

ANALYSIS OF POVERTY IN JAVA-BALI ISLAND AND REGIONS OUTSIDE JAVA-BALI

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Abstract

The urgency of this study is to analyze poverty based on the characteristics of districts/cities in Java-Bali and regions outside Java-Bali. This study used panel data from 2010-2019 in 128 regencies/cities in the Java-Bali islands, and 382 regencies/cities outside Java-Bali region. Analysis using the STATA application with the analytical used is Fixed Effect Model (FEM). Access to electricity has a negative and significant effect on poverty while access to sanitation has a negative and insignificant effect on poverty in Java-Bali. The KUR program, access to clean water, GRDP, education and population have positive and significant impact on poverty in the Java-Bali region. The results of the analysis in areas outside Java-Bali suggest that GRDP has a positive but insignificant effect on poverty while the KUR Program, access to electricity, access to water, access to sanitation, education and population have significant and positive effect on poverty.

Keywords: *poverty; panel data; common effect; fixed effect; random effect*

INTRODUCTION

Poverty is a condition when the individual is unable to meet the basic needs for life (Sachs, 2015). Examples of conditions of failure to fulfill basic needs include: hunger, ill and unable to afford medical expenses, and not having a place to live (Ravallion, 2001). Poverty (poverty line) is measured in monetary units (World Bank, 2005). Poverty is caused by the imbalance between the increase in population and the availability of food. In addition, limited access to sanitation, electricity and clean water reduces the competitiveness of the population in the labor market. This has an impact on the individual's wage levels and eventually it will be related to the number of poor people in an area (Sanz et al., 2017; Alkire & Santos, 2014). Indonesia has chronic poverty that is characterized by economic inequality among its population (Purwono et al., 2021).

The population of Regencies/Cities in Java-Bali Island is more than the population of Regencies/Cities outside Java-Bali Island (Central Statistics Agency, 2019). The availability of infrastructure access (water, electricity and sanitation) among regencies/cities in Indonesia also experiences inequality (Sukartini & Saleh, 2016). The Central Statistics Agency (2019) stated that the total GRDP gains from each Regency/City were in accordance with economic conditions. The GRDP of Regencies/Cities in Java-Bali Island is greater than the GRDP of Regencies/Cities outside Java-Bali Island. The condition of population education also experiences inequality where the residents of Regencies/Cities on the island of Java-Bali have a better education than the residents of regencies/cities outside Java-Bali Island. The percentage of interest from the People's Business Credit (KUR) is applied equally to all Regencies/Cities on the island of Java-Bali and areas outside the island of Java-Bali. Conditions of inequality in population acquisition, access to infrastructure (access to water, electricity, and access to sanitation), income (GRDP) are the basis for selection as factors causing poverty. Meanwhile, the percentage of the value of the People's Business Credit (KUR) applies comprehensively to each Regency/City. The People's Business Credit (KUR) is one of the government's policies to overcome poverty. Based on the description above, there are several factors that experience inequality and there are also factors that apply a whole. This causes the factors of population, access to water, access to electricity, and access to sanitation, income (Gross Regional Domestic Product), education and the People's Business Credit Program to be used to analyze poverty.

Population is a factor that influences poverty. Increasing population is positively related to increasing poverty in districts/cities in Indonesia (Azizah et al., 2018; Budhi, 2013). However, research results in developed countries and developing countries show population to have a negative effect on poverty (Nabi et al., 2020). The factor that causes poverty is not only population, but also the availability of basic infrastructure access. Increasing basic infrastructure access is useful to improve economic and social performance in regencies/cities in Indonesia (Sukartini & Saleh, 2016). Three basic infrastructures are: access to clean water, sanitation and access to electricity. Access to clean water has an effect on alleviating poverty because it can reduce the cost of living and has an impact on improving welfare (Budiono & Purba, 2020). Good access to electricity can extend productive period until the evening, thus increasing productivity (Christiani & Nainupu, 2021). The lack of access to electricity in developing countries leads to increased poverty and delays in development (Banerjee et al., 2021). Access to electricity has a positive effect on development, whereas development has a negative effect on poverty. This is due to uneven access to electricity in Indonesia (Jayanthi Ria, 2021). Access to sanitation is also dependently related to poverty level (Rizki Bhimo & Saleh, 2007).

