

Quality Growth in Poverty Reduction Provinces in Indonesia

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Abstract: Quality Growth in Poverty Reduction in Indonesia

Poverty is still a major problem in Indonesia as reflected in the SDG's. This study aims to see how growth in Indonesia can reduce poverty. This study has a novelty in the research method that raises the issue of endogenous variables in the study. This study can have an impact on increasing valuable insights into the role of growth in decision-making, especially in cases of poverty. This study uses growth data as an independent variable, dependent variables consisting of poverty rates (P0), poverty depth rates (P1), poverty severity index, and other control variables that focus on data from all provinces in Indonesia from 2017-2023, utilizing quantitative analysis methods through the 2SLS (Two Stage Least Square) approach to overcome the issue of variable endogeneity. The results of the study explain that growth has a negative effect both by using the population index (P0), the Poverty Gap Index (P1), and the Poverty Severity Index (P2). so that this study is expected to be able to provide information to the government and policy makers to be able to focus on strategies that encourage regional economic growth.

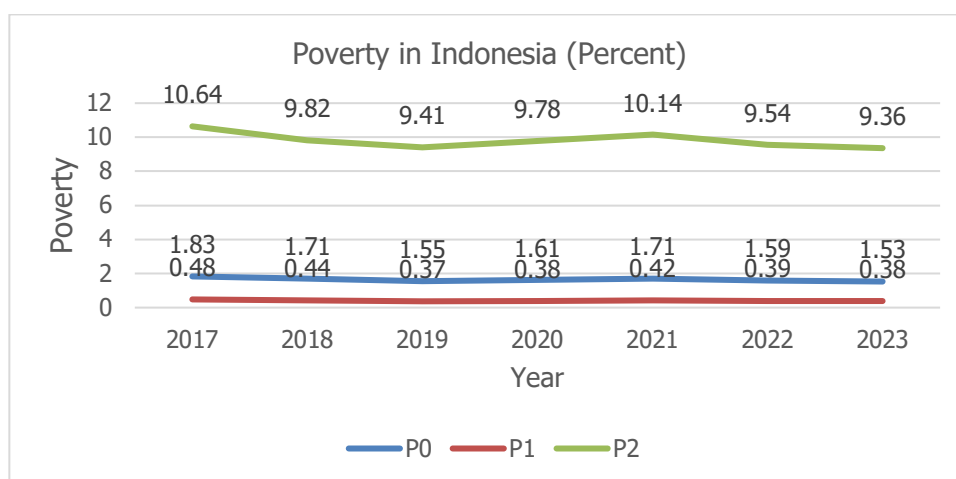
Keywords: Economic Growth; Poverty; Endogenous Variables

INTRODUCTION

Poverty has consistently been a prominent issue, a problem that persists and recurs almost everywhere in the world. From an economic perspective, poverty can also be defined as the inability of individuals or households to meet basic food and non-food needs. The World Bank (2001) define poverty as a deficiency in terms of welfare. The ability of households or

individuals to meet sufficient resource needs reveals this. According to the Central Agency Statistics (2023) individuals classified as poor fall below the poverty line when their monthly average per capita expenditure falls short of the average. In 2023, the poverty line in Indonesia based on March data is IDR 550,458 per capita per month. This figure is the minimum limit of average individual expenditure to meet basic needs in Indonesia. Residents who have expenditures below this line are categorized as poor.

Indonesia is a country that is still working on poverty reduction. Figure 1 reflects this trend, showing a decrease in Indonesia's poverty rate from 2017 to 2023, as indicated by three poverty measures: the poverty percentage (P0), the poverty depth index (P1), and the poverty severity index (P2).



Source: Central Agency Statistics, 2024

Figure 1. Poverty in Indonesia

The importance of poverty reduction is still a focus to date. The National Long-Term Development Plan (RPJPN) 2005-2025 reflects this. Additionally, the National Medium-Term Development Plan (RPJMN) IV 2020-2024, a component of the RPJPN 2005-2025, outlines several agendas aimed at achieving the RPJPN goals. Three of the seven RPJMN agendas, which are also RPJPN agendas, focus on strengthening economic defense through quality growth, developing five regions to reduce inequality or gaps, and enhancing the quality and competitiveness of human resources. This agenda has the potential to contribute to the reduction of poverty, as evidenced by its proven ability to foster good growth (Dollar and Kraay, 2002).

Ravallion (1997) stated that growth will have benefits in poverty reduction. Dollar and Kraay (2002) also tried to see the relationship between growth and poverty using various tests. The results showed that growth is beneficial for the poor. The study is also supported by

research conducted by Kakwani and Son (2004) which states that poverty reduction will be rapid if balanced with maximum growth. Quality economic growth is important and a major concern to be able to help improve the welfare of people in a country, especially for developing countries. Indonesia is included in the developing countries that continue to strive to increase their economic growth in order to improve the quality of the country and the welfare of the community. We typically use Gross Domestic Product (GDP) and Gross Regional Domestic Product (GRDP) as indicators to gauge a country's growth at the regional level. Data comparing the GRDP per capita levels across Indonesian provinces in 2023 reveals that several provinces continue to experience relatively small growth in comparison to other provinces. East Nusa Tenggara Province has the smallest growth, while DKI Jakarta Province has the largest growth. The ability of each province to develop its own region also drives this.

The quality of economic growth refers to the extent to which growth not only increases gross domestic product (GDP) figures but also provides equitable, inclusive, and sustainable benefits for the entire community. Conceptually, the quality of growth emphasizes the aspect of inclusiveness, namely how growth outcomes are able to reduce socio-economic disparities and improve the welfare of vulnerable groups. Theoretically, this approach is often explained through the concept of sustainable development that integrates economic, social, and environmental dimensions. Empirically, the quality of growth can be seen from indicators such as the level of poverty reduction and education improvement. Economic growth in various provinces in Indonesia has differences where DKI Jakarta occupies the highest position with a value of 192,133.32, followed by East Kalimantan with 137,510.39 and Riau with 83,070.74. On the other hand, the provinces with the lowest economic value are Maluku with 18,392.66, East Nusa Tenggara with 13,513.49, and North Maluku with 36,267.29.

