A Cross-city Analysis of Pro-poor Growth in Sumatra Island

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Abstract

Economic growth in Sumatra Island plunged at an annual rate of 2.21 percent in 2020, but recovered sharply at the rate of 4.56 percent in 2021 due to the outbreak of COVID-19 pandemic. While economic growth is now comfortably on a par with pre-pandemic levels, the consequence of the pandemic was a rapid increase in poverty that was shown by the rise of the head count index by 4 percent in 2020. Along with the rise of economic growth in 2021, the proportion of poor people in Sumatra Island was also reduced in general, but not in all of the cities. It means that some cities have more pro-poor growth than other cities. By using cross-city analysis, this study aims to determine under which conditions growth can be considered as pro-poor in Sumatra Island. This degree of pro-poor growth is measured by poverty equivalent growth rate (PEGR) that was calculated using raw data of Total Household Consumption from National Socio-Economic Survey. We use panel data of 154 cities in Sumatra Island over the period 2019-2021. This study can contribute to evaluating the pro-poorness of government policies in several factors. To identify the effect of labor market, local government budget, inequality of expenditure, and agricultural sector on pro-poor growth, we apply panel logistic regression. The cross-city evidence suggests that there is a variation in poverty reduction for the same growth rate in Sumatra Island. Agricultural sector is the most significant tool that affect the pro-poor growth due to the highest contribution of Sumatra Island to Indonesia in this sector. Surprisingly, the local government budget does not affect the pro-poor growth. Furthermore, there needs to be a deeper evaluation on the use of the government budget, so that the poor can feel the benefits of it.

I. Introduction

Poverty and economic growth are the central issues in regional economic development. Raising economic growth has been known as the parameter of successful economics, while reducing poverty has been a main goal of the government's programme. Based on the studies in Indonesia, the evidence suggests that economic growth and poverty reduction are positively correlated (Timmer, 2018; Farwati, 2012). In its mission of initiating a good governance programme, Indonesia needs to tackle poverty by making a development model for the poor. The poverty model based on good governance is mainly focused on this marginalized poor. This programme is in line with the concept of pro-poor growth.

According to IMF, OECD, UN, World Bank (2000), pro-poor growth is economic growth that benefits poor people and give them more access to economic opportunities. The economic growth needs to generate more income-earning from the poor people by engaging them in productive and well-paid work. It has to give access to assets to the poor people to help them become more productive and allow them to feed themselves. This theory assumed that increasing economic growth would create high job opportunities, and as the accelerant of reducing poverty.

In 2021, Central Bureau of Statistics (BPS) Indonesia stated that Sumatra Island GRDP was known to be about 21,37 percent of Indonesia's GDP. This makes Sumatra Island as the island with the highest economic contribution after Java Island, the central economy of Indonesia. Economic growth in Sumatra Island is decreased at an annual rate of 2.21 percent

in 2020, but recovered sharply at the rate of 4.56 percent in 2021 due to the outbreak of COVID-19 pandemic. This showed that Sumatra Island can emerge from the COVID-19 crisis stronger.

While economic growth is now similar with pre-pandemic levels, the consequence of the pandemic was a rapid increase in poverty that was shown by the rise of the head count index by 4 percent in 2020. Along with the rise of economic growth in 2021, the proportion of poor people in Sumatra Island was also reduced in general, but not in all of the regions. If we look deeper at the province level, all of the economies in Sumatra Island have grown over the range of 2,7 percent to 5 percent. Along with the economic growth, the percentage of poor people still remains increased in Aceh, but decreased in other nine provinces. This study aims to look further on poverty and economic conditions by doing a cross-city analysis.