Regency/City level poverty is related to income (domestic product). In the long term, domestic product has a positive effect on poverty, but in the short term, domestic product has a negative effect on poverty (Roshaniza et al., 2015). Gross Regional Domestic Product (GRDP) affects poverty in districts/cities in Indonesia (Bintang & Woyanti, 2018; Ariwuni & Kartika, 2019; Putra et al., 2020). However, the GRDP of Aceh Province does not have a significant effect on poverty (Nufus & Ratna, 2021). Poverty is not only analyzed using GRDP but lack of education is one of the causes of poverty (Ferezagia, 2018). Education is one of the solutions to overcome poverty for people living close to the poverty line (Nadege & Ndjobo, 2020). Indians overcame poverty through access to basic education (Paul, 2019). In addition, condition of education in Indonesia affects poverty in West Java Province (Nufus & Ratna, 2021). In conclusion, education is a means that enables people to get better jobs (Silva-Laya et al., 2020).

As a means of education, the government created a program to overcome poverty. The poverty reduction program is divided into four clusters, namely: 1) Family-based social protection, 2) National Community Empowerment Program (Program Nasional Pemberdayaan Masyarakat, PNPM), 3) Substance program, 4) MSME empowerment program (Lubis, 2017; Mursyidah, 2019; Manongga et al., 2018). Nation's Business Loan (KUR) empowers Micro, Small and Medium Enterprises (MSMEs). The first KUR program was launched in 2007. In 2015 there was a change in interest rate scheme from a loan fee system to an interest/margin subsidy scheme, which caused interest rates to decline. In 2007 the KUR interest rate was 24% but in 2015 the KUR interest rate decreased to 6% in 2015. The KUR program plays an important role in creating jobs, reducing unemployment, and reducing poverty (Indonesia, 2020).

The purpose of this study is to analyze the effect of GRDP value, population, education, access to water, access to electricity, access to sanitation and KUR program on poverty. Poverty analysis is divided into two areas, namely: Java-Bali and areas outside Java-Bali. This is due to differences in GRDP, population, education, access to water, access to electricity, and access to sanitation between Java-Bali and areas outside Java-Bali. Only the KUR program is applicable throughout Indonesia.

The renewal of this study uses research factors from various aspects to get more complex factors (not limited to one aspect only). Previous research had limited use of variables whereas, the study was limited to 1 aspect to measure poverty. Some of the aspects that are trying to be accommodated in this study consist of: 1) economic aspects (GRDP), 2) social (Population and education), 3) Infrastructure (Access to water, electricity and sanitation), 4) government policies (provision of People's Business Credit). The contribution of this research will provide additional information in the form of the results of poverty analysis studies that are specific to regencies/cities on the island of Java-Bali and the poverty conditions of regencies/cities outside Java-Bali. This research contributes practically to the form of programs to the government in alleviating poverty.

METHOD

The research data sources are the World Bank's Database for Policy and Economic Research (INDO-DAPOER) and Central Statistics Agency (BPS) data. This study used panel data with a time series of 10 years (2010-2019) and cross section data of 128 districts/cities in Java-Bali and 382 districts/cities outside Java-Bali. The poverty analysis used panel data regression through several stages.

The best panel data regression model is selected for the research. CEM, FEM, and REM were alternative panel data regression models the selection was conducted on. The panel data regression model is selected using Chow test, Hausman test and Lagrange test. Figure 1 shows the flow of the panel data regression model selection.