Several provinces in Sumatra, such as South Sumatra (41,277.53) and Jambi (46,007.34), show quite significant contributions. In Java, East Java has the highest value (44,423.32), while Yogyakarta has a smaller value (31,748.21). Overall, the distribution of economic growth shows an imbalance between provinces dominated by economic centers such as DKI Jakarta, East Kalimantan, and Riau. Kakwani *et al.*, (2000) stated that the goal of development is poverty reduction, but this can be achieved through high economic growth and equitable distribution of income. Akita and Miyata (2020) states that Indonesia provides large poverty reduction benefits but declines again when the effects of inequality are taken into account in the model. Several provinces in Indonesia continue to have higher poverty rates compared to the national

poverty rate. This is proven by data published by BPS, which explains that there are still 14 provinces that have high poverty rates.

The third agenda that is also a focus of the RPJMN is improving human resources that have the best quality and competitiveness. Improving human resources is also an important agenda that the government has long carried out. This can be seen by looking at how much and how far the community has access to development results to help the community obtain income, education, and good health. Improving human capital is very important to help the poor escape the cycle of poverty. This can also help reduce poverty in addition to growth. Growth is one way to reduce poverty. Dollar and Kraay (2002) explain that growth can help reduce poverty. However, Ahmed *et al.*, (2008) clarify that while growth is a viable option for poverty reduction, its impact is not significant. This study fills the gap by examining how the growth type affects poverty reduction in Indonesian provinces, considering economic structure and social inequality. This study presents novelty through a regional approach with a focus on inclusive growth metrics to maximize poverty impacts. The use of advanced econometric techniques that take into account endogenous variables to measure the differential effects of growth quality on poverty reduction across provinces. In addition, this study provides national policy insights specific to each province, which are rarely discussed in the literature and often focus on average data analysis or cross-country.

This study has implications for policy design, where the findings can help policymakers design inclusive and specific economic policies for lagging provinces, thereby reducing inter-provincial inequality. In addition, by identifying sectors or growth strategies that are effective in reducing poverty, this study supports sustainable development in accordance with the Sustainable Development Goals (SDGs). Another major impact is economic planning, where the insights of this study can help regional planners optimize resource allocation and economic strategies to encourage more equitable development across Indonesia. This study has the potential to provide academic contributions to the discourse on poverty and growth while also having a real impact in influencing regional development policies in Indonesia. Quality growth can overcome the problem of poverty; the differences between the two studies pique researchers' interest in understanding how growth impacts poverty in Indonesia, particularly across different provinces.

LITERATURE REVIEW

According to Jonathan Houghton (2009) and the World Bank (2001) defines poverty as the deprivation of welfare or the absence of welfare. The conventional view associates poverty with the control of commodities, characterizing poor individuals or households as those who lack sufficient income and sufficient consumption to surpass the minimum threshold. Economically, poverty is defined as the inability of individuals or households to meet basic needs, including food and non-food items, as measured by their expenditures. The World Bank bases its determination of poverty on an individual's daily income, defining poverty as an income below US\$2 per day.

Poverty is a multidimensional, multi-definition concept and has various measurement alternatives. BPS (2020) defines poverty as the inability of the population to meet basic needs (basic needs approach) and defines the poor as people who have an average per capita expenditure per month below the poverty line. Central Agency Statistic (2023) combines the Food Poverty Line (GKM) and the Non-Food Poverty Line (GKNM) to form the concept of the poverty line. The GKM represents the daily expenditure on basic needs, equivalent to 2100 kilocalories. The measurement of GKNM relies on the requirements for housing, education, health, and clothing. Poverty has always been a hot topic for various countries. Both developed and developing countries consistently strive to lower their poverty rates. Increasing poverty tends to hinder a country's growth. Poverty, growth, and inequality are interrelated. Which growth will benefit the poor if regional inequality is getting lower? The importance of growth for poverty is not new; several studies have shown it. Bourguignon (2003) explains the importance of inequality and growth as a development strategy that supports poverty reduction. Bourguignon (2003) calls this the triangle of poverty, growth, and inequality.

These three things are important to know whether growth in Indonesia is on the side of the poor. Dollar and Kraay (2002) conducted a study to investigate whether growth benefits the poor. The study conducted robust checks using Ordinary Least Square (OLS) and Instrumental Variable (IV). The results explain that growth is beneficial for the poor. The results demonstrate that various factors, including open trade and economic stability, can influence growth rates, leading to increased growth that ultimately benefits the poor.

Kakwani and Son (2004) provide further support by examining the correlation between economic growth, inequality, and poverty across different countries. The results of the study show that poverty reduction will be rapid if balanced with maximum growth. Fosu (2017), in his attempt to elucidate global comparative evidence on the impact of economic growth on

poverty reduction in developing countries, underscores the crucial role of income inequality. The results of the study explain that areas that experience higher GDP growth will show a higher poverty reduction. Zhu, Bashir, and Marie's research from 2022 demonstrates the importance of poverty alleviation policies in promoting economic growth.

Fosu (2023) carried out a study in Africa, drawing on poverty records from the 1980s. Since the mid-1990s, when growth revived in Africa, income growth has been the primary driver of this progress, consistent with global evidence. However, inequality often plays a complementary role in most countries, and in a small number of cases, it is the main driver of poverty change. Therefore, this study highlights country-specific differences in the relative roles of growth and inequality in poverty reduction on the continent based on qualitative and quantitative evidence. Therefore, this study should provide a useful guideline for those who want to understand the specific situation of a country in the African context.