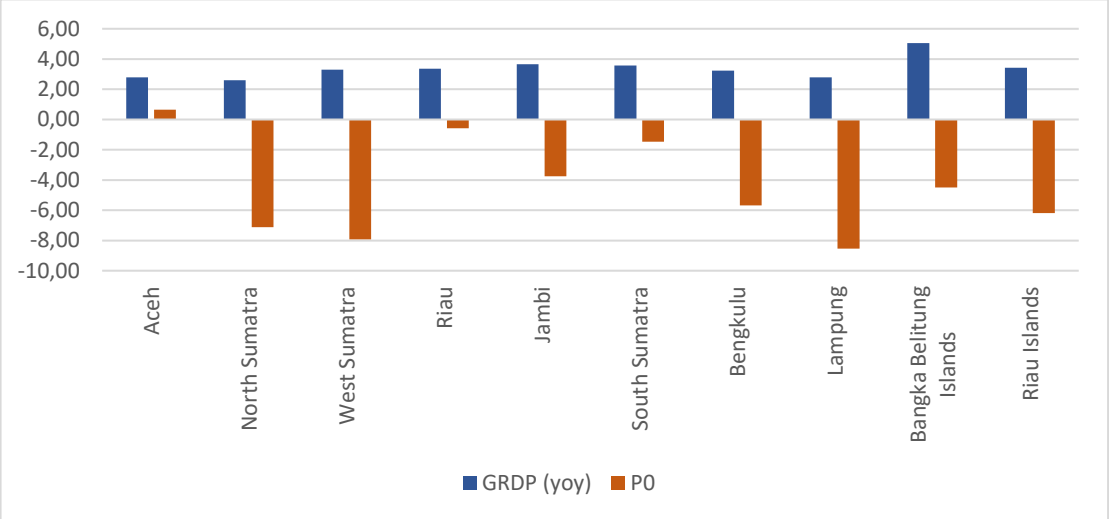

Figure 1. Regional Economic Growth in Sumatra Island

The measurement of pro-poor growth is not merely from the correlation of economic growth and poverty, but we need to answer on how much must the poor benefit for growth to be considered pro-poor. Therefore, we attempt to answer the following research question: by using cross-city analysis, under which conditions growth can be considered as pro-poor in Sumatra Island? There still remains no consensus on the strict measurement of pro-poor growth, but a number of studies have attempted to define and measure it (Jmurova, 2017; Son, 2007). For some, what matters is whether the incomes of the poor are rising relative to the incomes of the non-poor and hence inequality is falling.

After measuring the degree of pro-poor growth, this study will investigate the determinants of the pro-poor growth itself. Increasing the rate of job creation from growth, effectively allocating government budget, inequality matters, and raising production in agriculture are several attempts that is hypothesized impacting the pro-poor growth. By using panel logistic regression, we identify the effect of labor market, local government budget, inequality of expenditure, and agricultural sector on pro-poor growth.

The contribution of this study as follows: First, pro-poor growth studies in Indonesia are still focused at the national and provincial level (Timmer, 2018; Farwati, 2012; Cahyadi, 2017; Rudi and Kaluge, 2013). A cross-city analysis will make the study become more specific in which each city has their own characteristic. Second, this study will also evaluating the pro-poorness of government policies in several factors by analysing the determinants of the pro-poor growth.

II. Methodology

The dataset includes panel data of 154 cities in Sumatra Island over the period 2019-2021. The degree of pro-poor growth was calculated using raw data of Total Household Consumption from National Socio-Economic Survey. To identify the determinants of pro-poor growth, our data were collected from various sources: Central Bureau of Statistics (BPS) Indonesia, and Ministry of Finance.

In this study, we follow the pro-poor growth measure that is proposed by Kakwani et al. (2004) called the Poverty Equivalent Growth Rate (PEGR). This measurement has taken account the level of the actual growth rate. The PEGR is defined as the growth rate that will result in the same level of poverty reduction as the present growth rate if everyone in society receives the same proportion of benefits from growth (Son, 2007). The value of PEGR can be formulated as follows:

$$PEGR = \gamma^* = \left(\frac{\delta}{\eta}\right)\gamma$$

δ is total elasticity of poverty, η is growth elasticity of poverty, and γ is actual growth. Afterward, the value of PEGR is compared to the value of actual growth using these criteria:

