

Research Article

Assessing the Effectiveness of Social Assistance Programs to Alleviating Poverty in Indonesia

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Abstract.

Poverty in Indonesia is a fundamental problem that needs special attention. The government is trying to alleviate poverty by introducing various programs to people who are below the poverty line. One of these programs is the Social Assistance Program. This research aims to determine the extent of the impact of social assistance programs on poverty reduction in Indonesia. The method used is a quantitative method with analytical tools, namely R, to carry out regression analysis on the data. The data used include (1) data on poverty levels in Indonesia, (2) demographic data on the Indonesian population, (3) data on social assistance programs organized by the government or other institutions, (4) data on household or individual income, and (5) data related to the socio-economic conditions of social assistance recipients. The research results show that social assistance programs influence poverty reduction. Influence can be increased by (1) providing clear regulations and rules in implementing aid, (2) cross-checking target recipients of aid, and (3) carrying out regular monitoring and evaluation of aid program implementation.

Keywords: policy evaluation, social assistance program, poverty, Indonesia

1. Introduction

Indonesia is a country with a large population. The population of Indonesia in 2021 reach 273.8 million people [1]. This number continues to increase yearly, making Indonesia the country with the fourth largest population in the world after the United States, China, and India. The large population means that Indonesia must face serious challenges in overcoming the problem of poverty. In 2011, the government issued Law Number 13 of 2011 concerning Handling the Poor to overcome the problem of poverty. The law regulates development and work plans through aid, donations, disasters, and disaster management [2]. The President followed up on implementing the Law on Handling Poverty by issuing Presidential Regulation Number 166 of 2014 concerning accelerated

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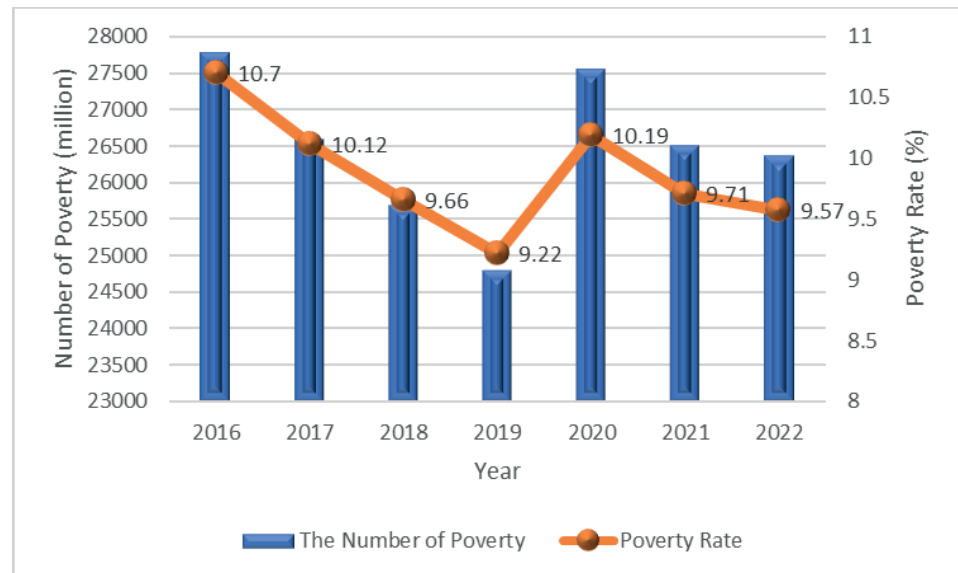
poverty reduction programs [3]. This Presidential Regulation encourages various kinds of regulations and programs at the regional government level to move quickly to develop and implement policies as a form of accelerating poverty alleviation in Indonesia.

Implementing various regulations proves that the Indonesian government prioritizes poverty as an urgent national problem. Handling the problem of poverty requires systematic, integrated, and comprehensive steps and approaches. The various steps and approaches aimed to reduce the burden and fulfill the basic rights of citizens appropriately. This encourages the government to establish poverty alleviation to implement the Long-Term Development Plan and global agreements to achieve sustainable development goals.

Poverty can be defined as the inability to meet basic food and non-food needs [1]. Poverty can be further defined as a lack of ability to meet basic needs, especially regarding money and consumption [13]. To overcome poverty effectively, an integrated, comprehensive, and sustainable strategy is needed because it affects several sectors, geographic regions and generations. Poverty has many different aspects and may be everywhere.