A country's economic growth serves as a gauge of its level of welfare. We constantly strive to enhance economic growth, aiming to enhance the well-being of communities in every region. Todaro and Smith (2004) asserted that economic growth serves as a primary indicator for identifying and analyzing emerging issues, including rising rates of poverty, unemployment, and income inequality. People typically use income per capita to measure a country's growth. Various developments in thought have emerged to facilitate in-depth discussions of economic growth. In general, we can identify four schools of thought related to growth: classical theory, neo-Keynesian theory, neo-classical theory, and modern theory (Tambunan, 2006).

The theory of economic growth is neo-Keynes, developed by (Harrod, 1939). Both economists did something to be able to complement the shortcomings of Keynes' theory which is related to labor and short-term economic theory. Harrod-Domar's theory tries to analyze the provisions needed and important by a country to be able to have an economy that grows and develops in the long term well or steady growth. Harrod-Domar's theory directly provides an understanding of the importance of investment formation in a country's economic growth process. Investment holds significant importance as it can contribute to the generation of income within a country, thereby exerting a greater influence on the demand side. This investment can also help increase the capacity of economic production by increasing the stock of capital which will later be able to influence the supply side.

The research conducted by Amponsah, et.al (2023) makes two important contributions to the literature on economic growth. First, the study answers criticisms of previous studies that measure economic growth using GDP per capita but fail to consider the inclusiveness of

society. To address this limitation, we introduce a new measure, namely GDP per capita employed, which accurately captures the participation and benefits of individuals in economic activities in accordance with research conducted by (Banerjee and Duflo, 2003; Felipe, 2012; Berg *et al.*, 2018). This measure is essential for assessing a country's progress in achieving inclusive and sustainable economic growth. The analysis explains that along with the growth that occurs, poverty will decrease regardless of the level of inequality.

Sugiharti *et al.*, (2022) conducted a study aimed at determining the level of poverty severity in Indonesia using poverty alleviation and household tracking methods in Indonesia in 2007-2014. Dollar dan Kraay (2002) who tried to see whether growth is good for the poor. The test was conducted using ordinary least squares (OLS) and instrumental variables (IV) to check robustness. The results explain that growth is beneficial for the poor. The results explain that there are factors that can affect the growth rate, such as open trade and economic stability, that can provide benefits to increasing growth, which is ultimately good for the poor. This is also supported by looking at the relationship between economic growth, inequality, and poverty in various countries. The results of the study show that poverty reduction will be rapid if balanced with maximum growth. states that Indonesia provides large poverty reduction benefits but declines again when the effects of inequality are taken into account in the model.

Inequality is also considered important by Bourguignon (2003) who stated that high initial inequality is one of the obstacles to economic growth in reducing poverty. This is from Eastwood and Lipton (2000) which explains that countries with high inequality are relatively anti-poverty; high inequality will be associated with low poverty elasticity to growth. Especially for poor countries, pro-poor growth is best stimulated by policies that encourage progress in agriculture and land redistribution.

Another level of research conducted by the Development Cooperation Section Bangkok (2022) explains that the Indonesian government needs to make adjustments to the poverty standards initiated by the World Bank to produce an optimal poverty alleviation program. Research conducted by Neumayer (2001) analyzed 155 countries and found that 42 countries were potentially unsustainable. This is largely triggered by the low HDI, which is assumed to have low achievements in the future. The results of the study can then help in providing an overview of the importance of increasing development in human capital.

Other research results are supported by research conducted by Kartini *et al.*, (2023) which shows that Indonesia is classified as pro-poor growth where the benefits of growth are greater for the poor compared to the non-poor so that growth can help reduce poverty in

Indonesia. In addition, it is explained that Indonesia is heading towards convergence between provinces in Indonesia (Kartini *et al.*, 2018). This is also supported by research conducted by Akita and Miyata (2020) which explains that Indonesia is classified as pro-poor growth. Based on the results of the discussion above, the hypothesis in this study is as follows:

H1: Growth has a negative impact on the poverty

H2: Gini has a positif impact on the poverty

H3: Elementary School has a negative impact on the poverty

H4: Middle School has a negative impact on the poverty

H5: High School has a negative impact on the poverty

H6: Bachelor has a negative impact on the poverty

H7: School Enrolment Rate School has a negative impact on the poverty

METHODS

This study uses the 2SLS method to be able to overcome the issue of endogenous variables. However, this study also displays the results of research using the OLS (Ordinary Least Square), fixed effect, and random effect methods to be able to perform a robustness check on the results of the research that has been carried out. This study uses an analysis tool in the form of Stata in the process of running data for 2017-2023, 2017 was chosen as the beginning of the research year considering the availability of data due to the existence of new provinces due to the expansion of old provinces. Wooldridge (2016) explains when the model indicates the presence of omitted variable bias (unobserved heterogeneity). Three options exist to overcome this problem. First, reject the problem that occurs with the consequence that the estimation results will be biased. Second, find and choose the right proxy for the unobserved variable. Third, assume that the omitted variable does not change over time by using the first differencing method or fixed effect model. Solution related to proxy variables will provide satisfactory results, but it is not always possible to find a suitable proxy. You can also use the Instrumental Variable (IV) method to overcome the presence of unobserved variables. The regression model as follows:

$$y = \beta_0 + \beta_1 x + u \quad (1)$$

Where in the model x and u are correlated

$$\text{cov}(x, u) \neq 0 \quad (2)$$

The research method using IV can be used either when x and u are correlated or

uncorrelated. However, if there is no correlation between x and u , we can use the OLS estimation method. To obtain a consistent β_0 and β_1 estimator when there is a correlation between x and u , other variables are needed in the research model. Wooldridge (2016) explains that the use of variables must meet the following assumptions:

1. Instrument variables have no correlation with u , or $Cov(z, u) = 0$.
2. Instrument variables only affect the value of the dependent variable (y) through the variable that is suspected to be endogenous (x)

Based on these results, this study has prepared a research framework as follows:

