

ECONOMIC GROWTH AND POVERTY: THE MODERATING EFFECT OF INCOME INEQUALITY

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Abstract

The trickle-down effect assumes that the progress of a group of people will automatically trickle down, thus creating jobs which in turn will promote the necessary conditions for equitable economic growth. However, previous studies on the association between economic growth and poverty have shown inconclusive results. This study fills the gap of the above research differences by introducing income inequality as a moderating variable in the relationship between economic growth and poverty. Secondary data from 34 provinces in Indonesia during 2016-2020 period were analyzed using panel data moderated regression. The results showed that while simple linear regression model indicates positive significant effect of economic growth on poverty, the interaction between economic growth and income inequality shows negative significant effect on poverty. This paper concludes that income inequality as measured by the Gini index moderates the effect of economic growth on poverty which supports the importance of inclusive economic growth.

Keywords: *economic growth; poverty; income inequality; moderating variable; Indonesia*

INTRODUCTION

According to neoliberal theory, income inequality is necessary for growth and is offset by a trickle-down effect on the poor (Greenwood & Holt, 2010). The progress of a group of people will automatically trickle down, thus creating jobs which in turn will grow the necessary conditions to materialize inclusive economic growth. The trickle-down effect is based on the accumulation of wealth. The rich's accumulation of wealth is thought to benefit the poor by transferring increased wealth from the rich to the poor. According to Aghion and Bolton (1997), as capital accumulates, more funds may become available to the poor. Income redistribution channels improve economic efficiency by increasing investment incentives for the poor with the help of economic growth and developed financial systems. The process of achieving equality of opportunity hastens the trickle-down mechanism.

However, previous studies on the effect of economic growth on poverty have shown inconclusive results. Several authors find that economic growth negatively affects poverty (Moore & Donaldson, 2016; Muthia, 2019; Nyamweya & Obuya, 2020; Sehrawat & Giri, 2018; Nansandiqa et al., 2019). That is, an increase in economic growth is followed by a decrease in poverty. However, other authors (see for example Afzal et al., 2012; Berardi & Marzo, 2017) find that economic growth does not have a significant effect on poverty. Therefore, research is needed to address the inconclusive findings.

De Silva & Sumarto (2014) found that the Indonesian economic growth during 2002-2012 this period benefited rich households, and that the poor receive less benefits than the non-poor. Therefore, since poverty reduction is one of the main goals of the Indonesian government, policies designed to promote growth must take into account the effect of economic growth on income inequality. To which extent growth eradicates poverty depends on how poverty is measured, and on the absorptive capacity of the poor, the pattern and rate of growth. When the gap between rich and poor widens, the trickle-down effect scenario needs to be re-examined (Škare & Družeta, 2016).

This study introduces a moderating variable of income inequality on the relationship between economic growth and poverty in an effort to close the gap in the aforementioned research findings. The selection of income inequality is based on previous research results. Kakwani et al. (2010) state that growth should spread across every income group. Lee & Sissons (2016) who analyzed the effect of economic growth on poverty in British cities in 2000-2008 found little evidence that growth reduces poverty. This is because economic growth is

related to wage increases but only in the upper middle class. In India, the difference between the income share of the highest 1% and the share of the lowest 50% is associated with higher level of poverty (Kulkarni & Gaiha, 2021). Economic growth helps reduce poverty in India, while income inequality exacerbates poverty (Sehrawat & Giri, 2018). Dauda (2017) stated that the Nigerian economy in recent times has reached substantial growth. However, poverty remains unstoppable because the growth that is not pro-poor. The benefits of income growth have not reached a large proportion of the United States population over the past few decades (Greenwood & Holt, 2010). Warr (2018) confirms that the rate of poverty reduction in Southeast Asia is significantly related to the sectoral composition of economic growth, particularly as it relates to the expansion of the agricultural sector in comparison to the rest of the economy. The results demonstrate that growth resulting from the expansion of this sector contributes more to poverty reduction than growth resulting from the expansion of industry or services. In the last three decades, Malaysia has experienced rapid and sustained growth, effectively reduced the incidence of poverty, and made significant strides in meeting its societal restructuring goals. Rapid economic growth contributed significantly to the reduction of poverty by generating employment opportunities that led to substantial improvements in living conditions for all ethnic groups. However, rapid growth alone would not have been sufficient to reduce poverty in the absence of a strong government emphasis on distributing development gains across all economic sectors (Manaf & Ibrahim, 2017).