1. $\gamma^* = \gamma$ Growth is neutral, everyone receives the same benefits proportionately from the growth
2. $\gamma^* > \gamma$ Growth is pro-poor growth, the poor population receives more benefit from the growth
3. $0 < \gamma^* < \gamma$ Growth is not pro-poor growth yet, the poor population receives less benefit from the growth, but poverty reduction still occurs
4. $\gamma^* < 0$ Growth is anti pro-poor growth, the benefits of growth is received by non-poor people and the poverty still increases

Limited Dependent Variable or Binary Choice Models for Panel Data are commonly used in studies that have a categorical dependent variable in panel data with large N and small T conditions Baltagi (2005). In this method, the categorical dependent variable is regressed on independent variables using binary logistic regression. This method allows researchers to investigate the effects of independent variables on the likelihood of an event occurring or a category being chosen. The use of panel data in this method provides more information and allows for the examination of changes in the effects of independent variables over time and across individual observations.

In binary logistic regression for panel data, Baltagi (2005) states that the dependent variable is usually represented by a value of 1 if the i observation at the t experiences an event ($y_{it} = 1$) and is represented by a value of 0 if not ($y_{it} = 0$). If the p_{it} is the probability of the i observation occurring at the t time, then:

$$p_{it} = Pr(y_{it} = 1) = 1 - Pr(y_{it} = 0)$$

Fixed effects assume that the unobserved heterogeneity is time-invariant and can be captured by individual-specific intercepts, while random effects assume that the unobserved heterogeneity is random and can be captured by a normally distributed error term. The choice between Fixed Effect and Random Effect depends on the nature of the unobserved heterogeneity and the estimation method used. Baltagi (2005) states the equation of Fixed Effect as follows:

$$y_{it} = x'_{it}\beta + \mu_i + v_{it}$$

Where:

$$\Pr(y_{it} = 1) = \frac{e^{x'_{it}\beta + \mu_i}}{1 + e^{x'_{it}\beta + \mu_i}}$$

$$Ln\left(\frac{p_{it}}{1 - p_{it}}\right) = x'_{it}\beta \ + \ \mu_i$$

According to Homer and Lemeshow (1989), parameter estimation used in binary logistic regression is the Maximum Likelihood (MLE) method. In the fixed effect logit model, the individual effects represent unobserved characteristics that are fixed over time and differ across individuals. When T (time period) is defined, the individual effects resulting from the MLE estimation will have problems with consistency, so the individual effects must be excluded. Therefore, the conditional maximum likelihood (CML) method is used to estimate the coefficients of the independent variables in the fixed effect logit model. The CML method eliminates the individual effects by taking differences in the dependent variable within each individual across time periods. This method results in consistent estimates of the coefficients of the independent variables even when T is finite (Chamberlain, 1980).

III. Results

According to poverty data from BPS, the poverty rate in the district/cities of Sumatra has fluctuated during the period from 2019 to 2021. In 2020, most of the city poverty rates decreased, but they increased again in 2021 due to the ongoing COVID-19 pandemic. The first confirmed case of the pandemic in Indonesia was on March 2, 2020, which was around the time of the National Socioeconomic Survey data collection for poverty recording. Therefore, the poverty rate in 2020 could not reflect the impact of the pandemic.

In 2021, the highest poverty rate in the district/cities of Sumatra was in West Nias at 26.42%, followed by Meranti Islands with 25.68% and North Nias with 25.66%. The city with the highest growth in poverty rate in 2021 was Muaro Jambi, which experienced an increase of 18.28% compared to 2020.

However, the economic conditions of cities in Sumatra in 2021 started to improve, as indicated by the highest economic growth rate of 9.27% in the city of Pangkal Pinang compared to the previous year. Nevertheless, there was one district that experienced a decline in economic growth, which was North Aceh District with a decline of -0.55%.