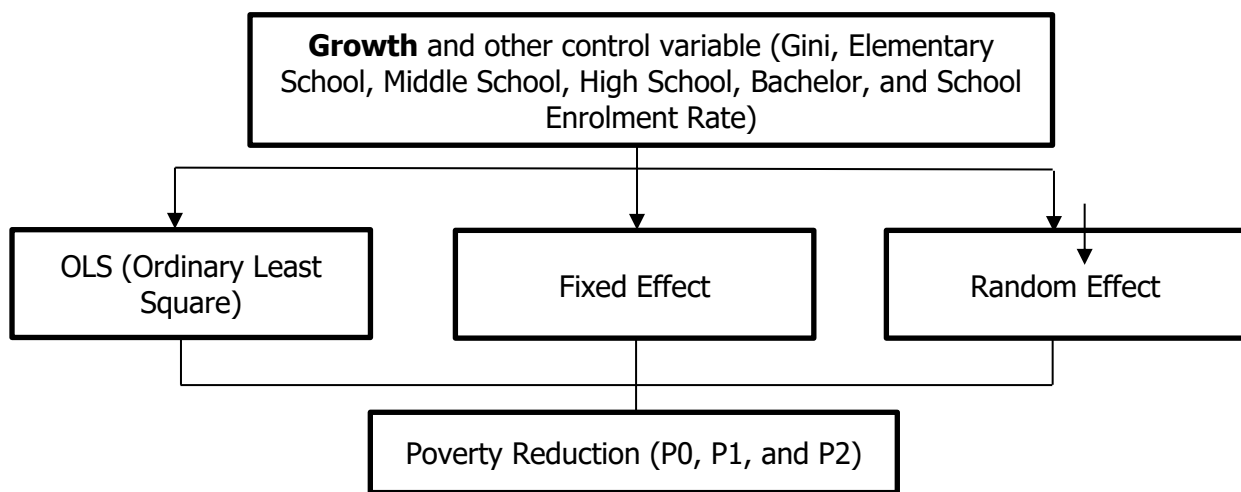


Figure 4. Research Framework

In practice, it is better to use more than one IV for one endogenous variable in order to increase the accuracy of parameter estimation. The estimation method using more IVs than the estimated endogenous variables is called the two-stage Generalized Method of Moment (2GMM)/Two Stage Least Square (2SLS) method if there is no heteroscedasticity problem. While adding more instruments can boost the estimator's accuracy, it may also lead to bias, particularly if the instruments have a weak correlation with the endogenous variables. The following model explains the general specifications of the study and the various independent and dependent variables:

Model 1:

$$\ln P0_{it} = \alpha_{it} + \beta_1 \ln GRDP_{it} + \beta_2 Control_{it} + \varepsilon_{it} \quad (3)$$

Model 2:

$$\ln P1_{it} = \alpha_{it} + \beta_1 \ln GRDP_{it} + \beta_2 Control_{it} + \varepsilon_{it} \quad (4)$$

Model 3:

$$\ln P2_{it} = \alpha_{it} + \beta_1 \ln GRDP_{it} + \beta_2 Control_{it} + \varepsilon_{it} \quad (5)$$

In which, $P0_{it}$ measured in Percentage of poor population in province i at time t , $P1_{it}$ is poverty depth index of province i at time t , $P2_{it}$ is a Poverty severity index of province i at time t , GRDP is Growth of province i at time t , α is the Intercept, β_1 , β_2 are regression coefficient values, and ε_{it} is Error component of province i at time t

However, in a study conducted by Dollar and Kraay (2002) explained the existence of endogeneity issues in the initial model, so to overcome this, the 2SLS method was used to answer the research questions. Dollar and Kraay (2002) explained that the GRDP variable is an endogenous variable, highlighting the importance of selecting the appropriate instrument variable to overcome this. The instrument variable used as an estimator to estimate the growth value is the previous year's growth (GRDP_{t-1}) Previous research informs the selection of the above instrument variable, which uses the previous year's growth as one of the measures to calculate the speed of convergence. Several previous studies such as Vidyattama (2006) explained the existence of convergence between provinces in Indonesia. as we know that convergence occurs if there is a positive relationship between growth and the previous year's growth. the selection of the previous year's growth instrument is also supported by the research of (Sumarto and de Silva, 2014; Dollar and Kraay, 2002; Balakrishnan, et.al, 2013).

Wooldridge (2016) explains that there are two stages in 2SLS estimation, the first stage is carried out by estimating the value of the variable that is suspected to be endogenous, while the second stage is entering the value of the first estimation result into the initial estimation model. The first stage in the 2SLS estimation model looks like this:

$$\ln \widehat{GRDP}_{it} = \alpha_{it} + \delta_1 \ln GRDP_{t-1it} + \delta_2 Control_{it} + e_{it} \quad (6)$$

Then the predicted results of the GRDP value (\widehat{GRDP}) obtained from the first stage estimation results will be used in the second stage estimation model, the specifications of the second stage estimation model are as follows:

Model 1:

Model 1 explains the poverty measure using the percentage of poor population (P0). The specifications are as follows:

$$\ln P0_{it} = \alpha_{it} + \beta_1 \ln \widehat{GRDP}_{it} + \beta_2 Control_{it} + u_{it} \quad (7)$$

Model 2:

Model 2 explains the poverty measure using the poverty depth index (P1). The specifications are as follows:

$$\ln P1_{it} = \alpha_{it} + \beta_1 \ln \widehat{GRDP}_{it} + \beta_2 Control_{it} + u_{it} \quad (8)$$

Model 3:

Model 3 explains the poverty measure using the poverty severity index (P2). The specifications are as follows:

$$\ln P2_{it} = \alpha_{it} + \beta_1 \ln \widehat{GRDP}_{it} + \beta_2 Control_{it} + u_{it} \quad (9)$$

Using the 2SLS model can lead to less efficient estimation results compared to OLS, as it has a larger standard error. Therefore, we need an endogeneity test to determine if there is a correlation between the instrument variable and u . Here is the model for the endogeneity test:

$$y_{1it} = \beta_{0it} + \beta_1 y_{2it} + \beta_2 Z_{1it} + \dots + \beta_n Z_{nit} + u_{it} \quad (10)$$

Z_1 to Z_n represent exogenous variables. The OLS model can conduct the study if y_2 has no correlation with u . According to Wooldridge (2016), the difference in estimation results between OLS and 2SLS indicates that y_2 is an endogenous variable. So it is necessary to compare the results of the OLS and 2SLS models.