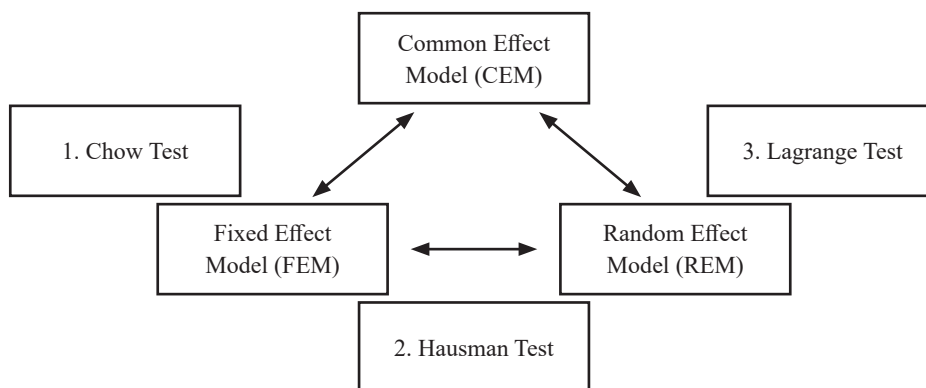


Figure 1. Panel data regression analysis

Chow test is conducted to select between CEM or FEM. Chow test hypotheses: H0 is CEM and H1 is FEM. Model selection is through comparing the P-value with the level of significance. When the P-value is smaller than the significance level ($\alpha=0.05$) then FEM is concluded as better than CEM, and the next step is Hausman test.

The Hausman test is conducted to select between FEM or REM. Hausman test hypotheses: H0 for FEM and H1 for REM. P-value and significance value is used as reference to select between the hypotheses. If the P-value is smaller than the significance level ($\alpha=0.05$), FEM is better than REM.

Lagrange test is conducted to select between REM or CEM. Lagrange test need to be conducted when Chow test and Hausman test yield different results. Lagrange test hypotheses: H0 for REM and H1 for CEM. The bases to select between the hypotheses are the p-value and the significance level. If the p-value is smaller than the significance level ($\alpha=0.05$) then H0 is accepted, which means that REM is the best model. When the p-value is higher than the significance level ($\alpha=0.05$) H1 is accepted. CEM is selected as the best model.

The classical assumption test in this study is carried out without normality test and autocorrelation test. The normality test is not used because the distribution of the research data varies with a large range of values. The autocorrelation test is also not used because the study used panel data. The classical assumption tests used are multicollinearity and heteroscedasticity.

Analyzing the correlation between independent variables, whether there is a linear or independent relationship. Variance inflation factor (VIF) is used to detect multicollinearity. A VIF value of 1-10 means that it is free from multicollinearity, while a VIF value of more than 10 means that multicollinearity is found.

The heteroscedasticity test looked at the differences in variants from residues between observation periods. Probability values are useful for detecting heteroskedasticity. If the probability value is less than the significance rate ($\alpha = 0.05$) it means that heteroskedasticity occurs. On the contrary, if the probability value is greater than the significance value ($\alpha = 0.05$) it means that heteroskedasticity occurs.

The panel data regression used poverty (Y_{it}) as the dependent variable. Independent variables consist of population (X_1), access to electricity (X_2), access to sanitation (X_3), access to water (X_4), GRDP (X_5), education (X_6) and KUR program (X_7). The panel data regression of this research is as follows:

$$Y_{it} = \beta_0 + \beta_1 KUR_{it} + \beta_2 Elec_{it} + \beta_3 San_{it} + \beta_4 Water + \beta_5 GRDP_{it} + \beta_6 Edu_{it} + \beta_7 Pop_{it} + \varepsilon_i \dots\dots\dots(1)$$

RESULTS

The Java-Bali region is the center of government, economy and tourism. This causes many people to live on the island of Java-Bali, however, poverty is still found on the islands of Java-Bali. There are 128 regencies/cities on the islands of Java-Bali. Access to electricity is evenly distributed throughout the Java-Bali islands. GRDP is high due to the many industries and high level of economic activities and tourism. Education is very adequate as seen from the number of people who have completed junior high school. Access to clean water and sanitation is almost evenly distributed in all regions with a value of above 98 percent. The KUR program is also provided by the government for residents of the Java-Bali islands. The dense population is due to the large number of people looking for work and economic opportunities. Table 1 is the descriptive data for the Java-Bali region.