The government consistently carries out various initiatives to reduce poverty. This effort is quite serious and has been upgraded to become one of the government's main priorities [14]. In 2007, there was a program namely Program Keluarga Harapan (PKH) which aims to improve human quality by providing conditional cash assistance for poor families in accessing certain health and education services. In 2014, there were Social Assistance Programs for the People including the Smart Indonesia Card or Kartu Indonesia Pintar Program and the National Health Insurance Program namely JKN-KIS. In 2017, there was a Non-Cash Food Assistance program, where this assistance was in the form of non-cash from the government which was given to "beneficiary families" every month through an electronic account mechanism which was used only to buy food at food traders/e-warong [4],[5]. Although the government has implemented various social assistance programs as an effort to achieve the goal of alleviating poverty, the effectiveness of these programs is not yet clear. Based on BPS data collected from 2016 to 2022 on the number of poor people and the comparison with the proportion of poor people can be seen in the following graph.

In Figure 1, it can be seen that the number of poor people in 2016 was more than 27 million and continued to decline until 2019, which only reached 24 million with a poverty reduction rate of 1.48%. In 2020 it experienced another increase with the rate of poor people reaching 0.97%. From 2021 to 2022 there will be a decline at a rate of 0.62%. This data illustrates that poverty is an aspect of a phenomenon that is full of uncertainty



Source: Statistics,2022

Figure 1: Percentage of Poor People vs The Number of Poor People in Indonesia

so the government must make more efforts. There are various ways to measure the impact of social assistance provided by the government on poverty levels in Indonesia. One way is to use six types of indicators, namely household consumption/expenditure, employment, housing, food, health and education.

2. Methods

This research uses a quantitative type with a panel regression method to evaluate the impact of social assistance programs on poverty reduction in Indonesia. The panel regression approach is a statistical method that allows combining panel data, namely data collected from a number of observation units (regions, areas or individuals) over several time periods. This method will be used to identify the causal relationship between the independent variable social assistance program expenditure and the dependent variable poverty level by considering time fixed effects and region fixed effects. The data used in this research is secondary data obtained from publications by the Statistics or Badan Pusat Statistik (BPS) in Indonesia regarding provincial poverty in Indonesia and factors thought to influence poverty in 2016-2022. The variables used are divided into two types, namely predictor variables and response variables. The data used in this research is secondary data regarding the percentage of the poor population and factors that are thought to influence include the average length of schooling (RLS) which represents the educational aspect [5], the average percentage of expenditure

per capita per month for non-food represents the economic aspect [6], and the number of villages/subdistricts that have health facilities (JDK) represents the health aspect [7]. This data covers 34 provinces from 2016 to 2022 obtained from the BPS. The data structure in this research is presented in the following table.

TABLE 1: Structure Data.

Subject	Annual	Variable Respon (Y)	Variable Predictor (X1)	...
1 st Province	2016	Y (1;2016)	X1(1;2016)	...
	⋮
	2022	Y (1;2022)	X1(1;2022)	...
2 nd Province	2016	Y (1;2016)	X1(1;2016)	...
	⋮
	2022	Y (2;2022)	X1(2;2022)	...
...
34 th Provinsi	2016	Y (34;2016)	X1(34;2016)	...
	⋮
	2022	Y (34;2022)	X1(34;2022)	...

3. Results and Discussion

3.1. Panel Data Regression

In this research, to prepare policy recommendations based on influencing factors using panel data regression. Panel data regression has the advantage of allowing a better analysis of causation, because it can examine the impact of independent variables on the dependent variable over a certain period of time. This helps in understanding changes caused by policies over time and can provide powerful insights for developing relevant policy recommendations[8],[9]. Panel regression is a regression with a combined structure of cross section data and time series data. Panel data, namely the same individual units, are collected from time to time with the following mathematical model.

$$y_{it} = \alpha_{it} + \sum_{k=1}^K \beta_{kit} X_{kit} + \epsilon_{it}$$

Note:

y_{it} response variable in i-th province and t-th time period,

α_{it} intercept coefficient of the i-th individual unit and time period ke-t, $i=1,2,\dots,n$; $t=1,2,\dots,T$

β_{kit} is the slope coefficient with k being the number of predictor variables

ϵ_{it} residual on the i-th individual unit at time t-th,
 X_{kit} k-th predictor variable from province i-th, time period t-th
 or in this research it can be written as follows:

$$PPP = Constanta_{it} + \beta_{1it}RLS_{1it} + \beta_{2it}PRB_{2it} + \beta_{3it}JDK_{3it} + \epsilon_{it}$$

Where, the dependent variable is represented by the percentage of poor people (PPP), while the independent variable is represented by the average length of school (RLS) [10], the average percentage of monthly expenditure per capita for non-food (PRB) [11], and Number of Villages/Kelurahan That Have Health Facilities (JDK) [12]. The modeling carried out in this research uses the common effect (CEM), fixed effect (FEM) and random effect (REM) models. Where to determine which one of the best models will be used to measure the effectiveness of the Social Assistance Program.

