The Determinants of Income Equality in Bangka Belitung Province

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Abstract. The income distribution phenomenon in Bangka Belitung Islands Province during the 2007-2018 period became the basis for analyzing the determining variables of income distribution including the industrial sector, the agricultural sector, the trade sector, and the industrial labor productivity. We measured the income distribution indicator from the Gini coefficient value used the Panel Data Regression approach to determine the effect of these variables on the Gini coefficient in all regencies/cities in the Bangka Belitung Islands Province. The results showed that the determinant of the income distribution was the agricultural sector. Further findings prove that the agricultural, industrial, and trade sectors improved income distribution.

Keywords: Income Inequality, industrial sector, agricultural sector, industrial labor productivity

JEL Codes: O1, 015, O150

1. Introduction

The value of the Gini ratio categorized income distribution in Indonesia, separated into two classifications: high distribution or low inequality (0.00-<0.35) and moderate distribution or inequality (0.35-<0.50). Inequality classification was spatially mapped into low, medium, and high levels, split into a red zone representing a high classification, a yellow zone representing a medium classification, and a blue zone

representing a low classification. The Indonesian provinces usually had modest differences because they belonged to the yellow zone with an overall Gini ratio of 0.34. Figure1.1 shows the spatial classification of

Figure 1 Gini Ratio Distribution in Indonesia in 2018

inequalities in all provinces in 2018. Figure 1 shows only one Indonesian region is in the blue zone, include Bangka Belitung Province, thus the province has the lowest classification categorized in the high equalization, classification compared to other provinces. It has a Gini ratio of 0.272 lower than the entire country. According to the BPS-Statistics of Bangka Belitung Province (2019) several factors related to income distribution in this province, specifically (1) the population average expenditure in the lowest 40 percent group increased by 3.05 percent, while for the population of the top 20 percent, it increased by 2.17 percent. (2) There was a decrease in expenditures distribution in the top 20 percent and middle 40 percent groups, particularly 0.21 points and 0.03 points, respectively.

Meanwhile, in the lowest 40 percent group, there was an increase of 0.25 points. This shows an increase in the percentage of regional income enjoyed by the group of 40 percent and below and a decrease in regional income enjoyed by the middle to upper-class population, so it influences increasing income distribution. The increase in expenditure, which reflects an increase in the income of the lower-class population, cannot be separated from infrastructure development, conducive development of trade and services businesses, and social protection schemes run by the government (BPS Bangka Belitung Province, 2019). In the province of Belitung, we can see an equal distribution of income from the role of the three leading sectors, namely the agricultural, industrial, and commercial sectors. Besides the circumstances of the Bangka Belitung Islands, there is also a structural transition which is characterized as a change in the economy related to creating demand, trade, output, and other factors that are continually required to increase income and social welfare by increasing per capita income [1] [2] [3] [4] [5] [6]

Some research examined changes in the economic structure and distribution of income. [7] performed a study to determine the effect of changes in the economic structure on income inequality, and the findings found that the transition in the economic structure to industrialization had a positive impact on income equality. Besides [8] observed that the shift in income distribution was more flexible in the agricultural sector than the industrial sector, although both sectors' development would increase the income distribution. However, [9] reported that productivity in the agricultural sector would reduce income distribution in developing countries.

2. Literature Review

[7] examined the economic transformation or structural change of the Kuznets theory, and the results showed that changes in the economic system towards the service sector contributed to income inequalities. The wage fair prospects would improve as the pattern of the economic system was changed to industrialization. [8] found a higher elasticity of income distribution owing to systemic shifts of the agricultural sector in the manufacturing sector. However, without permanent systemic changes in the agricultural sector, the influence of income allocation has increased since the growth of the agricultural sector would promote a more flexible distribution of incomes than the development of the industrial sector. In some studies, explicitly addressed changing the economic structure to industrialization which led to many problems including income inequality. The decline in manufacturing value-added and manufacturing jobs share in many developing countries is identified by [14] as the result of the shift from manufacturing activities towards a relatively small community, instead of the changes in the sector's development potential.