The results of the obtained statistical tests determine whether to reject or accept H_0 . The research hypotheses are as follows:

$H_0: \delta_t = 0$ (the instrument variable is not correlated with u)

$H_1: \delta_t \neq 0$ (the instrument variable has a correlation with u which states that the variable is endogenous).

RESULT AND DISCUSSION

This data contains several variables related to the economy and income distribution for 238 observations. Variables such as $\ln P_0$, $\ln P_1$, and $\ln P_2$ may represent the logarithmic values of some economic or social indicators at different time periods, with means of 2.24, 0.43, and -0.98, respectively. The fairly large standard deviation variations in $\ln P_1$ and $\ln P_2$ (0.62 and 0.73) indicate significant differences in the data. Gini, which may measure inequality in income distribution, has a mean of 0.35 with small variations, indicating relatively consistent inequality across observations.

$\ln GRDP$ and $\ln GRDP_lag1$, with means of about 11.99 and 11.95, may indicate economic growth (e.g., GRDP) and its lag, with moderate variations. Other variables such as Elementary School, Middle School, High School, and Bachelor's Degree may describe the level of education, where Middle School and School enrolment rate show a high school participation rate with an average of above 70%. This high school participation rate shows a relatively high level of education participation, while the distribution of elementary school (98.81) and high school (74.82) values shows a striking difference between basic and secondary education.

This study uses a panel data set which uses 2017-2023 as the research year for all provinces in Indonesia. The descriptive statistics are presented in the following table 1:

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev	Min	Max
LnP0	238	2,24	0,49	1,24	3,32
LnP1	238	0,43	0,62	-0,71	2,01
LnP2	238	-0,98	0,73	-2,52	1,04
LnGRDP	238	11,99	1,14	10,05	14.53
LnGRDP_lag1	238	11,95	1,14	9,98	14.48
Gini	238	0,35	0,04	0,24	0,46
Elementary School	238	98,81	2,80	81,8	99,9
Middle School	238	95,32	3,44	79,09	99,72
High School	238	74,82	5,94	63,35	91,17
Bachelor	238	27,33	6,49	14,99	51,85
School enrolment rate	238	74,07	3,69	62,20	85,32

Source: Secondary data Output after processing, 2023; (Kartini, 2024)

We conducted the study by distinguishing between the Ordinary Least Square (OLS) method and the Least Square Dummy Variable (LSDV) method. However, the study also attempted to utilize the 2SLS method to establish whether the Gross Domestic Product (GRDP) between Indonesian provinces is an endogenous variable, as suggested by several previous studies. The study also compared the results with three poverty measures.

Tables 2 and 3 explain that growth measured by GRDP has a negative and significant relationship using both poverty measures P0, P1, and P2. The results also explain a consistent relationship using both the OLS and LSDV methods. Another important variable to include in the research model is inequality, this is supported by various studies such as Bourguignon (2003) which explains that high inequality can hinder quality growth. We measure inequality using the Gini ratio and examine its impact on poverty in Indonesia. The estimation results show that Gini has a positive and significant effect on poverty in Indonesia and is consistent with the poverty measure and method used.

School participation for elementary, junior high, senior high, undergraduate, and median levels of school participation as a whole differ depending on the level of education taken. The estimation results explain that education at elementary and senior high school levels has a negative relationship to poverty in Indonesia. However, for junior high and undergraduate levels of education, the results explain that there is a positive and significant relationship to poverty in Indonesia.

The following study also includes the human capital variable, which measures school participation rates for each level of education:

Table 2. Analysis Results using the Ordinary Least Square method

	Headcount Index (P0)		Poverty Gap Index (P1)		Poverty Severity Index (P2)		Support for Hypothesis
InGRDP	-	-0.021***	-	-	-0.001***	-0.002***	
	0.015*** (0.003)	(0.003)	0.004*** (0.001)	0.005*** (0.001)	(0.000)	(0.000)	Yes
Gini	0.273*** (0.075)	0.514*** (0.078)	0.072*** (0.017)	0.134*** (0.019)	0.023*** (0.006)	0.045*** (0.007)	Yes
Elementary School	-		-		-0.001*** (0.000)		Yes
Middle School	0.003 (0.002)		0.001** (0.000)		0.000** (0.000)		No
High School	-0.000 (0.001)		-0.000 (0.000)		-0.000 (0.000)		Yes
Bachelor School	0.001* (0.001)		0.000 (0.000)		0.000 (0.000)		No
School enrolment Rate		-0.002*** (0.001)		-	0.001*** (0.000)	-0.000*** (0.000)	Yes
Constant	1.170*** (0.103)	0.348*** (0.075)	0.318*** (0.023)	0.088*** (0.018)	0.119*** (0.008)	0.032*** (0.007)	
Observations	238	238	238	238	238	238	
R ²	0.491	0.259	0.576	0.274	0.615	0.259	
Adj. R-sq	0.478	0.250	0.565	0.264	0.605	0.250	

Note: Values in parentheses are standard error/robust standard error. (*) (**) (***) describes the significance level (10) (5) (1) percent.

Source: Secondary data Output after processing, 2023; (Kartini, 2024)

In addition, the results of the study using the OLS method also explain the size of education calculated by the median School Participation Rate for each province in Indonesia. The results of the study explain the varying results depending on the size of poverty and the sample of research data used. However, there is a tendency for differences in the LSDV method where education as a whole can have a negative impact on poverty, where an increase in educational participation will cause an increase in poverty.