In looking for the effect of economic growth on poverty, Kakwani (2001) did a study of decomposition of growth effects and redistribution effects. The negative per capita consumption growth effect indicates a reduction in poverty, meaning that economic growth is increasing the average income and consumption levels of the population. The negative redistribution effect suggests that economic growth is reducing inequality by targeting people with low incomes, such as the poor. We found that almost all districts/cities in Sumatra experienced an increase in poverty in 2021 due to a positive net effect. This means that the positive impact of economic growth is outweighed by the negative impact of redistribution. However, there are five districts/cities in Sumatra that have a negative net effect, namely Nias, South Nias, West Nias, South Ogan Komering Ulu, and Empat Lawang.

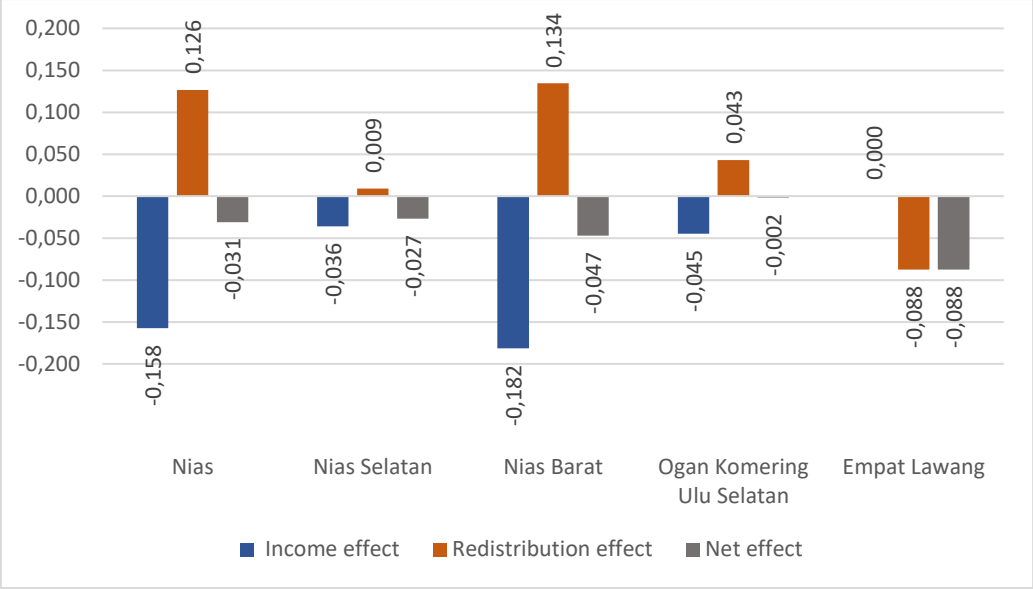

Figure 2. Income effect, redistribution effect, dan net effect in 2021

Among these five cities, Nias Regency stands out with a positive redistribution effect, indicating that economic growth in this district is targeting people with low incomes. As a result, the growth in per capita consumption can reduce poverty by -15.8%. However, the positive redistribution effect has the potential to increase the poverty rate by 12.6%, resulting in an actual poverty reduction of only -3.31%. This means that the positive impact of economic growth on poverty reduction in Nias Regency is limited by the negative impact of redistribution.

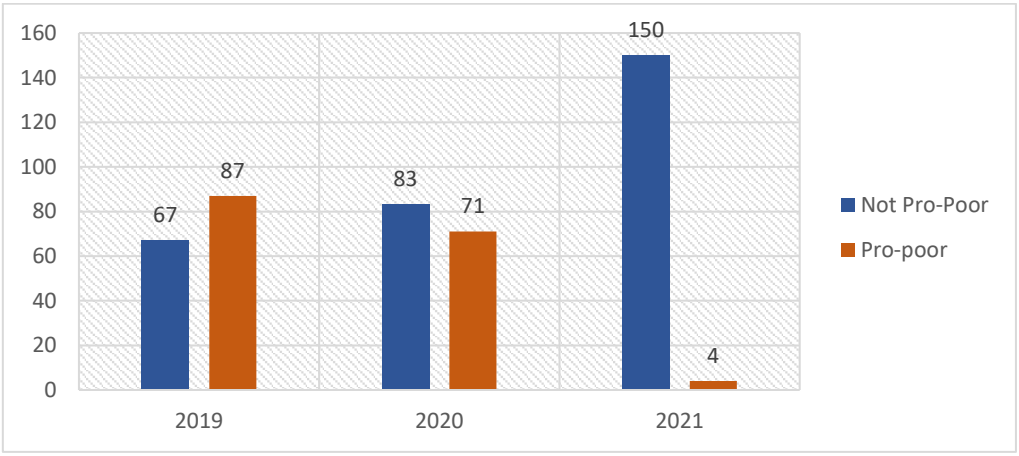

Figure 3. Comparison of the number of cities that pro-poor and not pro-poor in Sumatra in 2019-2021

