

STRUCTURAL TRANSFORMATION AND POVERTY ERADICATION IN EAST JAVA (A PANEL DATA APPROACH OF 38 COUNTIES)

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ABSTRACT

The characteristic of structural transformation is a decrease in the share of agriculture followed by an increase in the industry share in the economy. Sometimes, the share of services to the economy increases more rapidly than the share of the industry, called immature structural transformation. This study aims to analyze the structural transformation process in East Java and its impact on poverty alleviation. Panel data for 38 districts/cities used from the Statistics Indonesia (BPS) during the 2012-2015 period. The estimation results revealed empirically that the service sector has a significant impact on reducing poverty in East Java. This research argues that East Java has experienced immature structural transformation seen from the stagnation of the industry's share of the economy. It is supposed that the role of the industrial sector is not significant, while the service sector is better to reduce poverty.

Keywords: *Structural Transformation, Poverty, East Java, Panel Data*

JEL: *B22, I32, L16*

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Introduction

As an emerging country, Indonesia has been facing economic obstacles to reach a developed country stage. Furthermore, it requires a tremendous economic scale; mainly, growth is driven by high value-added sectors. However, industrial sectors have been experiencing a decline in recent years. It implies that Indonesia has been considered the deindustrialization phase. According to [BPS \(2020\)](#), labors working in agricultural sectors are more significant than they work in industries. It means many people will earn relatively lower income since the farming sectors have been considered a low value-added sector. Thus, the impact of this phenomenon will complicate the poverty eradication policy.

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Indonesia must carry out a transformation to get out of the middle-income trap country. Therefore, the transition from an agriculture-based country to a country that prioritizes added value from the manufacturing industry is the government's concern. In addition to increasing added value, the structural transformation will also make the economy more productive because it will absorb more workers in the manufacturing sector and provide goods from upstream to downstream, thereby encouraging more inclusive economic growth [Kim et al. \(2018\)](#).

Structural transformation is expected to be a way out to encourage poverty alleviation programs. Thus, enabling structural change to escape the middle-income trap will also impact the government's efforts to reduce poverty. According to [McMillan & Rodrik \(2011\)](#), countries that have managed to move out of poverty and become richer have been able to diversify away from agriculture and other traditional products. As labor and other resources move from agriculture to modern economic activity, overall productivity will increase, and income will also increase.

[Aggarwal \(2016\)](#) also explained that structural transformation would, in turn, remove barriers to productivity growth. In developing countries, labor productivity in the primary sector, such as agriculture, is relatively lower than that in the secondary industry, such as manufacturing and services. This condition means that the shift in resources from the primary sector to the secondary industry increases growth. This type of structural transformation contributes significantly to poverty reduction by increasing the level of income, both of which are absorbed by the more productive sectors and those left in the primary industry.

[Timmer & Akkus \(2008\)](#) explained that structural transformation involves four main things specifically. First, a decrease in the share of agriculture in economic output and labor. Second, an increase in the percentage of urban economic activity in the modern manufacturing and service industry. Third, labor migration from rural to urban areas. The last is the demographic transition in birth and mortality rates. It is leading to a spike in population growth before a new equilibrium is reached. Ensuring poverty alleviation is linked to structural transformation involves government policies that are consistent in the long run.

The success of the structural transformation process at the national level is influenced by the commitment of local governments to carry out structural transformation at the regional level. Furthermore, one of the regions has an essential role in the structure of the national economy in East Java. Based on Gross Domestic Product (GRDP) on Gross Domestic Product (GDP), East Java is the second-largest after DKI Jakarta. Even in the last few years, East Java has consistently become an essential province in the structure of the national economy. This consistency certainly makes East Java one of the regions that significantly contribute to the national economy.