Table 3. Analysis Results using the LSDV/Fixed Effect method

	Headcount Index (P0)		Poverty Gap Index (P1)		Poverty Severity Index (P2)	
InGRDP	-0.003 (0.004)	-0.005 (0.004)	-0.002 (0.001)	0.000 (0.001)	-0.001 (0.001)	0.000 (0.001)
Gini	0.120*** (0.033)	0.122*** (0.035)	0.030** (0.013)	0.033** (0.014)	0.011** (0.006)	0.013** (0.006)
Elementary School	-0.004** (0.002)		-0.005*** (0.001)		-0.002*** (0.000)	
Middle School	-0.002 (0.001)		-0.000 (0.000)		-0.000 (0.000)	
High School	-0.003*** (0.001)		-0.000 (0.000)		-0.000 (0.000)	
Bachelor	0.001 (0.000)		0.000 (0.000)		0.000 (0.000)	
School enrolment Rate		-0.003*** (0.001)		-0.001*** (0.000)		-0.001*** (0.000)
Constant	0.866*** (0.195)	0.381*** (0.079)	0.560*** (0.073)	0.114*** (0.031)	0.273*** (0.032)	0.041*** (0.014)
Observations	238	238	238	238	238	238
R ²	0.271	0.194	0.298	0.127	0.324	0.094
Adj. R-sq	0.127	0.050	0.160	-0.030	0.190	-0.068

Note: Values in parentheses are standard errors/robust standard errors. Autocorrelation is treated by first differencing with the Newey-West procedure (*) (**) (***) explains the significance level (10) (5) (1) percent.

Source: Secondary data Output after processing, 2023; (Kartini, 2024)

In addition to the research method using OLS and LSDV. The study also uses the 2SLS method to be able to answer research questions. Where according to Dollar and Kraay (2002); De Silva and Sumarto (2014); and Balakrishnan, Steinberg and Syed (2013) who explained that there are issues related to endogeneity in the research model. In order to address these issues, the study employed the 2SLS method, focusing on a single instrument variable. The study using the 2SLS method shows in Table 4 that the endogeneity test shows that the measure of education using school enrolment causes endogeneity problems in the research model. However, the results using the measures of elementary, junior high, high school, and college education cause different outcomes depending on the measure of poverty used.

The regression results in the table show that InGRDP (logarithm of Gross Regional Domestic Product) has a significant negative effect on the three poverty indicators: Headcount Index (P0), Poverty Gap Index (P1), and Poverty Severity Index (P2). The coefficients for

InGRDP are -0.015 for P0, -0.004 for P1, and -0.001 for P2, with a very high level of significance 1% (***). This demonstrates a close relationship between an increase in GRDP and a decrease in the poverty rate, encompassing the number of impoverished individuals (P0), the poverty gap (P1), and the severity of poverty (P2).

Table 4. Analysis Results using the Two Stage Least Square (2SLS) method

	Headcount Index (P0)		Poverty Gap Index (P1)		Poverty Severity Index (P2)	
InGRDP	-0.015*** (0.003)	-0.021*** (0.003)	-0.004*** (0.001)	-0.005*** (0.001)	-0.001*** (0.000)	-0.002*** (0.000)
Gini	0.273*** (0.075)	0.514*** (0.078)	0.072*** (0.017)	0.134*** (0.019)	0.023*** (0.006)	0.045*** (0.007)
Elementary School	-0.013*** (0.002)		-0.004*** (0.000)		-0.001*** (0.000)	
Middle School	0.003 (0.002)		0.001** (0.000)		0.000** (0.000)	
High School	-0.000 (0.001)		-0.000 (0.000)		-0.000 (0.000)	
Bachelor	0.001* (0.001)		0.000 (0.000)		0.000 (0.000)	
School enrolment rates		-0.002*** (0.001)		-0.001*** (0.000)		-0.000*** (0.000)
Constant	1.170*** (0.103)	0.348*** (0.075)	0.318*** (0.023)	0.088*** (0.018)	0.119*** (0.008)	0.032*** (0.007)
Observations	238	238	238	238	238	238
R ²	0.491	0.259	0.576	0.274	0.615	0.259
Adj. R-sq	0.478	0.250	0.565	0.264	0.605	0.250

Note: Values in parentheses are standard errors/robust standard errors. Autocorrelation is treated by first differencing with the Newey-West procedure (*) (**) (***) explains the significance level (10) (5) (1) percent.

Source: Secondary data Output after processing, 2023; (Kartini, 2024)

The negative effect of InGRDP on these three indicators indicates that economic growth in a region (measured through GRDP) contributes significantly to poverty reduction. When GRDP increases, the region experiences an increase in overall economic welfare, which in turn reduces the number of people living below the poverty line. Furthermore, the impact of GRDP on the Poverty Gap Index (P1) and Poverty Severity Index (P2), indicators of the depth and severity of poverty, suggests that economic growth not only decreases the number of

impoverished individuals but also enhances the living conditions of the most vulnerable. The higher the GRDP, the greater the capacity of the economy to reduce the poverty gap.

Overall, studies have shown that GRDP plays a crucial role in reducing poverty across all dimensions. Increasing economic output in a region contributes significantly to reducing poverty rates, narrowing gaps, and decreasing poverty severity. So the results of this study can be used as recommendations in increasing growth to support the SDGs in reducing poverty.

The Effect of GRDP on Poverty

Growth is one of the important aspects used to determine the condition of the Indonesian economy. In addition, growth is also one of the important things in terms of poverty reduction. This is proven by the results of previous research conducted by Kartini *et al.*, (2023) explaining that Indonesia has pro-poor growth, which will later be able to help in terms of poverty reduction. The results of the study obtained explain that the first hypothesis is accepted, where growth (GRDP) has a negative and significant relationship to poverty, both using poverty measures P0, P1, and P2. This is indicated by a probability value that is smaller than the significance value (1%, 5%, or 10%). These results are supported by several previous studies, including Dollar and Kraay (2002); Zhu, Bashir and Marie (2022) and Son and Kakwani (2008) which explain that growth will be able to help in terms of poverty reduction.