These conditions created inequalities opportunities for salaries and employment. The transition to industrialization led to the introduction of capital-intensive and growing technologies and skilled labor in the new manufacturing field. The disparity in work and income will then be inevitable [10]

Otherwise, by modeled on Lewis (1954), Lewis (1955), and Kuznets (1955), the agricultural economic structure transition to industrial economic structure in-state development would lead to an overall increase in modern sector income and would lead to inequalities that are being used with high productivity levels. According to [11] the economic reform process is a change from the agricultural sector to the domestic market, not a shift from farming to manufacturing and services which, as suggested by Kuznets, caused increased inequality. [12] has concentrated on the unformalized interaction between development and inequality. It varies including from convergence or literature [13].

The model argued that structural changes triggered by technology (e.g., the emergence of information and communication technology and e-commerce), culture (e.g., increased demand for health food), institutional (e.g., reform and openness), or policy (e.g., privatization movements) caused a shock relocation of resources across sectors and locations, leading to an imbalance in demand and supply factors and thus causing changes in income distribution [12] [15]. In line with the [11] [16] concluded that a combination of a shift from agriculture to manufacturing and services and a rise in agriculture labor productivity would promote income equality. [15] published a report on economic change in industrialization, especially in the monopoly and competitive industries. The study showed that the subsector contributed 8.2% of the overall income difference between employees. The analysis only varied in education degree that contributed to inequalities.

This economic transition does not have a significant effect on income distribution. According to [17] government policies such as regional development, rural development, a low-income social security

system, taxes, education, and the bureaucratic structure were required. Besides, the resource-oriented manufacturing sector should also be discussed. [18] the spatial distribution of resource-oriented manufacturing industries (e.g. wood processing, plantation-based, and mineral resource-based) had high transport costs, which appeared to be located where raw material inputs were available. This produced an unequal spatial distribution of income per capita.

The transition in the agricultural economic system to the industrial economic structure is associated with economic development was modeled by Lewis (1954) and Kuznets (1955), whose purpose of increasing income from the new sector would lead to a rise in inequalities because most of the population working high productivity jobs.

They based the transformation of the economic structure into industrialization in Bangka Belitung on the phenomenon of high equality. A model of economic change was used to embrace or dismiss the theory that [11] opposed. To evaluate this, a conceptual framework was developed as follows:

1. Agriculture Sector Added Value
2. Industrial Sector Added Value
3. Trade Sector Added Value
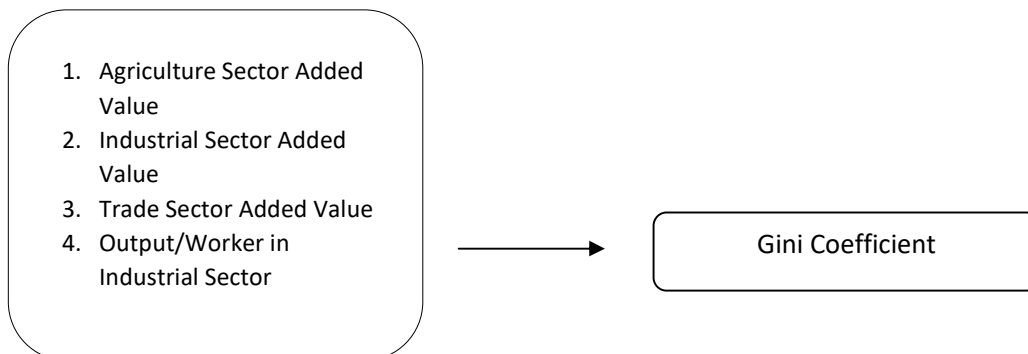4. Output/Worker in Industrial Sector

→ Gini Coefficient

Figure 2. Conceptual Framework

This research examined the condition of income distribution and the determining variables including the added value in the industrial sector, agricultural sector, and trade sector, and the output/worker in the industrial sector in all cities and regencies in Bangka Belitung island in 2007-2018. This study used time-series data and a cross-section data sourced combination from BPS (Statistics Indonesia). The data got then were analyzed with descriptive analysis and quantitative analysis. The descriptive analysis would look at the income distribution, added value in the agricultural sector, industrial sector and trade sector, and output/workers in the industrial sector. Interpreting tables and graphs conducted a descriptive analysis to see the trends that occurred in the data. Quantitative analysis was used to test the Kuznet Hypothesis (1955) and Lewis Model (1954) by looking at the determinants of the income distribution during the

structural changes process. This included the added value in agriculture, industry, trade, and output/workers in the cities, regencies in Bangka Belitung Islands. The writer used the Regression Data Panel with the following equation models.

$$Y_{it} = \beta_0 + \beta_1 Agr_{it} + \beta_2 Ind_{it} + \beta_3 Trd_{it} + \beta_4 PrInd_{it} + e_{it} \tag{1}$$

Explanation:

Y = Income distribution per capita in 2007 - 2018
α = Interception
β_1-β_4 = The regression coefficient for each independent variable
Agr = Added Value of the Agricultural Sector
Ind = Added Value of the Industrial Sector
Trd = Added Value of the Trade Sector
PrInd = Output/worker in Industrial Sector
t = 2007-2018
t = Year
e_{iT} = Error term.