3.2. Estimation Modeling with CEM, FEM, and REM

There are three panel data regression approaches, namely the Common Effect Model (CEM), Fixed Effect Model (FEM) and Random Effect Model (REM). The model obtained from the Common Effect Model (CEM) with provinces denoted by $i = 1, 2, \dots, 34$ and years used from 2016-2022 is denoted by $t = 1, \dots, 6$ as follows:

$$PPP_{it} = 17.81 - 1.47_{1it}RLS_{1it} - 0.23_{2it}PRB_{2it} - 0.12_{3it}JDK_{3it} + \epsilon_{it}$$

Based on the CEM model above, it is carried out by combining all data without distinguishing year effects or province effects. The CEM model has a coefficient of determination value of 65.3%.

The FEM model obtained is divided into two models, namely province effect FEM and time effect FEM (2016-2022). For the FEM model, the provincial effect can be written as follows:

$$PPP_{it} = Constanta_i - 0.34_{1it}RLS_{1it} - 0.19_{2it}PRB_{2it} - 0.04_{3it}JDK_{3it} + \epsilon_{it}$$

Meanwhile, for FEM, the time effect from 2016 to 2022 can be written as follows:

$$PPP_{it} = Constanta_t - 0.56_{1it}RLS_{1it} - 0.76_{2it}PRB_{2it} - 0.021_{3it}JDK_{3it} + \epsilon_{it}$$

For the FEM model with individual and time effects it is written as follows:

$$PPP_{it} = Constanta_{it} - 3.98_{1it}RLS_{1it} - 1.24_{2it}PRB_{2it} - 0.33_{3it}JDK_{3it} + \epsilon_{it}$$

From the three FEM models, if the value of the coefficient of determination (R^2) from each model is compared, the following values are obtained:

TABLE 2: Determination Determination.

Model FEM	R^2
Individual	0.87
Time	0.76
Individual dan time	0.89

So the best model selected is the Province and Time Effect FEM with the largest coefficient of determination (R^2). The model obtained from the Random Effect Model (REM) is as follows:

$$P_{it} = 15.31 - 1.89_{1it} RLS_{1it} - 0.14_{2it} PRB_{2it} - 0.001_{3it} JDK_{3it} + \epsilon_{it}$$

The REM model above involves correlation between error terms due to changes in individual units and time. Using the REM model produces a coefficient of determination of 50.83%.

3.3. Panel Data Regression Model Decision

Selecting the right model ensures that the analysis results provide accurate and relevant estimates. Several factors that must be considered in selecting this model include basic assumptions such as independence of observations, heteroscedasticity, and the absence of multicollinearity. In addition, researchers must also consider the nature of the panel data used, including whether a fixed effects or random effects regression model is more appropriate, as well as whether a model with instrumental variables or interactions between variables is needed. This analysis helps ensure that the selected model is empirically and statistically appropriate to the existing data, so that the results are reliable and relevant for research purposes. Errors in selecting a panel data regression model can produce biased or inconsistent estimates, which in turn can affect the validity and interpretation of research results. Therefore, careful analysis in model selection is an important step in conducting robust and informative research. To choose the right model, use the Chow test, Hausman test and Lagrange Multiplier (LM) test.

Based on Table 3 and Table 4, the best model results are the FEM model with regional effects and time effects, this shows that regional fixed effects and time fixed effects play an important role in explaining variations in poverty levels. This model reveals that the independent variables (Average years of schooling, Average Percentage of Monthly Expenditure per Capita for Non-Food, and Number of Villages/Kelurahan That Have Health Facilities) have a significant impact in reducing the percentage of poverty levels after controlling for these fixed effects.

TABLE 3: Suitable Model Decision.

Test	Measure Tools	P-Value	Decision
Chow	Choosing between the Common Effect Model (CEM) and the Fixed Effect Model (FEM)	0.0008	cause p-value<5% so FEM Model Suitable
Hausman	Choosing between the Random Effect Model (REM) and the Fixed Effect Model (FEM)	0.000	cause p-value<5% so FEM Model suitable
Lagrang Multiplier	Choosing between the Random Effect Model (REM) and the Common Effect Model (CEM)	Not done	-

Region fixed effects indicate that there are factors specific to each region that influence poverty levels, which are not captured by the independent variables. This shows differences in educational, social and economic conditions between regions in Indonesia. Time fixed effects describe changes in poverty rates from year to year that cannot be explained by independent variables. This highlights the dynamics of time in poverty change.

3.4. Pre-requisite Test

In using the statistical method of the panel data regression approach, there are several conditions that must be met, namely (1) The data has no relationship between variables (no multicollinearity), and (2) The residuals of the data are normally distributed.

3.5. Multicollinearity

Multicollinearity testing is carried out to see whether cases of multicollinearity occur. Multicollinearity is the existence of a strong linear relationship between several predictor variables in a regression model. The results of the multicollinearity test can be presented in Table 5 as follows.