The welfare-based growth model by Dollar and Kraay (2002) explains that inclusive economic growth tends to have a significant impact on reducing poverty, as is the case in Indonesia. This is also supported by the Kuznets hypothesis, which for Indonesia is currently in a phase of economic growth where inequality tends to decrease along with increasing income because the benefits of growth begin to be enjoyed by the lower groups. There is significant variation between provinces regarding how economic growth impacts poverty. A more in-depth analysis can explore whether provinces that are more integrated into the global market or have better access to infrastructure reduce poverty faster.

The Effect of Inequality on Poverty

Inequality is important to help in poverty reduction. The progress of pro-poor growth is also influenced by a country's intervention to increase the income of the poor and their vulnerability. High inequality between provinces can hinder growth from becoming quality for poverty reduction. The results of the study obtained explain that inequality (gini ratio) has a positive and significant relationship with poverty. This is in line with the hypothesis in the study. This means that high inequality can cause poverty to increase. The results show similar things using poverty measures P0, P1, and P2. This is indicated by the significant probability

value, which is smaller than the significance value (1%, 5%, or 10%). This positive relationship between inequality and poverty is also supported by several studies, including Ravallion (1997); Barro (2000); Berg *et al.*, (2018); and Fosu (2023) which state that high inequality will hinder poverty reduction.

High inequality often means that resources—such as wealth, education, health, and economic opportunities—are concentrated in the hands of a small group of people. The poor, who are often in rural or less developed areas, struggle to access these vital resources. As a result, they remain trapped in poverty, while wealthier segments of society are able to accumulate more wealth. In many countries with high inequality, social safety nets and redistribution mechanisms are often underdeveloped or inefficient. In this case, the benefits of economic growth are not shared evenly, and the gap between rich and poor widens. Poor redistribution policies, such as regressive tax systems or inadequate social welfare programs, actually worsen poverty by failing to lift those at the bottom of the economy.

The Kuznets Curve theory states that in the early stages of economic development, inequality tends to increase as a country grows. However, as economic development progresses and institutions improve, inequality decreases, ultimately reducing poverty. This theory has been both supported and challenged over time, but the findings of this study may be in line with a modified version of the Kuznets Curve, where inequality actually inhibits poverty reduction at certain stages of development rather than naturally decreasing over time.

The Effect of Elementary School Participation on Poverty

The results of the study indicate that elementary school participation can help reduce poverty in Indonesia. This has the same results using poverty P0, P1, and P2. The results of this study are in line with the hypothesis in the study where there is a negative relationship between variables. The results of this study can also be concluded based on the probability value that is smaller than the significance value (1%, 5%, or 10%) used in the study. Increasing elementary school participation will help reduce poverty in Indonesia. In addition, this study is also supported by Silva (2015) who stated that increasing education can help reduce poverty. Luqman (2012) explained that elementary education can have benefits for economic growth, which will later help in reducing poverty.

Human Capital Theory argues that education is an investment in human capital, leading to increased productivity, higher incomes, and better economic outcomes. According to this theory, primary education is essential because it provides the basic skills needed for further learning and development. The results of this study are consistent with human capital theory,

as increased primary school enrollment is associated with poverty reduction through increased ability of individuals to engage productively in the economy. External factors such as economic policies, technological developments, and changes in the labor market can also influence the impact of primary education on poverty. Further research could examine how primary education can be aligned with broader economic needs to produce more effective outcomes in poverty reduction.

The Effect of Middle School Participation on Poverty

The results of this study indicate that junior high school participation has a significant effect on poverty. The results of this study can also be concluded based on the probability value that is smaller than the significance value (1%, 5%, or 10%) used in the study. However, the relationship between middle school participation and poverty is positive, where the increasing junior high school participation will cause an increase in poverty. This has the same results using poverty P0, P1, and P2. The results of this study are not in line with the hypothesis.

In addition, this study is also supported by Sachs *et al.*, (1995) who found a positive relationship between junior high school participation and growth, which can later hinder poverty reduction. In addition, Maksymenko and Rabbani (2011) explained that education will have benefits on growth through increased productivity by the workforce, but the results of research conducted specifically on provincial samples in Indonesia explained that middle school education levels have a positive effect on poverty reduction in Indonesia, where when junior high school education levels increase, poverty in Indonesia will increase.

Even if school participation increases, if improvements do not follow it in the quality of education, its impact on poverty reduction may be reduced or even nonexistent. In some areas, the increase in the number of children entering junior secondary school is not matched by the quality of teaching, school infrastructure, or the availability of adequate resources, so that the education process does not provide maximum benefits in improving students' skills or economic capacity. Further research can explore how the quality of education at the junior secondary level affects students' economic outcomes after they graduate. Better quality education, with a focus on skills relevant to the labor market, can help reverse these negative impacts and make a greater contribution to poverty reduction.

The Effect of High School Participation on Poverty

The results of this study indicate that high school participation has a significant and negative effect on poverty, where increasing high school participation will cause a decrease in

poverty in Indonesia. The negative but insignificant relationship is explained by a higher probability level than the significance level. The results of this study are the same using poverty P0, P1, and P2. In addition, this study is also supported by Rolleston (2011), who stated that a higher level of education has relatively greater benefits. The results of this study are in line with the hypothesis in the study where there is a negative relationship between variables

Although high school enrollment shows a negative effect on poverty, the non-significant results suggest that this relationship may not be strong enough or consistent across samples. Endogenous Economic Growth Theory argues that investment in education serves to increase productivity and support economic growth. However, this theory also emphasizes the importance of appropriate job creation and supportive economic policies for higher education to truly contribute to poverty reduction. Without sufficient job opportunities or supportive policies, the positive impact of higher education on poverty may be limited, as the results of this study suggest. Future research could explore how more integrated economic and educational policies can encourage job creation that matches the skills acquired by high school graduates. This could include analyzing policies that improve the linkages between education and the labor market.

