

The Elasticity of Poverty to the Growth and Inequality Before and During the Covid-19 Pandemic

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Abstract

This study aims to measure the elasticity of poverty to income growth and inequality and to assess the pro-poorness of the growth near and during the Covid-19 pandemic by taking the South Kalimantan province of Indonesia as a focused study. The lack of poverty elasticity and decomposition study during the Covid-19 pandemic has motivated this study to be done. By using the poverty decomposition method applied to South Kalimantan data, this study achieved some conclusions. First, all the poverty measurements (FGT indexes) have the absolute value of elasticities by more than one, indicating that poverty is highly sensitive to the change of income growth and inequality. Second, when inequality is constant, an increasing growth rate of income will benefit the poor more than the less poor, and selecting the poverty measurement to observe is critical. Third, the trade-off between growth and inequality represented by MPRS is positive and more than one in all years of examination. There should be more growth rate needed to respond to an increasing inequality to maintain the poverty rate stable. Forth, the targeted policies to the poor in the period from 2020 to 2021 are proven to help the poor shown by the Poverty Growth Curve.

Keywords

Elasticity of Poverty; Poverty Decomposition; Growth; Inequality; South Kalimantan

INTRODUCTION

Poverty is the focus of Goal 1 of Sustainable Development Goals (SDGs) initiated in 2015 by the United Nations (UN) to be implemented by its country members (United Nations, n.d.). In detail, for Goal 1.1, extreme poverty (people living below \$1.25 a day) should be eradicated by 2030 and halving the poverty rate measured by the respective national standard. The progress of poverty reduction is remarkable in recent decades.¹ However, the Covid-19 pandemic worsen the welfare situation all over the world indicated by the economic contraction that sequentially affected the poverty rate.

Eradicating extreme poverty by 2030 may face a more complicated situation during the Covid-19 pandemic. Moreover, if the pandemic is uncontrollable, the tasks of Goal 1 of SDGs are unlikely to be materialized. The World Bank (2020) estimated that the pandemic has added another 88 million people or around 1.4% of the total world

population into extreme poverty by 2021. The pandemic problem is one obstacle to reaching Goal 1 of SDGs besides climate change and conflict issues.

According to Kakwani (1993), the magnitude of the poverty rate depends on two variables: income growth and inequality in income distribution. This means that to push the poverty rate down, growth and inequality become the main focus to formulate a precise policy intervention. And once again, discussing growth and inequality, we are dealing with other SDGs goals: Goal 8 (Decent Work and Economic Growth) and Goal 10 (Reduced Inequalities). With the Covid-19 pandemic's existence in reaching Goal 1 of SDGs, we are also involving Goal 3 of SDGs (Good Health and Well-Being) because of its high correlation with health issues during the pandemic. It is clear that the discussion of eradicating poverty during the Covid-19 pandemic relates with many SDGs goals; hence, it needs serious efforts.

¹ The threshold for extreme poverty is \$1.90 a day according to the UN, and the Goal 1.1 focuses deeper on the extreme poor living at \$1.25 a day.

The interaction of poverty-growth-inequality has been discussed by many researchers such as Kakwani & Son (2006), Ravallion (2004), Ravallion & Chen (2003), and Son (2004) amongst others. Those studies underlined the impact of economic growth on poverty with the additional influence of inequality which leads to the concept of pro-poor growth and trickle-down growth. Alternatively, this paper employs the Kakwani (1993) approach aiming to calculate the elasticity of income growth and inequality on the various poverty measurements which has not been deeply examined during the Covid-19 pandemic. In addition, this paper uses two years of examination on household-level data before and during the Covid-19 pandemic to emphasize the pandemic impact on welfare. Thus, this paper contributes to the poverty-related studies based on two points: (1) This paper employs Kakwani (1993) approach to measure the Marginal Proportional Rate of Substitution (MPRS) that covers various poverty measures; and (2) This paper accommodates the period before and during the Covid-19 pandemic to examine poverty situation. This paper is organized as follows. (1) Introduction; (2) Literature Review; (3) Research Method; (4) Result and Discussion; and (5) Conclusion.