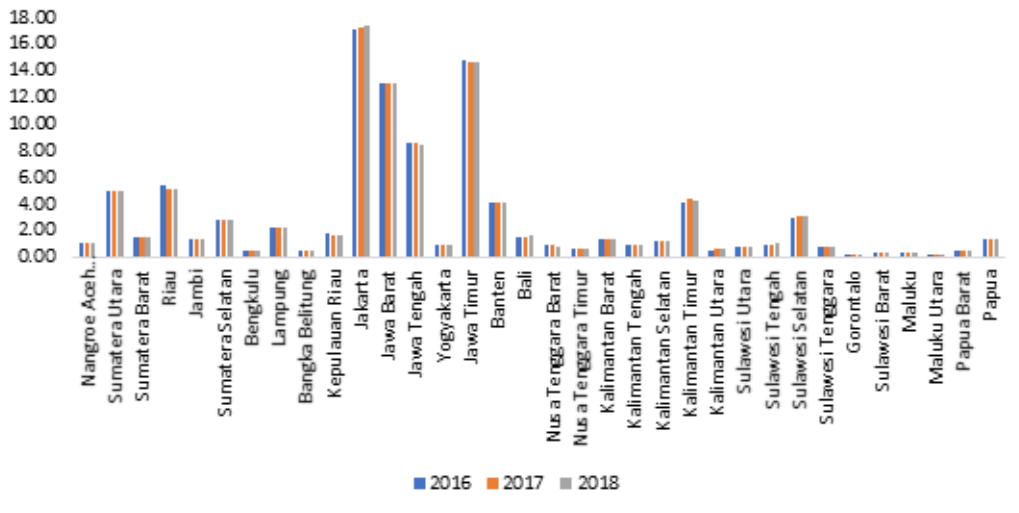


Figure 1: Share of GRDP on GDP

Source: Statistics Indonesia (processed)

Figure 2 illustrates the share of poor population in all provinces in Indonesia. Even though East Java is one of the centers of economic growth with a significant role, poverty levels is still a social and economic problem. The percentage of poor people in East Java is still double digits, although it tends to decline. In Java Island, the poverty rate in East Java is higher than in DKI Jakarta, West Java, and Banten. Nevertheless, it is relatively lower than Central Java and the Special Region of Yogyakarta. This problem is a big challenge that must be resolved because poverty represents an unequal economic impact on society.

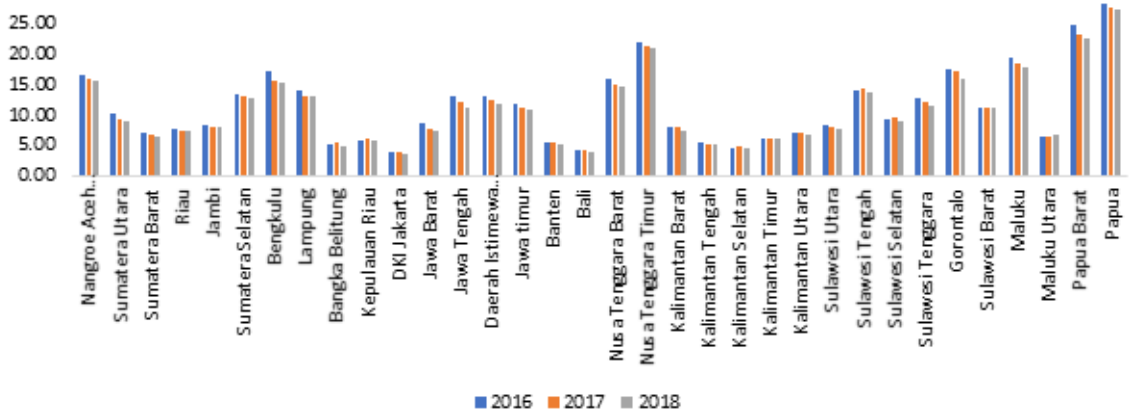


Figure 2: Share of Poor Population

Source: Statistics Indonesia (processed)

The importance of economic growth that leads to social justice is the government's concern. Government must take one way out to encourage structural transformation efforts that are thought to be one of the best ways to implement poverty alleviation programs. Unfortunately, at the macro level, it shows that East Java is undergoing a structural transformation process that is not established yet.

The share of agriculture shows a decline in GRDP. Still, in the last few years, the percentage of the manufacturing industry has not demonstrated a significant and robust performance, even tends to stagnate. The process of structural transformation is then often called immature structural transformation.