3. Results and Discussion

The selection of the model was based on several tests, namely the Chow test, Hausman test, and Lagrange multiplier test. The following are the results of model testing presented in Table 1:

Table 1 Model Testing Result

No	Tests	Statistics	Probability
1	**Chow Test**	13,398	0,037
2	**Hausman Test**	0,0000	1,0000
3	**LM Test**	15,920	0,0001

The selection of regression method was necessarily conducted before the estimation. First, a test is using the Chow Test, which was comparing the Pooled Least Square (PLS) to Fixed Effect Model (FEM). Based on Chow's test results, the probability value on the model of the income distribution was 0.037. It showed that the best-selected model on income distribution model was the Fixed Effect Model with a probability value of the chi-square less than the actual level of 5%. We carried the next test to

choose the best model between the Fixed Effect Model and the Random Effect Model by doing the Hausman Test. Based on the results of the Hausman test, the value of the probability of Chi-Square on the model of the income distribution accounted for 1,000 showing that the best model was the Random Effect Model. There were some differences from each testing result, thus the Lan range Multiplier test was carried out using the Breusch-Pagan test. It showed that "both" probability value was smaller than the actual level of 5% {0.0001<0.05), therefore, the model selected was the Random Effect Model (REM). The output of the estimated model was depicted in Table 2:

Table 2 Panel Data Regression Estimation Results

Dependent Variable: Y?				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.654673	0.103770	6.308883	0.0000
LNIND?	-0.006486	0.002485	-2.609877	0.0110
LNAGR?	-0.029576	0.009061	-3.264191	0.0017
LNTRD?	-0.019833	0.007660	-2.589070	0.0116
LNPRIND?	0.000620	0.000286	2.166541	0.0335
Random Effects (Cross)				
Bangka	0.009532			
Belitung	0.009342			
Bangka Barat	0.000579			
Bangka Tengah	-0.004153			
Bangka Selatan	0.001040			
Bangka Timur	-0.015565			
Pangkal Pinang	-0.000775			
	Weighted Statistics			
R-squared	0.192603	Mean dependent var	0.162992	
Adjusted R-squared	0.148362	S.D. dependent var	0.035147	
S.E. of regression	0.031042	Sum squared resid	0.070343	
F-statistic	4.353503	Durbin-Watson stat	1.303890	
Prob(F-statistic)	0.003261			
	Unweighted Statistics			
R-squared	0.174222	Mean dependent var	0.275474	
Sum squared resid	0.077962	Durbin-Watson stat	1.176462	

Estimated findings of income distribution determinants in Bangka Belitung Province using the Gini Ratio showed that the Random Effect model was the better model. This model was selected because the Random Effect Model was the best model by the Hausman test and the LM test. In this model, all variables have been declared important, namely the agricultural sector, the industrial sector, the commercial sector, and the output/workers in the industrial sector.

Statistical analyses, including F test, t-test, and coefficient of determination, were carried out before further phases of the study. The findings of the F statistical test revealed that the statistical likelihood value of F was lower than the actual 5% (0.003 <0.05) and therefore the variables of the agricultural sector, the manufacturing sector, the commercial sector and the output/workers in the industrial sector were at the same time important for the Gini ratio. In the meantime, the effect was partly evaluated using the-test shown in Table 4.3.

The probability value of the industrial sector variable was smaller than the real level of 5% (0.0110 <0.05) now that the industrial sector partially had a significant impact on the Gini coefficient whereas the probability of industrial sector variables was smaller than the real level of 5% (0.017 <0.05) so that partially the industrial sector had a significant impact on the Gini ratio. The trade sector variable had a probability value smaller than the actual level of 5% (0.01 <0.05). The trade sector partially had a significant effect on the Gini ratio. Furthermore, the output/worker variable in the industrial sector was smaller than the actual level of 5% (0.033 <0.05) thus the output/worker in the industrial sector partially had a significant effect on the Gini ratio. The further test conducted was the determination coefficient test to find out how the variety of variables namely the agricultural sector, industrial sector, trade sector, and output/workers in the industrial sector contribute to determining the Gini ratio variable with the R^2 results 0.192 or 19.2%. Meanwhile, the remaining 80.8 percent affected by other variables.