LITERATURE REVIEW

The relative contribution of growth and redistribution of income on the poverty measurements was examined by Datt & Ravallion (1992). They theorized that poverty reduction cannot be fully determined by declining in inequality. Furthermore, the impact on poverty from inequality (redistribution effects) should be accompanied by growth. So, the decomposition does matter in the poverty examination. More specifically, the growth component in the change of poverty is the change in the mean of income by holding the Lorenz curve constant. The redistribution component is the change in the Lorenz curve by holding the mean of income constant. Also, the residual component exists in the modeling process which did not be accommodated by Kakwani & Subbarao (1990) and Jain & Tendulkar (1990). Although the residual is not the main focus of the analysis, it should always be evaluated via growth and redistribution consistency.

The theory of the growth and distribution of poverty was also written by Kakwani (1993). The poverty measurements depend on three factors such as poverty line,

mean of per capita income, and income inequality. By holding the poverty line constant, the impact of income growth (so-called pure growth effect) and income redistribution (so-called inequality effect) can be examined separately. Based on the theorized model, the coefficient of mean per capita income should be negative, meaning that the positive growth of income will bring the poverty rate down (and vice versa). On the other hand, the coefficient of inequality should be positive, inferring that increasing inequality will make the poverty rate goes higher (and vice versa). The trickle-down effect happens if the poverty rate declines at a small rate for any given positive growth of income per capita. The trickle-down effect is also recognized when the poor receive the benefits equal or less than the growth rate in case of the coefficient of inequality is non-positive. From here, the degree of trickle-down is shown by the coefficient of inequality (Kakwani & Subbarao, 1990). Kakwani (1993) also highlighted the trade-off between pure growth effect and inequality effect in that model providing the term of Marginal Proportional Rate of Substitution (MPRS). For example, a 1% increase in the Gini index should be responded by a certain degree of percentage change in the mean income to hold the poverty rate at the same rate. MPRS describes such a certain degree of the percentage change of mean income to keep the poverty rate the same given a change in the Gini index.

Son (2003) introduced a new poverty decomposition that does not refer to any inequality measurements nor involve residual terms in the factors that affect poverty. The decomposition according to Son (2003) is divided into four components such as growth effect holding inequality in the distribution constant, between-group growth rate differences effect, within-different-group inequality changing effect, and various-groups population shares changing effect. Those components are summed and produce changes in poverty.

Aristondo et al. (2010) took a different approach to decomposing poverty. Their decomposition involves the product of the headcount ratio, total income gap ratio, and generalized entropy inequality index of the poor's income gaps. This approach can be used to examine whether the increasing poverty is related to changes in either one of the poverty measurements or a combination of all those. In this sense, poverty changes

based on poverty incidence, intensity, and inequality.

Some studies involving the interconnection of poverty, growth, and inequality have been conducted by Kakwani et al. (2000), Ravallion & Chen (2003), Ravallion (2004), Son (2004), and Kakwani et al. (2004), amongst others. Those above-mentioned studies have shown the importance of growth and inequality in determining poverty. Furthermore, those concepts emphasized the pro-poor growth terms, the condition when the economic growth shares the majority portion of benefits into the pocket of the poor. In more applicative studies in Indonesia, poverty decomposition has been examined as follows: Asra (2000), Sumarto & De Silva (2013), Pukuh & Fadlun Widyasthika (2017), and Murjani (2021). There is still a research gap that should be examined particularly about the trade-off between growth effect and inequality effect in affecting poverty before and during the Covid-19 pandemic. It is an essential matter for the policymaker as well as researchers to study the Marginal Proportional Rate of Substitution in every poverty measurement; thus, the poverty-oriented policy intervention could be more effective especially during the Covid-19 pandemic. This paper uses Kakwani's (1993) approach to measure MPRS in the period before and during the Covid-19 pandemic by selecting the South Kalimantan province of Indonesia as a focused study.² To complete the analysis, the pro-poorness of the income growth in the period from 2020 to 2021 will also be examined by using Son's (2004) approach.

RESEARCH METHOD

Data

This study employs the Indonesian National Socioeconomic Survey (SUSENAS) data for the years 2020 and 2021 in the South Kalimantan province of Indonesia to represent the period before and during the Covid-19 pandemic. Murjani (2021) suggested utilizing a short period of examination to avoid a possible mixed result in the case of using a longer period. The variables of per capita expenditure as a proxy for income and household size will be extracted from

SUSENAS data and be used in the calculation. As complementary data, the poverty line for South Kalimantan in 2020 and 2021 will be used as respective poverty thresholds in each year, the data for the poverty lines is available at the website of the BPS-Statistics Indonesia of South Kalimantan.³ For the calculation, this study uses the DASP Stata Package written by Araar & Duclos (2021).