The Effect of Bachelor Participation on Poverty

The results of this study indicate that bachelor participation has a significant and positive effect on poverty, where increasing bachelor participation will lead to an increase in poverty in Indonesia. The results of this study can be concluded based on the probability value that is smaller than the significance value (1%, 5%, or 10%) used in the study. The results of the study have the same results using poverty P0, P1, and P2. The results of this study can also be associated with the increasing unemployment rate for bachelor education levels in Indonesia; this is due to the lack of employment for S1 education levels when compared to the number of S1 graduates. The results of this study are not in line with the hypothesis. However, This research is supported by Bils and Klenow (2000) who argue that education will only have a limited impact on growth.

One of the main explanations for this finding is the high unemployment rate among university graduates in Indonesia. Although more and more people are earning a university degree, the number of jobs that match this educational qualification is relatively limited. As a result, even though university graduates spend time and resources on higher education, they struggle to find decent jobs and thus are unable to escape poverty. Many university graduates

in Indonesia may not have skills that match the needs of the labor market. Higher education curricula in some fields may not prepare graduates for existing jobs, or university graduates may choose majors that are not in high demand by the labor market, thus they face difficulties in finding relevant jobs. Further research is needed to focus on education quality, job creation policies, and market-relevant skills development to enhance the positive impact of higher education on poverty reduction in Indonesia.

The effect of school enrolment rates on poverty

School enrolment rate is a measure of education used by using the average school enrolment for all levels of education. So that the number represents the overall participation in each province in Indonesia. The results of the study using the 2SLS method explain that school enrolment rate has a negative and significant effect on poverty in Indonesia, where when school enrolment rate increases it will cause a decrease in poverty in Indonesia. The results of this study are in line with the hypothesis in the study where there is a negative relationship between variables. This result is evidenced by the probability value, which is smaller than the significance value. Similar results are supported by research conducted by Balisacan, Pernia and Asra (2003); Weil (2019); Jonathan Haughton (2009) which states that education is one of the important factors that contribute to the growth and development of regions in Indonesia.

These findings provide insight that increasing school participation rates can play an important role in reducing poverty. Human Capital Theory explains that education improves individual skills and productivity. When people are better educated, they are better able to produce more value and income. The results of this study support this theory, where increasing school participation rates can improve workforce skills, which will ultimately reduce poverty in Indonesia. The results of this study indicate that increasing school participation rates can reduce poverty in Indonesia. Education plays an important role in improving skills, productivity, and economic opportunities, which can ultimately reduce poverty. These findings support the view that education is an important investment in human capital that can lead to more inclusive economic growth and poverty reduction. Further research needs to explore aspects of education quality and policies that support school participation to maximize its positive impact on poverty.

CONCLUSION

Based on the regression results, it can be concluded that Gross Regional Domestic Product (GRDP) has a significant negative effect on all poverty indicators, namely Headcount Index (P0), Poverty Gap Index (P1), and Poverty Severity Index (P2). This shows that

increasing GRDP consistently reduces the number of poor people, narrows the poverty gap, and lowers the severity of poverty in a region. In other words, economic growth as measured by GRDP plays an important role in poverty alleviation, both quantitatively and qualitatively. Increasing economic output can improve people's welfare, especially those in the poorest groups. In detail, the overall results can be seen in the following conclusions; 1). The results explain that there is a negative influence between growth and poverty, so it can be seen that growth can help in terms of poverty reduction in Indonesia, 2). The results explain that there is a positive influence between inequality and poverty in Indonesia, where high inequality can hinder poverty reduction in Indonesia, 3). The results explain that there is a negative and significant influence between independent variables (School enrolment rate, Elementary School, High School) on poverty in Indonesia. So it can be seen that elementary school, high school, and school enrolment rate can help reduce poverty in Indonesia. While there is a positive influence between independent variables (Middle School and Bachelor) on poverty in Indonesia, both using poverty P0, P1, and P2. So it can be seen that middle school and Bachelor can cause an increase in poverty in Indonesia.

This study's implications suggest that increased GRDP, a measure of economic growth, serves as a crucial tool in poverty alleviation policies. Governments and policymakers can focus on strategies that encourage regional economic growth to directly reduce poverty rates and improve people's welfare. Higher GRDP not only reduces the number of poor people, but also improves the gap and severity of poverty. However, these results also indicate that economic growth alone may not be enough to fully address poverty issues. Given the Gini coefficient showing a positive relationship between inequality and poverty, policies that ensure a more equitable distribution of economic growth are important. Therefore, to ensure that all levels of society feel the benefits of economic growth, the government must not only encourage economic growth but also consider income redistribution policies and improve access to basic services like education and health. This study also establishes a foundation for targeted interventions in education and school participation, demonstrating a significant impact on poverty reduction. Investment in education and increasing school participation should be an integral part of long-term economic development strategies. In addition to its practical implications, there are theoretical implications that can be found in this study. As is known, the aspect of human capital measured using school participation for each level of education and using the average overall school participation can help see its impact on poverty in Indonesia. These diverse results can help in further research related to how each level of education has

different influences. Measurements at each level of education are expected to provide a broader picture. This is also important to know in order to be able to find out the main focus on which level of education.

The research is still limited to using three poverty measures in monetary terms, including the headcount index, poverty gap index, and poverty severity index. The research has not used multidimensional poverty due to limitations in accessing data at the micro level. The use of multidimensional poverty is expected to provide a better picture of the research results. In addition, there is the possibility of other variables that are not used as independent variables in the study that are suspected of having an influence on poverty between provinces in Indonesia. With the limitations of the research, further research is expected to be able to use multidimensional poverty measures as a measure of poverty in Indonesia. Further research can use research samples with a longer period of time in the research, and based on the research results, several things are known that can help in terms of poverty reduction, so that the research results are expected to be used to see the picture of poverty in Indonesia as a whole.

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