This research contributes both theoretically and practically. Theoretically, this research bridges the gap between previous studies on the effect of economic growth on poverty, the results of which are contradictory. Practically this research contributes to the emphasis on the importance of inclusive economic growth.

METHODS

This study uses panel data of 34 provinces in Indonesia in 2016-2020. The selection of this particular time frame was predicated upon the accessibility of the most recent data at the time of analysis. A period of five years is often regarded as an adequate duration for the analysis of the data. Economic growth is measured in percent, poverty is measured by number of populations living below the poverty line, and Gini ratio is used as a proxy for income inequality. The model selection is based on Chow, Hausman and Lagrange multiplier tests.

Chow test is used to select a model in panel data regression, by adding a dummy variable so that it can be seen that the intercepts are different and can be tested with the chow test (statistical F test) by looking at the Residual Sum of Squares (RSS)-likelihood ratio. The guidelines that will be used in drawing conclusions from the Chow test are as follows. If the value of the probability cross-section Chi-square $< \alpha=0.05$, H0 is rejected, which means that the fixed effects model is selected. If the value of the Chi-square cross-section probability $> \alpha=0.05$, H0 is accepted, which means that the common effects model is chosen.

Hausman test is used to choose between a random effect model and a fixed effect model. This test works by testing whether there is a relationship between the error in the model (composite error) and one or more explanatory variables in the model. The guidelines that will be used in drawing conclusions from the Hausman test are as follows. If the error probability of random cross-section $< \alpha=0.05$, H0 is rejected, which means that the fixed effect model is selected. If the random cross-section probability value $> \alpha=0.05$, H0 is accepted, which means that the random effect model is chosen.

Lagrange multiplier test is used to select the best model between the fixed effects model and the fixed coefficient model. This test is based on the distribution of Chi Squares with degrees of freedom (df) equal to the number of independent variables. The LM test calculation method used in this study is the Breusch-Pagan method. The Breusch-Pagan method is the method most widely used by researchers in the LM test. The guidelines used in drawing conclusions from the LM test based on the Breusch-Pagan method are as follows. If the value of the Breusch-Pagan cross-section $< \alpha=0.05$, H0 is rejected, which means that the random effect model is chosen. If the value of the Breusch-Pagan cross-section $> \alpha=0.05$, H0 is accepted, which means that the common effects model is chosen.

This study investigates the effect of economic growth on poverty in Indonesia with income inequality as a moderating variable. Before including income inequality as a moderating variable, the basic model about the effect of economic growth (EG) on poverty (POV) is:

$$POV_{it} = \alpha + \beta EG_{it} + \epsilon_{it} \dots\dots\dots(1)$$

Moderated regression analysis is used to test the role of the moderating variable whether it affects the relationship of the independent variable and the dependent variable. According to Ghazali (2011), moderated regression analysis is a special application of multiple linear regression, which contains an interaction element, namely the multiplication between two or more independent variables. In this study, the moderating variable

is income inequality, measured by Gini ratio (GR). The panel data moderated regression model can be written as follows:

$$POV_{it} = \alpha + \beta_1 EG_{it} + \beta_2 GR_{it} + \beta_3 EG_{it} \cdot GR_{it} + \varepsilon_{it} \dots\dots\dots(2)$$

Where, POV stand for poverty, α represent constant, β_1 , β_2 stands for regression coefficients; β_3 represent regression coefficient of the interaction between X_1 and X_2 , EG_{it} represent economic growth, GR_{it} represent income inequality, $EG_{it} \cdot GR_{it}$ stands for interaction between economic growth and income inequality, ε represent error term, i stands for cross section, and t represent time series.

RESULTS

This study aims to analyze the effect of economic growth on poverty in Indonesia, by adding income inequality as a moderating variable. Therefore, to get the best results from panel data analysis, the first thing that needs to be done is the Chow Test. The result of the Chow test is presented at Table 1.

Table 1. Result of Chow Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	712.285622	(33,169)	0.0000
Cross-section Chi-square	1008.219395	33	0.0000

Source: output Eviews.11

Based on Table 1 the error probability of the Chi-square cross section is 0.0000. This means that H_0 is rejected. Therefore, the model used is the Fixed Effect Model.