Poverty Decomposition

The decomposition of poverty with the impact of growth and inequality that developed by Kakwani (1993) is formulated as follows:

$$d\theta = \frac{\partial\theta}{\partial\mu}d\mu + \sum_{i=1}^k \frac{\partial\theta}{\partial m_i} dm_i \quad (1)$$

Where, θ is the poverty index determined by the poverty line, the mean of income per capita, and income inequality (shown by the Lorenz curve). Changes in the Lorenz curve is affected by changes in k parameters $m_1, m_2, m_3, \dots, m_k$. The part $\frac{\partial\theta}{\partial\mu}d\mu$ is identified as pure growth effect and the part $\sum_{i=1}^k \frac{\partial\theta}{\partial m_i} dm_i$ is the inequality effect. The premise is that if the economic growth is positive, the pure growth effect will be negative (increasing growth will push poverty down), and vice versa. For the inequality effect, if the redistribution of income benefits the rich, the inequality effect will be positive (higher inequality will make poverty worse), and vice versa. The situation when the inequality effect is negative is called trickle down. More specifically, the trickle-down effect happens when the poor absorb benefits at least equal to the growth rate (Kakwani, 1993).

Equation (1) is then partially differentiated to calculate each elasticity and the final equation can be written as

$$\frac{d\theta}{\theta} = \eta_{\theta} \frac{d\mu}{\mu} + \varepsilon_{\theta} \frac{dG}{G} \quad (2)$$

Where, η_{θ} is the partial elasticity of poverty to income growth (assuming inequality constant) and ε_{θ} is the partial elasticity of poverty to the Gini index (assuming the

² For the strength and weakness of the Analytical Approach by Kakwani's (1993) and its methodological review, see Araar (2012 p.14).

³ SUSENAS 2020 was held in March 2020. This period of the survey did not fully show the impact of the Covid-19

pandemic in Indonesia, especially in South Kalimantan. It is considered a relevant year for representing the before-pandemic time of reference. The SUSENAS data used are from the March survey.

income growth is constant). If $\frac{d\theta}{\theta}$ or proportional change in poverty is equal to zero, the Marginal Proportional Rate of Substitution (MPRS) can be written as

$$MPRS = \frac{\partial \mu / G}{\partial G / \mu} = - \frac{\varepsilon_{\theta}}{\eta_{\theta}} \quad (3)$$

Poverty Growth Curve (PGC)

As an additional analysis of the poverty-growth-inequality relationship, this study utilizes the Poverty Growth Curve (PGC) introduced by Son (2004). In the period from 2020 to 2021, there were many pro-poor policies applied by the government amidst the Covid-19 pandemic in Indonesia intended to counterbalance the socioeconomic impact especially on the poor that can affect the distribution of income (Ministry of Social Affairs Republic of Indonesia, 2021). Thus, the PGC analysis can be employed to complete the analysis.

The PGC can be written as

$$g(p) = g + \Delta \ln(L(p)) \quad (4)$$

Where, $g = \Delta \ln(\mu)$. $g(p)$ is the PGC of the bottom p percent of the population. g is the growth rate mean of per capita expenditure. $L(p)$ is the Lorenz curve. The PGC indicates the pro-poor growth of income if the PGC is above the value of g for the poor group; otherwise, it could be either a trickle-down growth or immiserizing growth.

RESULT AND DISCUSSION

The detailed calculation in this study especially in the data processing stage uses the DASP Stata Package developed by Araar & Duclos (2021). The result for the Analytical Approach by Kakwani (1993) can be seen in Table 1.

 Insert Table 1 in here

Table 1 provides the elasticity of poverty measurements from the FGT indexes (Foster, Greer, & Thorbecke, 1984) on the average income growth and Gini index in South Kalimantan taking the years 2020 and 2021. By utilizing all the FGT indexes, the examination can be more comprehensive especially reviewing the impact on the poor. The higher the value of α (i.e., P0 is the index when $\alpha=0$) the more weights are given to the

poorest poor (Kakwani, 1993). Some substantial findings are elaborated as follows. The absolute values of elasticity of the average income growth and Gini index are higher than one for all of the poverty measurements in all time of observations, meaning that the poverty is highly sensitive to the changes of income growth and Gini index regardless of the time of examination (before or after the pandemic). Furthermore, poverty will decrease faster than the rate of average income growth by holding inequality constant. The higher the α , the higher the absolute value of the elasticity (except for P1 in 2020 that has a relatively smaller elasticity than P0). In general, this result indicates that the poor will benefit more than the less-poor from the income growth by holding the inequality constant. This evidence is more visible in 2021 during the Covid-19 pandemic (the higher α , the bigger the elasticity).