Table 1. Descriptive Statistics of Java-Bali Islands

Variable		Mean	Std. Dev.	Min	Max	Observations
Y	overall	319277.8	83150.9	169256.0	729256.0	N = 1280
	between		63372.0	223238.9	552778.9	n = 128
	within		54095.4	148770.6	496000.0	T = 10
Pop	overall	1161300.0	826048.2	21082.0	5970000.0	N = 1280
	between		825846.2	25556.6	5393237.0	n = 128
	within		71644.2	581938.7	1733473.0	T = 10
Elec	overall	99.7	0.9	89.1	100.0	N = 1280
	between		0.5	96.6	100.0	n = 128
	within		0.7	92.2	103.1	T = 10
San	overall	72.2	14.1	7.4	98.1	N = 1280
	between		12.0	28.5	95.5	n = 128
	within		7.4	13.2	975.0	T = 10
Water	overall	76.0	16.2	10.8	100.0	N = 1280
	between		13.0	37.0	99.9	n = 128
	within		9.6	27.0	113.1	T = 10
GDRP	overall	41400000.0	65300000.0	2028000.0	453000000.0	N = 1280
	between		64200000.0	2588700.0	349000000.0	n = 128
	within		13200000.0	49200000.0	145000000.0	T = 10
Edu	overall	47439.6	57792.2	688.0	589143	N = 1280
	between		56926.77	1248.4	493240.8	n = 128
	within		11049.1	-60976.4	143341.8	T = 10
KUR	overall	0.5	0.5	0.0	1.0	N = 1280
	between		0.0	0.5	0.5	n = 128
	within		0.5	0.0	1.0	T = 10

There are 382 different regencies/cities in regions outside of Java-Bali. District/city level poverty is greater because there are poorer areas (NTT and Papua regions). Meanwhile, access to clean water, access to electricity and access to sanitation are not comprehensive. There are areas that rely on rain water and live without access to electricity. Table 2 is the descriptive data for regions outside Java-Bali.

Table 2. Descriptive Statistics of Regions Outside of Java-Bali Islands

Variable		Mean	Std. Dev.	Min	Max	Observations
Y	overall	331172	96547.02	145473	992610	N = 3820
	between		78510.9	188724.1	745768.3	n = 382
	within		56319.89	89638.74	584708.4	T = 10
Pop	overall	270330	258891	0	2279894	N = 3790
	between		255547.9	0	2197362	n = 379
	within		43300.63	1788.805	1919257	T = 10
Elec	overall	84.27591	23.46717	0	100	N = 3820
	between		22.27391	0	99.925	n = 382
	within		7.466594	23.18891	126.7296	T = 10
San	overall	63.18998	20.92883	0	99.62	N = 3820
	between		19.21952	0	94.597	n = 382
	within		8.336465	4.037982	101.39	T = 10
Water	overall	54.71282	23.49808	0	100	N = 3820
	between		21.53384	0	99.56	n = 382
	within		9.462881	12.06082	113.5438	T = 10
GDRP	overall	9287813	1.55E+07	0	1.57E+08	N = 3820
	between		1.53E+07	1.17E+05	1.24E+08	n = 382
	within		2615669	2.24E+07	4.40E+07	T = 10
Edu	overall	12305.02	11997.2	0	153989	N = 3820
	between		11277.68	1105.9	120650	n = 382
	within		4128.736	33760.88	65533.62	T = 10
KUR	overall	0.5	0.5000655	0	1	N = 3820
	between		0	0.5	0.5	n = 382
	within		0.5000655	0	1	T = 10

Next is the selection of the best model between CEM, FEM and REM. The first stage of the Chow test aims to select between CEM or FEM model. Chow test hypotheses: H0 for CEM and H1 for FEM. Table 3 shows the results of the Chow test; the P-Value value is 0.0000, which is smaller than the significance value ($\alpha = 0,05$). The conclusion from the Chow test is that FEM is the best model.

Table 3. Chow test result

Test	F - value	P - Value	Result
Cross Section-F Test	108.22	0.0000	Reject H0
Cross Section Chi-Square	61.37	0.0000	

Hausman test is to select between FEM or REM, where the P-Value (probability) value of 0.0000, which is smaller than 0.05 (significance level), is used as an indicator of choosing the best model. The Hausman test consists of hypotheses: H0 for FEM and H1 for REM.