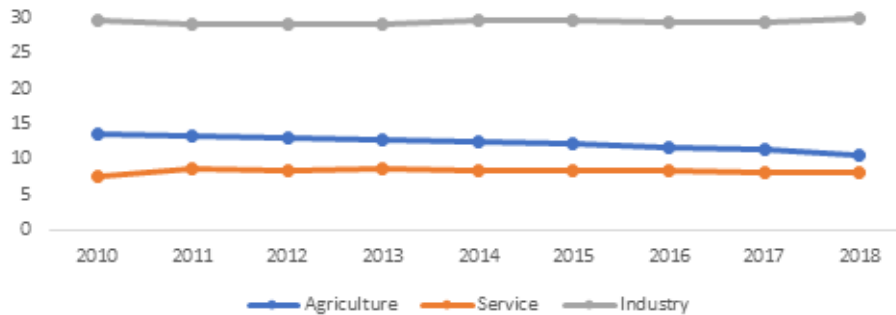


Figure 3: Share of Agriculture, Service, and Industry on East Java GRDP

Source: Statistics Indonesia (processed)

To accelerate poverty eradication, Indonesia urgently needs to transform the economic structure. However, the transformation itself depends on the regional level, such as East Java as the second-largest financial contribution. Besides, East Java is also facing poverty issues, making the structural transformation must be done immediately. In general, the structural change will reduce poverty, yet there is an immature condition that leads to underperforming to eradicate the poverty in East Java. This study aims to analyze further the impact structural transformation process in East Java on poverty eradication. This study is also contributing in terms of structural transformation issues at the regional level due to a research gap since more structural transformation topics are considerably discussed at the national level.

Literature Review

Several previous studies have contributed a lot to the impact of structural transformation on poverty alleviation. At the ASEAN-4 regional level, [Kahya \(2012\)](#) found that structural transformation has positive and negative effects on income distribution, depending on country conditions. Meanwhile, structural transformation significantly contributed to poverty reduction in ASEAN-4 countries over the past three decades. However, [Kahya \(2012\)](#) stated that structural transformation might not be an essential factor in reducing inequality and poverty. Furthermore, improvements in the agricultural sector may have a more substantial impact on income distribution and poverty reduction than in the industrial sector.

[UNIDO \(2012\)](#) found similar things where at the regional level of Brazil, Russia, India, China, and South Africa (BRICS) countries, the structural transformation has a significant impact on poverty reduction. Especially in China, the poverty rate decreased from 15 percent to 3 percent during the 1984-2004 period. One of the leading causes is the urbanization by the poor to work in the manufacturing sector in urban areas.

At the level of a country's economic entity, structural transformation also showed performance in line with theory. [Tello \(2015\)](#) explained that the shift of labor from the informal sector to the formal sector due to structural transformation led to an increase in income in Peru. The rise in labor income causes a decrease in the percentage of poor people. [Christiansen & Kaminski \(2015\)](#) found that poverty reduction in Uganda decreased more rapidly in cities because of more excellent employment opportunities in the manufacturing sector than

in rural areas.

Furthermore, [Aggarwal \(2016\)](#) found that structural transformation in India has not been going well despite its impact on poverty reduction. This situation is because there are still many workers, most of whom are still trapped working in the agricultural sector. Meanwhile, the existing manufacturing industry tends to be oriented towards the heavy industry. Nonetheless, the Indian government seeks to create a young, skilled workforce through policy interventions in the tertiary education and technology sectors in early growth.

[Kabubo-Mariara & Kiriti \(2002\)](#), based on research in Kenya, recommends that the government focus on achieving structural transformation alone. Because there will be poor people who cannot keep up with the flow of structural transformation changes to be affected by the structural transformation process—protection of the poor through educational programs such as waiving school fees. The aim is to stimulate the poor, especially young people, to continue to attend education, which will shape them into skilled workers.

[Dartanto et al. \(2017\)](#) resulting from substantial increases in income and structural transformation, have been associated with growing levels of income inequality. We explore the link between structural transformation and inequality in Indonesia by applying Theil's L decomposition (both static and dynamic revealed that the disparity in poverty in Indonesia varies greatly, especially between rural and urban areas. The most appropriate policy is through local government intervention, which shows that the structural transformation process is not only done by the central government.

Interrelated and supportive policy synchronization is required. [Kim et al. \(2017\)](#) convey a more realistic opinion. Structural transformation that is not going well in Indonesia resulted in low poverty reduction. However, to improve the economy and create jobs, the existing workforce can not ignore opportunities in other sectors. In short, to encourage structural transformation, investment is needed to make better employment opportunities in the manufacturing industry.