If the values of the elasticity are compared between 2020 and 2021, the absolute values of elasticity of P0 to average income growth and Gini index in 2020 are higher than in 2021. A contrast situation is found for P1 and P2. From a pro-poor policy perspective, the pro-poor program that targets the poor for enhancing income will be more effective in reducing the poverty gap and inequality among the poor during the pandemic in 2021 compared to 2020. So, the chosen poverty indicator as the targeting program should be wisely determined. Of course, the poverty rate will decline faster than the increasing rate of the average income growth but a higher rate of reduction is bigger in the period before the pandemic. This could make sense if the poor are more affected than the non-poor when the pandemic hits. Concerning that the values of elasticity of poverty measurements to Gini index are bigger than the absolute value of elasticity for the average income growth, the matter of inequality should be carefully controlled. The pro-poor programs should be more targeted and effectively applied, to ensure the inequality effect is minimized.

The concern about the interaction of the pure growth effect and the inequality effect leads the examination to the values of MPRS. First, all MPRS values are positive and more than one. The higher growth rate of average income will be required to counter the increasing rate of the Gini index to maintain the poverty measurements at the same level. Second, the higher the α for the poverty index, the bigger the MPRS. This means given a 1%

increase in the Gini index, more average income growth is needed for the higher poverty index (higher α). For instance, in 2020, to maintain P0 at the same level (or at a stable level), it needs the average income to grow by 1.52%. For P2, it needs 2.31% of average income to grow to maintain P2 at the same level. It can be concluded that when inequality takes a certain impact on poverty, we will need a higher effort of policy intervention if we concern more for poor people. This situation is also the same with 2021 during the pandemic. Third, MPRS for 2021 is less than in 2020 in respective poverty measurements. For example, for a 1% increase in the Gini index, during the pandemic in 2021, it needs a 1.49% increase of average income growth lesser than in 2020 that needs 1.52% to maintain P0 at the same level. The smaller value of MPRS in 2021 compared to 2020 may be due to increasing pro-poor programs from the government of Indonesia when the Covid-19 pandemic hit Indonesia. The intervention on the poor more or less has an impact on inequality.

One question remains whether the pro-poor policies in the period from 2020 to 2021 affect the distribution of income and favor the poor that were affected much by the pandemic. Figure 1 shows the pro-poorness of the average income growth in such a period.

 Insert Figure 1 in here

From Figure 1, it can be seen that the income growth in the period from 2020 to 2021 favors the poor. The PGC, especially at the bottom percentile groups, has value more than the average growth of population (shown by the blue line). The income growth is identified as pro-poor. The targeted policies applied by the government of Indonesia to assist the poor during the pandemic are evident in the PGC. This result also supports the result from Table 1, which explains that the poorer will benefit more than the non-poor from the increasing rate of income growth assuming inequality is constant.

CONCLUSION

Poverty, economic growth, and inequality are examined widely in the economic development area. Further, the inclusion of those macro indicators in the SDGs goals has put more attention from policymakers and researchers. The study of poverty decomposition has developed for a while until

now throughout many phenomena. This study is no exception. The Covid-19 pandemic that hit the world recently has motivated this study to be conducted. By taking the South Kalimantan province of Indonesia as a locus for study in the period from 2020 to 2021, this study concludes some points.

First, the elasticities of all poverty measurements to average income growth and Gini index are more than unity, meaning that the change of all of the poverty measurements will be higher than the rate of the average income growth and Gini index for all time of observations.

Second, by using the partial examination of the elasticities, providing a pro-poor program during the period of the pandemic in 2021 will give a higher impact on P1 and P2 compared to 2020. On the other hand, providing a pro-poor program in 2021 gives less impact on P0 compared to 2020. All assume that inequality is constant in each examination. The chosen poverty measurement is essential.