Furthermore, to test whether there is a relationship between the composite error in the model and one or more explanatory variables, the Hausman test is needed. Hausman test result is presented at Table 2.

Table 2. Result of Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.264622	1	0.6070

Source: output Eviews.11

From the Hausman test, the result is that the error probability of a random cross-section is 0.5728. It states that the appropriate estimation model used is the Random Effect Model because the probability value is > 0.05 .

After the Hausman test is performed, a Lagrange Multiplier (LM) test is needed to determine whether the random effect model or the common effects model is more suitable to use. Table 3. Presents the results of the Lagrange Multiplier test.

Table 3. Result of Lagrange Multiplier Test

	Hypothesis Testing		
	Cross-section	Time	Both
Breusch-Pagan	500.2212 (0.0000)	2.754312 (0.0970)	502.9755 (0.0000)
Honda	22.36562 (0.0000)	-1.659612 (0.9515)	14.64136 (0.0000)
King-Wu	22.36562 (0.0000)	-1.659612 (0.9515)	6.566287 (0.0000)
Standardized Honda	22.73244 (0.0000)	-1.473569 (0.9297)	11.76624 (0.0000)
Standardized King-Wu	22.73244 (0.0000)	-1.473569 (0.9297)	4.30082 (0.0000)
Gourieroux, et al.	-	-	500.2212 (0.0000)

Source: output Eviews 11

From the results above, it can be seen that the Breusch-Pagan error probability is $0.000 < \alpha=0.05$, which means that H_0 is rejected. Thus, the better model is the random effects model. The estimation results on the effect of economic growth on poverty can be seen at Table 4.

Table 4. Results of Simple Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.70047	1.017417	10.51729	0.0000
EG	0.070582	0.014935	4.725832	0.0000

Source: output Eviews.11

Based on Table 4, the error probability $> \alpha=0.05$, then economic growth has positive significant effect on poverty. It means that during 2016-2020 the higher the economic growth, the higher the number of poor people in Indonesia.

In this study, the authors tried to close the gap in the existing research findings by introducing a moderating variable of income inequality. Table 5 presents the results of moderated regression analysis to determine whether income inequality as measured by the Gini ratio moderates the relationship between economic growth and poverty.

Table 4 shows that at $\alpha=0.05$, economic growth (EG) has a significant positive effect on poverty, income inequality which is measured by Gini ratio (GR) has a positive significant effect on poverty, while the interaction of economic growth and income inequality has a significant negative effect on poverty. Thus, it concludes that income inequality moderates the effect of economic growth on poverty.

Table 5. Estimation of Moderated Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.097145	1.994020	0.550218	0.5828
EG	0.083686	0.177256	4.721019	0.0374
GR	27.18329	4.888383	5.560794	0.0000
EG_GR	-9.410017	4.818009	-9.153007	0.0454

Source: output Eviews.11

DISCUSSIONS

This study concludes that income inequality moderates the effect of economic growth on poverty. Economic growth in provinces with high income inequality is only enjoyed by the rich group, so it even deteriorates poverty. However, economic growth in provinces with low income inequality is enjoyed by the majority of the population, thus having a significant impact on poverty reduction.

The findings of Rini & Tambunan (2021) suggest that Indonesia's economic growth is not yet inclusive. Only a small number of provinces have accomplished inclusive growth. It was discovered that the number of households with access to computers and the percentage of households utilizing liquid petroleum gas (LPG) as their primary source of energy have a beneficial impact on Indonesia's ability to accelerate inclusive economic growth.

Using data from 65 countries in 1995–2011, Akinci (2018) show that the positive growth in the income of the rich increases the income of the poor. However, it is clear that the poor contribute more to income transfer to the rich than that from the rich to the poor. This means that the trickle-down effect does not apply in these countries.

Basu & Mallick (2007) find little evidence of a trickle-down effect in India, which is mainly due to capital-labor substitution thereby inhibiting growth to reduce poverty. The higher growth rates and reduced poverty during the late 1970s-1980s were mostly due to the anti-poverty actions in collaboration with equitable distribution of agricultural input and credit to small farmers.

Similarly, Saunders et al. (2022) reveal an overall drop in poverty in Australia that is contingent on the treatment of housing costs and a more consistent decline in deprivation, but little or no improvement for the majority of those experiencing poverty or deprivation. Throughout the period (a decade to 2018), poverty and deprivation were higher among unemployed households than among households in other states with a labor force. While these disparities have narrowed, the findings suggest that trickle-down effects have not reached a large proportion of the severely disadvantaged or are subject to lengthy delays.