In other studies, [Kim et al. \(2018\)](#) further explain that the structural transformation in Indonesia is not establishing well due to reforms in government that are also not going well, especially in terms of institutions and finances. Furthermore, the government needs to understand and actively deal with the consequences of structural transformation and these consequences, in turn, depend on the characteristics of the leading and lagging sectors. Indonesia's economic and social policies must be coherent and complementary to manage the consequences well. How policymakers work, the effects will be a critical factor in deciding whether economic growth led by structural transformation will be inclusive or not.

Data and Research Methods

This study aims to analyze the effect of structural transformation on poverty levels in East Java. The model used in this paper refers to [Lee \(2018\)](#). However, we made few modifications, and the basic model is the following.

$$poverty_{it} = a_1 + \beta_1 ST_{it} + \beta_2 X_{it} + \mu_{it} + \varepsilon_{it} \quad (1)$$

Where *poverty* is an indicator of poverty, *ST* is a structural transformation, and *X* is a control variable.

The data used is the district level throughout East Java Province (38 districts) in 2012-2015 sourced from the Central Statistics of Statistics. This study uses three indicators of poverty as the dependent variable: the percentage of poor people, poverty severity index, and

poverty gap index. The independent variable used as an indicator of structural change is the share of labor in the agricultural, industrial, and service sectors and used in research Lee (2018). Also, this study includes several control variables such as GRDP and population size.

Table 1: Variable Identity

Variable	Definition
	Percentage of poor people (HCI)
Poverty	Poverty Gap Index (PGI)
	Poverty Severity Index (PSI)
Agri	Share of labor in the agriculture sector
Industry	Percentage of labor in the industry sector
Service	Share of labor in the service sector
GRDP	(log) GRDP
Population	(log) Amount of people

According to the Central Bureau of Statistics, HCI is used to see the population below the poverty line. PSI describes the distribution of expenditure among the poor, while PGI measures the average expenditure gap between the poor and the poverty line. The estimation model used is fixed-effects to analyze the effect of structural transformation on poverty in East Java. One of the advantages of fixed-effects is that it can accommodate omitted variables constant over time Middendorf (2006) Also, we run an autocorrelation test to assure that there is no correlation between t period with the previous period $t-1$. However, to ensure the correct Ordinary Least Square (OLS) model, this study also conducted a Hausman test. The estimation model with three poverty indicators is as follows.

$$HCI_{it} = \alpha_1 + \beta_1 agri_{it} + \beta_2 industry_{it} + \beta_3 service_{it} + \beta_4 X_{it} + \mu_{it} + \varepsilon_{it} \quad (2)$$

In model 2, we employed HCI as the proxy for analyzing the impact of structural transformation to poverty indicated by using a percentage unit. On the other hand, we also used another proxy in model 3 below.

$$PSI_{IT} = \alpha_{it} + \beta_1 agri_{it} + \beta_2 industry_{it} + \beta_3 service_{it} + \beta_4 X_{it} + \mu_{it} + \varepsilon_{it} \quad (3)$$

In this model, we used PSI to describe the expenditure phenomenon among poor people. Lastly, in model 4, we applied PGI to represent poverty by looking at the average expenditure gap between the poor and the poverty line.

$$PGI_{IT} = \alpha_1 + \beta_1 agri_{it} + \beta_2 industry_{it} + \beta_3 service_{it} + \beta_4 X_{it} + \mu_{it} + \varepsilon_{it} \quad (4)$$

The models are used intentionally to complete each other and find which fittest model represents the poverty variable.