For further discussion, the following equation model would analyze the influence of each variable of the industrial sector;

$$Y = 0.654673 + -0.006486 \text{ LNIND} + -0.029576 \text{ LNAGR} + -0.019833 \text{ LNTRD} + 0.000620 \text{ LNPRIND} \qquad (2)$$

The estimation results showed that the coefficient value of the industrial sector variable was negative, showing the industrial sector had a negative and insignificant effect. These results illustrated that any increase in the output of the industrial sector in the Bangka Belitung islands would increase the income distribution. This condition proved that theoretically the model of economic transformation from the traditional sector to industrialization. The economic transformation from traditional to modern was a change in the economy related to product demand, trade, production, and other factors needed constantly
to increase income and social welfare through increasing per capita income [1] This was in line with the economic situation in the industrial sector, which experienced an increase in output every year. This positive trend had a significant impact on declining the Gini ratio or structural transformation from traditional to modern, the growth of industrialization affected the better income distribution.

In contrast, [18] found that the structural change model, especially in the industrialization process, created the inequality of income distribution to the country. The research concluded that the output of the agricultural sector increased equity more than industrialization, which harmed income distribution. It assumed that the industrialization process provided a bigger gap in terms of the wage gap and the labor gap because transforming the agricultural sector into industry caused numerous unskilled workers to unemployed.

Besides [7] discovered that the industrialization process had a positive impact on income distribution [8] research shows that structural changes from the agricultural sector to the industrial sector provided lower-income distribution elasticity. However, if there were no permanent structural changes in the agricultural sector, the impact on income distribution was higher since the agricultural sector growth would encourage income distribution more elastically than the growth in the industrial sector. An agricultural economic structure shift to an industrialized economy in-country development, which was modeled by Lewis (1954) and Kuznets (1955), should lead to a general increase in the share of income of the modern sector, with an unequal increase to where most of the generation was employed in a modern, high-productivity sector. According to [11] the process of economic transformation was a shift in the orientation of agricultural markets from within the country to export, and not (as argued by Kuznets) a shift from agriculture to manufacturing and services that caused an increase in inequality. [12] was in contrast to Kuznets' (1955) hypothesis which focused on the growth-inequality relationship, which was not formalized. This situation was also different from the convergence or catch-up literature, including [13]. The model assumed that systemic transition was induced by technology e.g. information and communication systems and e-commerce), culture (e.g. growing demand for organic food), structures (e.g. restructuring and transparency), or policies (e.g. privatization movements) that disrupted the reallocation of resources across sectors and locations that contributed to an imbalance. As a result, the income distribution has shifted [12] [15]

The analysis of [16] was in line with [11] model, which showed that it needed to drive transitions from agriculture to manufacturing and services, with a rise in agricultural labor productivity expected to promote

income distribution. [15] concluded that economic reforms in industrialization have two sides, namely the monopoly, and competitive sectors. Both subsectors accounted for 8.2% of the average income the differential between workers and the disparities in the standard of education further added to inequalities.

The economic transformation did not have a direct impact on income distribution, according to [17] it required government policies, including regional development, rural development, and social welfare systems for low-income people, taxation and education, and bureaucratic structuring. Besides policy responses, the cause of unequal income in the industrial sector was the resource-oriented manufacturing industry. [19] stated that spatial distribution of resource-oriented manufacturing industries (eg wood processing, plantation-based, and mineral resource-based industries) required high transportation and accommodation costs for raw material inputs since the output must be placed in where input raw materials were available. It created a relatively uneven spatial distribution to the income distribution per population.

The coefficient value on the output of the agricultural sector showed a negative direction, showing that any increase in agricultural output would give a decrease affects on the value of the Gini ratio. The role of the agricultural sector in increasing income distribution or reducing inequality could empirically explain this relationship. The role of the agricultural sector in reducing inequality was explained in the role of the agricultural sector in development transformation. Kuznet (1961) explained that (1) Contribution of agricultural sector products as providers of industrial raw materials; (2) Contribution of the household market in the agricultural sector was as the primary target of industrial sector consumptions, whether as direct consumption or used as input in agricultural production activities; (3). Contribution of foreign exchange, the agricultural sector played a role in contributing foreign exchange to the results of its exported production activities.