Based on the pro-poor-growth index (PEGR) compared to economic growth, several regions in Sumatra are categorized as pro-poor-growth, indicating that the benefits of economic growth are well distributed and felt by the poor, resulting in a reduction in poverty rate. However, the number of cities categorized as pro-poor in Sumatra has been decreasing over the years. In 2019, there were 87 cities categorized as pro-poor, which dropped to 71 cities in 2020 and drastically decreased to only 4 cities in 2021.

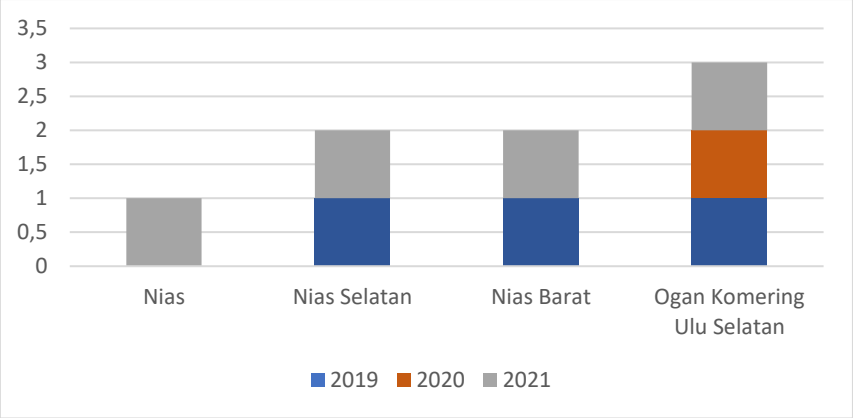

Figure 4. Pro-poor city through the years

The four districts that are still classified as pro-poor in 2021 are Nias, South Nias, West Nias, and South Ogan Komering Ulu. Only one city, namely Nias, changed its category from not yet pro-poor to pro-poor between 2019 and 2021, while the other three districts have remained in the pro-poor category since 2019. This suggests that although there may be some areas that have experienced pro-poor growth, overall, the trend in Sumatra is moving towards less pro-poor growth.

Y=pro-poor status	Coefficient	Standard Error	p-value
Unemployment Rate (%)	0.3922	0.1597	0.0140*
Ln_Agriculture Sector	4.0546	0.7703	0.0000*
Ln_Regional Expenditure	0.5042	0.5449	0.3550
Ratio Gini	-15.0707	6.4477	0.0190

Table 1. Model estimation results with fixed effect model

Based on the binary logistic regression analysis, the open unemployment rate variable is found to have a significant positive effect on the category of pro-poor regency/city, indicating that areas with higher unemployment rates are more likely to be categorized as pro-poor. This is consistent with previous research by Kakwani (2001) that has shown that income growth among the unemployed population is not necessarily pro-poor, meaning that being unemployed does not necessarily mean that one is poor, and vice versa. However, unemployment is often considered as a main cause of poverty since income from work is a major source of household consumption.

It is worth noting that the current employment conditions in Sumatra indicate that almost all provinces in Sumatra have more than 50% of workers earning less than the minimum wage in their respective provinces, which can contribute to the prevalence of poverty in the region (Ministry of Manpower, 2021). While economic growth has been occurring, it has not necessarily translated into higher wages for workers in the region. This can perpetuate the cycle of poverty, as workers struggle to meet their basic needs and have little ability to save or invest in their future.

