrease poverty level that occurs in Java. HDI reflects the quality of human development (Pratama, 2014). Good human quality encourages the increased of opportunities to improve the economic conditions of a household, including poor households. This is because the increasing HDI shows that the quality of humans is increasing, both education and health. This improvement in human quality will increase the opportunity to get decent work and income, and at the last it will improve the household economy and reduce the poverty level of a region. HDI can be improved by using several strategies, namely increasing access to public health with a main focus on reducing mortality (Sari, Harianto, & Falatehan, 2016). In addition, increasing access to education can also encourage an increase in HDI.

Analysis using the fixed effect model in the panel data regression will be possible to find out the differences in the intercepts formed in each of the cross-section data used. The results of the analysis will show differences in poverty levels in each region (East Java, West Java, Central Java, Yogyakarta Special Region, DKI Jakarta, and Banten) when the factors on the independent variables used are constant. The results showed in table 9 below.

The Provinces	Individual Effect
East Java	-0.8167
Yogyakarta Special Region	11.8277
Banten	-7.1700
West Java	-4.6234
Central Java	1.3107
DKI Jakarta	-0.5283

Table 9. Difference in Fixed Effect of Poverty Rate in Each Province in Java

Source: Analysis of Secondary Data, 2020

From Table 9, each study area has a different fixed effect value. In Table 9 the lowest individual effect value is -7.1700 which is owned by Banten Province, while the largest individual effect value is Yogyakarta Special Region which is valued at 11.8277. The fixed effect value shows that if the variables of inflation, open unemployment rate, RMW, and HDI are constant, then the minimum value of the poverty level of the population in Banten Province and Yogyakarta Special Region is -7.1700 and 11.8277, respectively. Yogyakarta Special Region has the greatest effect value indicating the level of poverty in the region is also getting bigger. These results are consistent with research conducted by Niswati (2014) and Giovanni (2012) which states the poverty level in the Special Region of Yogyakarta is the highest compared to other provinces in Java.

5. CONCLUSSIONS AND RECOMMENDATIONS

Based on the research results, variables that affecting poverty level in Java were inflation and Human Development Index (HDI). The inflation variable had a positive sign, which means that the higher of inflation rate, the higher of poverty rate. The HDI variable had a negative sign, so as to give an idea if the HDI is increasing, then the poverty rate in Java will decrease further. Therefore, an increase in inflation in the provinces of Java has the potential to increase population poverty in Java. On the other hand, an increase in HDI in each province on the island of Java has implications for decreasing poverty levels. Inflation can be controlled by ensuring the smooth running of the food supply chain and maintaining the stability of the exchange rate, so that the poverty level of the population in Java can be optimally suppressed. In addition, HDI needs to be improved in order to reduce poverty levels in Java by optimizing access to health and access to education for the community.

Author Contributions: In this research, Imade Yoga Prasada had the duty of conceptualizing the main idea of the research, building the theoretical framework, doing the research, writing, and revising the article. Tri Fatma Mala Yulhar had the duty of developing the idea of the research, observing the research activity and the progress of the research, writing the article. Tia Alfina Rosa helping to find out data research, data analysis, and editing.

Conflicts of Interest: The writer hereby stated that during the implementation of the research and in writing the article, there was not anything that could give private benefit to the writer, either commercially or financially, and the writer also stated that in this research there was not any interest which was against the funder.

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