Compared to economic development transition formulated by Lewis and Kuznet (1954) and Kuznets (1955), report that economic development transformation could lead to a general increase in the income distribution in the modern sector, whereas inequality influenced the increase to where most of the population was working in the modern sector. In line with the findings of [11] it was shown us the phase of economic development transformation was a change toward agricultural markets from within the country to exports, and not as Kuznets suggested) a shift from agriculture to manufacturing and services that induced increased inequality. Besides, [15] was opposed to Kuznet's (1955) hypothesis that focused on the relationship between inequality to growth, which was not formalized.

The position of the trade sector had a substantial negative impact on the value of the Gini ratio. It was proposed that an increase in the output of the trade sector played a major role in rising income in the Bangka Belitung Islands region. It was apparent that performing the trade sector during the period from 2007 to 2018 was of the highest importance relative to other sectors. This pattern was very noteworthy because the industrial sector played an important part in the province's economy. In comparison, the Gini ratio value was annually steady at 0.34, the lowest at the national level. Further confirmation was based on the literature

findings of a variety of studies confirming the results of the study. Pal, Chakraborty, and Ghose (2019) found that increase in the trade sector would specifically reduce income inequality. Similarly, the analysis [20] showed that performing the trade sector had a major impact on the Gini ratio. This was in line with the principle of the inverted U curve. In such a case, it was under the trade theory which discussed the effects of trade components in developing countries such as exports and imports, which would determine the level of the Gini ratio.

The role of the trade sector had a major negative effect on the value of the Gini ratio. An increase in the trade sector output would play a key role in growing income in the Bangka Belitung Islands region. The output of the trade sector during the period from 2007 to 2018 was of the highest value compared to other sectors. This trend was quite notable because some important studies on worker efficiency in the manufacturing sector revealed a tendency that was contradictory to Lewis and Kuznet's growth models. Labor productivity in the industrial sector had a positive effect on the rise in the Gini-value ratio, implying that labor productivity in the industrial sector improved the income distribution disparity. Specifically, several studies were performed in conjunction with the study which addressed the economic transition towards industrialization, causing several economic issues, including income inequality and wage inequality. Based on the results of [17] the situation was caused by a fall in the value-added of manufacturing and the share of manufacturing employment in many developed countries, not because of shifts in the development potential of the industry for a move in manufacturing activities to a relatively small country of population. As a result, a concentration of manufacturing activities was focused only on some regions. Besides, the conditions of industrialization have impacted wage gaps and work prospects, and the change in the economic system towards the industry has facilitated a shift in the manufacturing sector from conventional to modern, which has embraced capital-intensive uses. As a result, it required the use of technologies and skilled labor. If this shift happened, it will promote inequality of wealth and salaries [10] played an essential role in the region's economy. In contrast, the Gini ratio was constant at 0.34 a year, the lowest at the national level. We based further evidence on the literature findings from several types of research verifying the results of the study. Similarly, the study [20] found that the success of the trade sector had a significant effect on the Gini ratio. This was in line with the inverted U curve theory. In that case, the exchange hypothesis addressed the consequences of trade elements in developed countries, such as exports and imports, which will decide the degree of the Gini ratio.

4. Conclusion and Recommendation

As a result, it required the use of technologies and skilled labor. If this shift happened, it will promote inequalities in income and salaries [10] played an essential role in the region's economy. In contrast, the Gini

ratio was constant at 0.34 a year, the lowest at the national level. Further evidence was based on the literature findings from several types of research verifying the results of the study. The study [20] found that the success of the trade sector had a significant effect on the Gini ratio. This was in line with the inverted U curve theory. In that case, the exchange hypothesis addressed the consequences of trade elements in developed countries, such as exports and imports, which will decide the degree of the Gini ratio. The increase in industrial output had a strong and important effect on the Gini coefficient. This condition has proven that it has shown the rise in industrial output to reduce inequalities. The related consequences have shown that the role of the agricultural sector in rising income equalization in Bangka Belitung Province has been statistically proved. It was also important to improve the focus of the agricultural sector towards higher productivity. On the other hand, the productivity of employees in the manufacturing sector decreases the revenue charts. Structural changes for industrialization should then be reassessed and based exclusively on the market orientation of the agricultural sector.

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