3.6. Normality Assumption Test

The normality assumption test in this study used Jarque-Bera []. From the test results using Jarque-Bera, a value of 2,318 was obtained and a p-value of 0.64. By using a

TABLE 4: Multicollinearity Test Result.

Independen Variable	VIF	Decision
RLS	2.59	No Multicollinearity
PRB	2.15	No Multicollinearity
JDK	1.17	No Multicollinearity

significance level of 10%, we get χ^2 of 127.2111, so it can be said that the data is normally distributed.

3.7. The Discussion of Effectiveness of Social Assistance Programs to Alleviating Poverty in Indonesia

Social support and poverty have a very close relationship, which of course must be proven. One of the appropriate proof steps is to measure the effectiveness of the linear model assumptions obtained, where social assistance and poverty involve economic, health and educational aspects, and usually focus on efforts to reduce poverty and improve the quality of life of vulnerable communities. From the results obtained using panel data regression, the best model in FEM with province and time effects, the mathematical formulation is as follows:

$$PP_{it} = Constant_{it} - 3.98_{1it} RLS_{1it} - 1.24_{2it} PRB_{2it} - 0.33_{3it} JDK_{3it} + \epsilon_{it}$$

The results of statistical testing show that there is a significant relationship between the independent variable and the dependent variable. This indicates that the independent variable has a strong influence on the dependent variable and its impact can be considered statistically.

The Independent Variable represented by RLS or Average years of schooling is an aspect of education. In this study, the coefficient value shows a negative influence, meaning that if the average length of schooling increases, the percentage of poor people will decrease. This can be explained by the fact that social assistance programs can provide financial assistance for education costs, such as school fees, uniforms, books and equipment. other. This helps improve poor children’s access to primary and secondary education. Social assistance can also be used to improve the quality of education by supporting teacher training, providing libraries and educational facilities, as well as programs to improve the quality of education. By providing financial incentives to poor families to keep their children in school, social assistance programs can help reduce school dropout rates among poor children.

The independent variable represented by PRB or per capita expenditure of the population purchasing non-food items is an aspect of the economy. The selection of this variable is based on excess needs which will indicate that the population is not among the poor. The results show a negative influence between DRR and PPP so that if DRR increases, PPP will decrease. This event is supported where social assistance can provide direct financial assistance to families or individuals who are in poverty or at risk of falling into poverty. This can help meet basic needs, such as food, housing, and transportation, thereby reducing monetary poverty levels. Social assistance programs often include job training and job placement services, which can help poor residents improve skills and find sustainable employment. Social assistance can be used to support productive investments, such as small and medium enterprise funding, which can help poor people start productive businesses or projects to increase income.

The Independent Variable represented by JDK or Number of Villages that have health facilities is the health aspect. The panel regression model shows a negative relationship, meaning that the more health facilities in the village/district, the percentage of poverty will decrease. This is because social assistance programs can provide better access to health services, including medical examinations, vaccinations, prenatal care, and general health care. This can help reduce infant mortality, improve maternal health, and address health problems associated with poverty. Food aid or subsidized food programs can help ensure that poor families receive adequate nutritional intake, which is important for children's growth and development and general family health. Social assistance can be used to support programs for preventing and treating infectious diseases, such as HIV/AIDS, and also help prevent non-communicable diseases, such as diabetes and heart disease, by providing education and prevention services.

From the discussion that has been explained, these results provide valuable insights into the development of policies that can help reduce poverty. The negative effect of the independent variable shows that investment in social assistance programs can be an effective step in alleviating poverty in Indonesia. These findings are consistent with previous research on the effectiveness of social assistance programs in reducing poverty, strengthening the validity of the results. This research provides strong insights for formulating policy recommendations that are more appropriate to local conditions and the dynamics of changing poverty in Indonesia.

Viewed from another perspective, it cannot be denied that this research still has many shortcomings, where opportunities for further research include conducting experimental research, such as Randomized Controlled Trials (RCTs), to further explore the impact of

social assistance programs. Such experiments would allow researchers to identify the cause-effect impacts of programs with more certainty. And can build predictive models that can help the government in policy planning by projecting the impact of social assistance programs in various future scenarios.

4. Conclusion

Based on the results of panel data regression analysis on the problem of poverty in Indonesia in 2016-2022, the best model was obtained, namely the Fixed Effect Model (FEM) between individuals and time. Factors that have a significant influence on poverty in Indonesia are the variables Average length of schooling, per capita expenditure of the population purchasing non-food items, and the number of villages that have health facilities are health aspects with a coefficient value (R^2) of 0.89 or 89% . Where social assistance is effective in reducing poverty levels by providing direct financial assistance to families in poverty. Social assistance programs provide better access to health services, food, and nutrition that can help improve the health of the poor and prevent disease. Social assistance also helps in increasing access to education by providing financial support for education costs and providing incentives to poor families to keep their children in school.

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