Table 4. Hausman Test Result

Test	Chi- Sq Statistic	P - Value	Result
Cross Section Random	1704.38	0.0000	Accept H0

Table 4 of the Hausman test result shows that H0 is accepted, meaning that FEM is the best model. The results of the Chow test and Hausman test points to FEM as the best model. Because FEM model is selected in the Chow test and Hausman test, there is no need to continue with Lagrange test. In conclusion, FEM is the best model for poverty analysis using panel data.

Finding the best model is followed by classical assumption test. The results of the classical assumption test is that there are multicollinearity and heteroscedasticity, thus, a treatment technique with robust data is needed so that the results meet the classical assumption of Best Linear Unbiased Estimator (BLUE). After doing robustness, the model is free from/without autocorrelation, multicollinearity, and heteroscedasticity. The panel data regression results are divided into three parts including: a) poverty analysis for districts/cities in the Java-Bali region, b) poverty analysis for districts/cities outside the Java-Bali region. Table 5 is the result of panel data regression analysis with FEM divided by region.

Table 5. Fixed Effect Model (FEM) Analysis Result

Variable	Java-Bali Islands	Outside the Java-Bali Islands
Constant	0.480 (1.835)	5.287*** (1.021)
KUR	0.0659** (0.0257)	0.124*** (0.0181)
Elec	-0.000588 (0.000486)	0.00131*** (0.000505)
San	-7.01E-07 (1.1e-06)	0.00162*** (0.000319)
Water	0.000990** (0.000401)	0.000529* (0.000317)
GRDP	0.601*** (0.145)	0.352*** (0.0804)
Edu	0.132*** (0.0420)	0.0943*** (0.0258)
Pop	0.0423 (0.0310)	0.0651** (0.0275)
Observations	1280	3805
R-Squared	0.87	0.789
Number of District/City	128	382

Fixed Effect Model (FEM) in the Java- Bali islands region is as follows:

$$Y_{it} = 0.480 + 0.0659KUR_{it} - 0.000588Elec_{it} - 7.01San_{it} + 0.000990Water + 0.601GRDP_{it} + 0.132Edu + 0.0423Pop_{it} \quad (2)$$

Fixed Effect Model (FEM) outside the Java- Bali islands region is as follows:

$$Y_{it} = 5.287 + 0.124KUR_{it} + 0.00131Elec_{it} + 0.00162San_{it} + 0.000529Water + 0.352GRDP_{it} + 0.0943Edu_{it} + 0.0651Pop_{it}$$

DISCUSSIONS

In Java-Bali area, access to electricity (-0.000588) negatively and significantly impact poverty. Access to sanitation (-7.01) has a negative and insignificant effect on poverty. Increasing access to electricity and access to sanitation can reduce poverty in districts/cities in Java-Bali. Increasing access to electricity and access to sanitation increases industry production capacity. The findings of this study are in accordance with research by Rizki Bhimo and Saleh (2007) who found that access to electricity can increase production time. Increased production capacity will increase income, which in turn reduces poverty (Christiani & Nainupu, 2021). The GRDP coefficient of 0.601 indicates that GRDP has a positive and significant effect on poverty. An increase in GRDP will result in an increase in poverty. The results of this study are in accordance with the research by Bintang & Woyanti (2018) Ariwuni and Kartika (2019) and Putra et al., (2020) that stated that GRDP affects poverty in Regencies/ Cities in Indonesia. Coefficient value of 0.132 for education variable means that education (those who completed Junior High School (SMP)) has a positive and significant effect on poverty. The results of this study are in accordance with research by Paul (2019) and Nufus and Ratna (2021), which stated that education affects poverty. The average population has completed junior high school education, therefore, competition in the job market based on education is quite tight. The condition of education in Java-Bali confirms the results of the research by Silva-Laya et al., (2020), which stated that education is a means to increase the capacity and ability of the population to get better jobs. The population variable has a coefficient value of 0.0423, which means that there is a positive and significant effect on poverty. An increase in population leads to an increase in poverty. These findings have similarities with research results by Azizah et al., (2018) and Budhi (2013) who found that the population influences poverty. The variable access to clean water has a positive and significant effect on poverty with a coefficient value of 0.000990. Increasing access to clean water has an effect on increasing poverty. This result is in accordance with findings from Budiono and Purba (2020), that access to clean water has an effect on poverty alleviation efforts. KUR program has a positive and significant effect with coefficient value of 0.0659. The increase in KUR program results in increase in poverty. KUR program is given by the government to districts/cities on the islands of Java-Bali. This is in accordance with Elliyana et al. (2020), which explained that the KUR program has a significant effect on poverty in Indonesia.