Third, MPRS has shown that the trade-off between pure growth effect and inequality effect affects the poverty measurements regardless of the pandemic, and the MPRS values for all FGT indexes are positive and more than one. During a hard time in the pandemic, MPRS in 2021 is less than in 2020 for each poverty measurement. The higher effort from the government to help the poor through pro-poor programs during the pandemic has seemingly affected the MPRS.

Forth, the result of pro-poorness analysis has shown the importance of government intervention to improve the distribution of income during the pandemic. The pro-poor policies are should be sustainable during a hard time. It is to make sure that everyone including the poor can pass this pandemic.

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Table 1. The elasticity of Poverty Measurements to Income Growth and Gini Index in South Kalimantan, 2020 and 2021

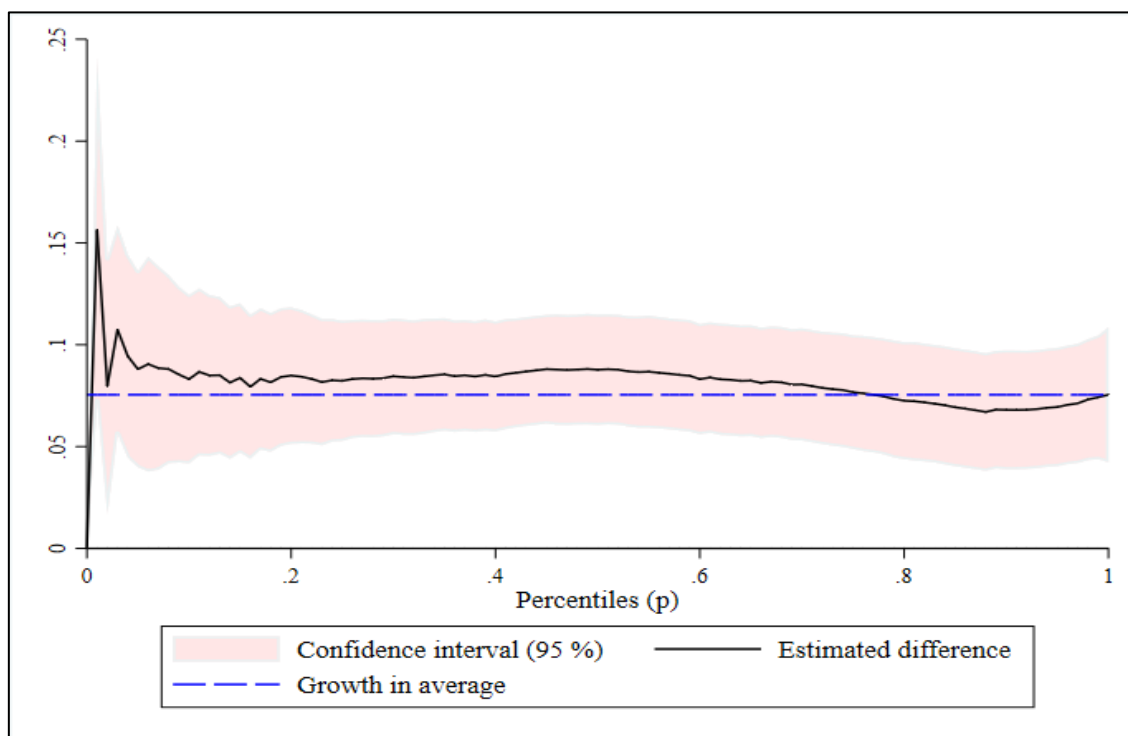
Year	Poverty Measurements	The elasticity of Poverty to Income Growth (η_θ)	The elasticity of Poverty to Gini Index (ε_θ)	MPRS ($-\frac{\varepsilon_\theta}{\eta_\theta}$)
2020	Headcount Ratio (P0)	-5.07	7.72	1.52
	Poverty Gap (P1)	-5.03	10.19	2.03
	Poverty Severity Index (P2)	-6.41	14.81	2.31
2021	Headcount Ratio (P0)	-4.55	6.76	1.49
	Poverty Gap (P1)	-5.90	11.26	1.91
	Poverty Severity Index (P2)	-8.04	16.93	2.11

Source: Author's processing.

Note: The poverty line in 2020 is 497,262 rupiah and in 2021 is 519,150 rupiah.

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Figure 1. PGC in South Kalimantan, 2020-2021



Source: Author's processing.