Nyamweya & Obuya (2020) reveal that income distribution has a significant mediating effect on the relationship between economic growth and poverty levels in East African countries. How economic growth

reduces poverty may occur in many channels, but the most direct one is through job creation and/or wage increases or labor market (Lee & Sissons, 2016). In line with this argument, Purnomo & Istiqomah (2019) find that job opportunities perfectly mediate the relationship between poverty and economic growth. The perfect mediating effect implies that economic growth will reduce poverty only if economic growth creates employment opportunities. This finding emphasizes the importance of inclusive growth that provides access for the poor to work and create business opportunities.

Dauda (2017) points out that the Nigerian economy has performed sizeable growth. However, poverty remains unstoppable. Dauda argues that the reasons may include growing unemployment, exclusive growth, and the unsuccessful measures to promote the structural transformations needed for sustainable growth, job creation, and narrowing income inequality. Therefore, it is recommended that the government should focus on structural transformation, good governance, corruption eradication, and social protection.

With regard to initiatives for inclusive growth, Sasmal & Sasmal (2016) show that the higher public spending on infrastructure, the lower the level of poverty. This finding implies that economic growth is important for poverty alleviation and that infrastructure is important for growth. Therefore, the infrastructure should be developed in all provinces. Alamanda (2020) finds a negative association between infrastructure spending and income inequality in urban and rural areas in Indonesia. In addition, infrastructure expenditure is significantly and negatively associated with poverty, with the effect being greater in rural areas. Asongu & Odhiambo (2018) find that the Gini coefficient can be decreased overall by increasing internet access and fixed broadband subscriptions.

Economic growth benefits the poor if certain conditions are met. Moore & Donaldson (2016) argue that when there is a strong local NGO network with local government, the rural based initiatives which are small scale and low technology such as the development of organic rice, handicraft, and rural tourism help reduce poverty. Regarding the role of tourism in increasing income distribution, Mahadevan & Suardi (2019) found that although the Gini index calculation of tourism growth with panel data of 13 tourist-intensive countries did not increase income distribution, the poverty gap was significantly reduced. They therefore recommend other measures, for example relative poverty or poverty gap. This paper also tried to use relative poverty, and we found similar effect. While absolute poverty reduction is possible, relative poverty reduction can only occur in the presence of a narrowing of the income inequality gap. The provision of basic services such as water, health, and education, as well as providing decent wages to workers, must be prioritized in order to close the income inequality gap (Pelizzo & Kinyondo, 2018).

Tsaurai (2021) emphasizes the vital role of economic growth and human resource development in order to eradicate poverty in developing countries. Mellor & Malik (2017) argue that in low-income as well as middle-income countries, rapid increase in small commercial farmers' production and income is the most powerful ways to alleviate poverty in rural areas. This effect results from higher spending on smallholder farmers, thereby increasing incomes for non-farm rural residents and reducing poverty levels.

Overall, the trickle-down hypothesis in China was supported by Ho & Iyke (2017). China's national economic and financial development are pro-poor. Three decades of financial, institutional, and structural changes have led to China's economic growth and financial sector development. China's poverty has also declined over this time. However, poverty in rural areas is high. Larger financial intermediaries and institutions may not extend credit to rural small businesses, as is also reported by Seven & Coskun (2016). Therefore, policymakers should promote rural small financial intermediaries and institutions. These financial intermediaries and organizations would understand rural enterprises and be willing to lend to them. Government may also formalize indigenous products and services to commercialize rural economy. The importance of financial inclusion is supported by Omar & Inaba (2020) that financial inclusion significantly reduces poverty and income inequality in developing countries. These findings support increased access to and use of formal financial services by marginalized populations. According to Zhang & Naceur (2019), reducing inequality and poverty can be accomplished through four of the five aspects of financial development (access, depth, efficiency, and stability). Some Latin American nations, such as Brazil and Argentina, have been able to reduce poverty through the improvement of microfinance organizations. Such institutions and lending programs should be well-designed and supplemented by additional services, such as aid with market entry, capacity building, etc., in order to be beneficial. In addition, policymakers should take seriously the crucial role of adequate regulatory and supervision procedures for managing the potential risks that financial sector development may entail (Seven & Coskun, 2016). Doumbia (2019) conclude that education, improved infrastructure, and financial development are the main contributors to reducing poverty and promoting inclusive growth.