Poverty in regions outside Java-Bali is different from poverty conditions in Java-Bali. GRDP of 0.352 has a positive but not significant effect on poverty outside Java-Bali. The P-value is 0.0804, which is greater than the significance value of 0.05. Regency/City GRDP is smaller than the Java-Bali region. The results of this analysis are in accordance with research in Aceh Province by Nufus and Ratna (2021), which found that GRDP has no significant effect on poverty. KUR program (0.124) has a positive and significant effect on poverty, wherein the increase in KUR program will increase poverty. This result is in accordance with findings of Elliyana et al. (2020). Access to electricity (0.00131) has a positive and significant effect on poverty. When access to electricity increases, poverty also increases. Jayanthi Ria (2021) found that access to electricity has a positive effect on poverty. Electricity access in areas outside Java is allocated more for consumptive activities than for productive activities. Access to sanitation (0.00162) has a significant and positive effect on poverty. Increasing access to sanitation will have an impact on increasing poverty. Rizki Bhimo and Saleh (2007) stated that access to sanitation is related to poverty. The region outside of Java-Bali is not evenly distributed; where there are still areas without access to sanitation. Access to clean water (0.000529) has a positive and significant effect on poverty, meaning that increasing access to clean water will increase poverty. Budiono and Purba (2020) found that access to clean water has an impact on poverty. On the island of Papua, there are still areas without access to clean water where people rely on rainwater to meet their daily needs. Education (0.0943), which is equivalent population that graduated from junior high school, has a significant effect on poverty, which means that when education is increased it results in an increase in poverty. Nufus and Ratna (2021) succeeded in identifying that the education variable has an influence on poverty. The total number of population (0.0651) has a positive and significant effect on poverty. An increase in population will increase poverty. Azizah et al., (2018) and Budhi (2013) found that poverty is affected by the population. The area outside Java-Bali is wider with a smaller population, therefore, the density is lower.

CONCLUSIONS

The theoretical contribution of this study to the poverty literature found that the fixed Effect Model (FEM) was selected to be the best panel data regression model in the Java-Bali Island area and areas outside the Java-Bali Island. The analysis on poverty in Java-Bali found that the variable access to electricity has a negative and significant effect on poverty. Access to sanitation has a negative and insignificant effect on poverty. KUR program, access to clean water, GRDP, education and population all have positive and significant impact on poverty in the Java-Bali Islands region. The analysis of poverty in regions outside Java-Bali found that the GRDP variable has a positive but not significant effect on poverty. KUR program, access to electricity, access to water, access to sanitation, education and population all have significant and positive effect on poverty in regions outside Java-Bali. Managerial implications for the Regency/City government in Java-Bali Island increase the program of equalizing access to electricity so that the poverty rate decreases. Regency/City governments outside Java-Bali Island should conduct poverty studies by adding new variables so that factors can be found that can reduce the poverty of Regencies/Cities outside Java-Bali Island.

The limitedness of the study consists of variable limitations and the division of the analysis area. This study was limited to using variables of population, access to electricity, sanitation access, access to water, GRDP and education and the People's Business Credit (KUR). Limited research used grouping of research areas into 2 of them: Regencies/Cities on the Island of Java-Bali and Regencies/Cities outside the Island of Java-Bali. Subsequent research should add other research variables to measure poverty. The next analysis area should analyze the Regencies/Cities in Indonesia as a whole (514 Regencies/Cities in Indonesia).

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