Unemployment can affect poverty levels in two ways. Firstly, if households rely heavily on their current income, then unemployment can directly affect their consumption spending. Secondly, if households are not highly dependent on their current income, an

increase in poverty may occur in the long term, with less of an impact in the short term (Tambunan, 2001). Adelzadeh (2007) have shown that creating pro-poor job opportunities can have a greater impact on reducing poverty compared to creating job opportunities in general.

The result of binary logistic regression analysis also shows a significant positive effect of GRDP growth in the agricultural, forestry, and fisheries sectors on the pro-poor category. This indicates that growth in these sectors benefits the poor and helps to reduce poverty. The fact that these sectors employ a large number of workers in Indonesia, especially in Sumatra, is also a positive sign for poverty reduction. According to data from the Ministry of Manpower in 2021, the agricultural, forestry, and fisheries sectors in Indonesia employ approximately 38.78 million workers, which is the largest sector in terms of employment. This sector accounts for around 29.59% of the total employment in Indonesia.

Studies of Amuka et al. (2019) and Sassi (2023) showed that growth in the agricultural sector can have a positive impact on the income of the bottom 20% group. This is because the agricultural sector is typically dominated by the poor, and growth in this sector can increase their income and reduce poverty. The increase in the Farmer Terms of Trade (FTT) in 10 provinces on the island of Sumatra, as indicated by the figures, is also a positive sign that farmers are becoming more prosperous. Overall, these findings suggest that policies aimed at promoting growth in the agricultural, forestry, and fisheries sectors can be an effective strategy for reducing poverty in Sumatra Island.

It seems that despite the positive relationship between regional expenditure and pro-poor status, the significance level is not achieved. However, according to Rambe et al. (2022), the increase in regional spending in Sumatra has been efficient in reducing poverty and promoting pro-poor growth, especially during the Covid-19 pandemic. The efficiency level is still lower than Kalimantan and Java-Bali islands, though, in terms of allocating spending to foster economic growth while reducing poverty.

The Gini ratio is often used as a measure of income inequality and is closely related to the concept of pro-poor growth. The results show that there is a significant negative relationship between the gini ratio and the pro-poor growth status of an area. High income inequality is not pro-poor, as it can limit opportunities for the poor to access education, healthcare, and other essential services, leading to further marginalization and poverty. This result is supported with Kuznets theory that says income inequality is closely related to the industrialization phase of a country. Kuznets' theory suggests that income inequality tends to increase in the early stages of industrialization and then decrease in the next phase.

The findings of Yusuf et al. (2021) and Weide & Milanovic (2018) also suggest that changes in the labor market and economic structure have significant impacts on income inequality. In the case of Indonesia, the shift from manufacturing to the service sector has contributed to increasing inequality. This is because the service sector tends to be more skill-intensive and requires higher levels of education, which means that those who have better education and skills are more likely to benefit from the growth in the sector. Additionally, Van der Weide's (2018) finding that inequality is negatively related to growth rates among low-income people but positively related to high-income people suggests that policies aimed at reducing inequality should focus on supporting the most vulnerable and disadvantaged groups in society.

IV. Discussion and conclusion

- Targeting job creation towards the poor can help to ensure that those who are most in need of income support are able to access productive employment opportunities. This can be achieved through a variety of policies and programs, such as skills training, education and job placement services, and support for small and medium-sized enterprises.
- The agricultural sector is an important sector in reducing poverty, given that this sector is dominated by the poor. Therefore, policies to support the growth of this sector can have a positive impact on poverty reduction.
- In many cases, economic growth has been accompanied by increasing income inequality, which means that the benefits of economic growth are not shared equally among all households. Therefore, it is important to ensure that economic growth is inclusive and benefits all households, especially those who are most vulnerable and marginalized, such as the poor. This requires policies and programs that promote income redistribution, such as progressive taxation, social safety nets, and targeted programs to improve the income and livelihoods of the poor.
- Finally, it is important to address regional disparities in economic development and poverty. Policies that promote balanced regional development can help to ensure that all regions benefit from economic growth and reduce poverty in the long term

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