Lee & Rodríguez-Pose (2016) recommend to local economic development practitioners, based on their study on the relationship between high tech industry and poverty, that pursuing tech employment may lead to aggregate gains, but if it is to reach the most disadvantaged groups, it must be combined with efforts to ensure that these gains are widely shared. Options for achieving this goal may include providing poverty-stricken

individuals with skills training or targeted employment assistance. Priority should be given to policies that provide long-term redistributive measures that promote economic growth and reduce inequality. This could be accomplished by providing more opportunities to people from low-income families and those from disadvantaged backgrounds (Niyimbanira, 2017).

The Islamic approach to lowering income disparities and relieving poverty focuses on historically effective techniques for reducing income disparities. Both obligatory (zakah) and voluntary (sadaqah) measures are employed to encourage the wealthy to contribute generously to initiatives aimed at alleviating poverty. Rich people are required to pay obligatory tax on their money, but they are also urged to spend more than the required amount on charity (Bashir, 2018). An analysis of 1309 zakah beneficiaries in West Java in, Ayuniyyah et al. (2018) indicates that current zakat distribution schemes can significantly alleviate poverty and minimize income disparity among zakat recipients.

By comparing two economic systems, Gai & Zhou (2022) conclude that the explanation for stalling or unblocking the trickle-down effect in different economies is "development for whom," which is defined by ownership. The capitalist method of social production coincides with the logic of "development for capitalists," which determines that the economic condition of the working class will never change, no matter how productivity improves, and always leads to "the rich becoming richer and the poor getting poorer." Only the "development for the people" logic and public ownership structure can guarantee the trickle-down of socialist social production and the sharing of development fruits by all. Two trickle-down development strategies are "development for the people" and "development for capitalists." The former is based on public ownership and has a positive (up-down) trickle-down effect, leading to common prosperity. The latter is based on private ownership and has a negative (bottom-up) trickle-down effect, leading to polarization.

Kouadio & Gakpa (2022) indicate that economic growth remains a critical prerequisite for poverty reduction, and that general improvements in institutional quality contribute significantly to the long-term reduction of poverty and income disparity. This contribution is made through the strengthening of democratic institutions, the reduction of bureaucratic constraints, the quality of the judicial and regulatory systems, the control of corruption, and the stability of the government. Furthermore, they show that improvements in the legal system, low levels of corruption, and increased bureaucratic competence are required for economic growth to significantly reduce income inequality.

Finally, Akinci (2017) recommends comprehensive mechanisms to speed trickle-down effect. Accelerating trickle down growth requires some mechanism to ensure that the poor benefit proportionally more than the wealthy. In this context, trickle down mechanisms are classified into three types: demographic, macroeconomic, and microeconomic. Higher levels of human development, optimal population levels, adequate natural resources, and country location are all examples of demographic mechanisms. Macroeconomic mechanisms include a high level of openness to international trade, macroeconomic stability, a smaller size of government, financial development, a lower tax rate, a higher level of employment, and industrial location policies. Non-discrimination on the basis of gender, ethnicity, or religion, non-artificial barriers to entry into domestic and foreign markets, a lower degree of monopoly power, strong property rights, and the rule of law are examples of microeconomic mechanisms.

CONCLUSIONS

This study attempts to explain the discrepancies in prior studies' findings regarding the effect of economic growth on poverty. Some studies have found that economic growth reduces poverty significantly, but other researchers have found that economic growth does not have a significant effect on poverty. By introducing income inequality as measured by the Gini index, this study finds that income inequality moderates the effect of economic growth on poverty. Economic growth in provinces with high income inequality is only enjoyed by the rich group of people, so it does not have an impact on reducing poverty. On the other hand, economic growth in provinces with low income inequality is enjoyed by the majority of the population, thus having a significant impact on poverty reduction.

This research contributes both theoretically and practically. Theoretically, this research reconciles the contradicting findings of prior studies on the effect of economic growth on poverty. Practically this research contributes to the emphasis on the importance of inclusive economic growth. For policy implications, future research should identify which sectors contribute to poverty reduction, which may be different across provinces, and the determinants of income inequality since it has significant effect to reduce poverty. For theoretical implications, income equality should be given a high priority because economic growth may increase poverty in the absence of income equality.

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