Finding and Discussion

Table 2: Estimation Result

Variable	HCI (Model 2)	PSI (Model 3)	PGI (Model 4)
	Coef	Coef	Coef
<i>Agri</i>	2.5823*	-0.1942	-0.0132
	(1.491)	(0.559)	(1.316)
<i>Industry</i>	-0.5952	-0.3003	-0.3902
	(2.299)	(0.984)	(2.185)
<i>Service</i>	2.4385*	-1.0124*	-2.3667*
	(1.389)	(0.515)	(1.187)
lnPDRB	-1.8458	0.1059	0.0571
	(1.416)	(0.300)	(0.634)
lnpopulasi	-21.6941	1.9601	2.5346
	(15.287)	(2.402)	(5.275)
Constant	323.9675	-26.9740	-32.7472
	(195.255)	(30.201)	(66.526)
Observations	152	152	152
R-squared	0.436	0.099	0.063
Number of regions	38	38	38
Hausman test	0.000	0.0082	0.0152
Autocorrelation test	0.000	0.816	0.9716

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10

Table 2 shows the estimation results using the fixed-effects model. Based on the results of the Hausman test with a significance level of below 5 percent, the most proper model is fixed-effects. Also, to ensure no autocorrelation issue in the model, which can cause the OLS estimator to be inefficient and biased estimation results, this study conducted an autocorrelation test. The autocorrelation test results from the level of significance below 5 percent for equation 2, so it can be concluded that there is an autocorrelation issue. On the other hand, the test results in the other two models (equation 3 and equation 4) reveal no autocorrelation issue in the model. Thus the estimation results are valid.

The estimation results in equation 3 show that structural changes to the service sector negatively affect the severity of poverty. Thus, the more significant the structural change to the service sector, the smaller the expenditure inequality among the poor will be. Likewise, the estimation results in equation 4 where the poverty gap index as the dependent variable, structural changes to the service sector have a negative and significant effect on the poverty gap index. This estimation means that the higher the structural changes to the service sector, the lower the average expenditure gap of each poor person to the poverty line.

Meanwhile, there is no firm evidence of a structural transformation's effect on poverty's agricultural and industrial sectors, both in terms of severity and gap. However, the main argument from the results of this study is that the structural transformation process in East Java has not been established. As already explained, the share of agriculture has decreased, which is one of the characteristics of the structural transformation process.

On the other hand, the share of the manufacturing industry has not shown a significant performance. It tends to be stagnant, so the shift of labor from agriculture to the manufactur-

ing sector tends to be slow. This slowdown process has led to a slow structural transformation process in East Java. Furthermore, the direction of the coefficient of share in the manufacturing industry is by the expectations, namely negative but not statistically significant. Uniquely, the service share shows the trend of the coefficient that matches the research expectations. Based on equation 3 and equation 4, an increase in the service share of 1 percent will reduce the severity of poverty and the depth of poverty by 1.0 percent and 2.4 percent, respectively.

However, this finding is another alternative for the government. Because in the end, the structural transformation process will reduce the share of agriculture. This result means that the government must attempt to build a new engine of economic growth. Kadir & Rizki (2016) also advised the government to develop other sectors besides agriculture to reduce poverty. Also, the service sector is closely related to encouraging investment in growing the manufacturing industry Mcculloch et al. (2007). Furthermore, the role of the service sector still plays a vital role in poverty alleviation, especially regarding the deepening of the financial industry that is accessible to the poor Lee (2018).

Also, one finds that is in line is from Suryahadi et al. (2006), who found that although agriculture is the most influential sector in poverty reduction, it only reaches people in rural areas. Meanwhile, in the structural transformation process, many residents have migrated to urban areas. In the long run, the focus should shift to achieving strong growth in the services sector. Emphasized by other discoveries, Suryahadi et al. (2012) found that although the agricultural sector is one of the most influential sectors in alleviating poverty, this only happens in rural areas.

Conclusion

Each economic sector will ultimately be related to one another. In the short run, the government has not been able to encourage structural transformation to run faster, so based on empirical results, it is precisely the service sector that can significantly reduce poverty. It can explain the transmission of research results through financial services. The investment needed to create jobs through the revitalization of the manufacturing industry in urban areas will absorb labor and become a spillover for the processing of goods involved from upstream to downstream and creating added value. From the rural side, the share of services related to financial deepening is still not optimal, especially programs that directly affect the agricultural sector. Thus, investment in urban areas that creates manufacturing industries and financial deepening in rural areas through the farming industry will together accelerate the structural transformation process. However, there are limitations in this study, mainly to the limited independent variables since the regional level data is more complicated to collect due to the availability and the length of time series. Future research direction is strongly suggested to elaborate more variables regarding structural transformation at the regional level.

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