

Analysis of Economic Development Disparity across Regencies in Aceh, Indonesia

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Abstract— This study empirically explores the influences of poverty and per capita income on inequality of economic development across 23 regencies in Aceh Indonesia over the period 2012-2016. To measure the inequality of economic development, the classical typology method of Williamson Index and Theil Index are adopted. Meanwhile, the panel multiple regression is used to investigate the influences of poverty and per capita income on inequality of economic development in the region. The study is documented that the level of poverty did not affect the imbalance of economic development, while the per capita income positively affected the inequality of economic development. This finding implied that to further reduce imbalance of economic development across the regencies, the government should distribute a just income so that all citizens could equally enjoy it.

Keywords— Klassen typology; Williamson index; Theil index; Development disparity; Poverty

I. INTRODUCTION

Economic development is expected to provide equitable economic development. This means that no region has experienced a gap or imbalance in economic development. The relationship between the income gap and economic development has been intensively discussed in the literatures, focusing mainly on developing country, including Indonesia.

Aceh Province is one of the provinces in Indonesia that has rich natural resources. However, Aceh is one of the provinces in the country with the poverty line above the national level. Rich natural resources failed to contribute toward higher economic development in 23 regencies in the province wide. Economic development in the province is aspired to be enjoyed equitably by the people in regencies across Aceh. Unfortunately, there has been an income disparity in the province. Although the level of economic in Aceh increased from 4.27% in 2015 to 4.31% in 2016, but it did not guarantee the absence of economic development gaps between the regencies in Aceh Province (Statistical Central Bureau, Aceh Province, 2017).

Previous studies on income inequality in Indonesia have been done by Afidatina (2016) in the Tuban Regency, Asih (2015) in Cilacap District, and Andiny (2017) in Aceh. Afidatina (2016) only measured the level of income inequality, while Asih (2015) and Andiny (2017) examined the effect of poverty on inequality. Andiny (2017) found that poverty insignificantly affected the inequality, while Asih (2016) found a negative effect of number of poor people on the inequality of economic development. These limited previous studies found a mixed finding on poverty-inequality nexus. Additionally, these studies only focused on poverty-inequality relationship, while other potential determinants of inequality of economic development were excluded.

Against the above backdrop, this study intends to measure the level of income inequality across 23 regencies in Aceh and its determinants over the period 2012-2016. Unlike the above studies, this study includes per capita income and poverty as the determinants of inequality of economic development in the regencies to enrich the existing empirical evidences on the determinants of income inequality. The findings of this study are hoped to shed some lights for policy makers to reduce income disparity across rich provincial regencies.

The rest of the study is structured in the following sequences. Section 2 discusses the previous related studies, while Section 3 highlights the research method and data adopted in the study. Section 4 discusses the findings and implications of the study, and finally Section 5 concludes the paper.

II. LITERATURE REVIEW

A. Income per capita

Per capita income is the amount of the average income of residents in a country. Per capita income is obtained from the distribution of a country's national income in a given year with the country's population in that year. Per capita income has its own function, which is to describe the level of prosperity in various countries. In the context it is assumed that the level of prosperity of a country is reflected by the average income received by its population.

B. Development Disparity

Development ideally creates fair and equitable economic growth and community prosperity. As explained by Smith (2003), development requires sustainable growth; if the increase in economic growth is only carried out by a handful of rich people then the increase in yield is likely to benefit only the rich. If this occurs then the progress of efforts to combat poverty will move slowly, while inequality will worsen. As stated by Safrijal (2012), economic inequality will emerge in regions if it exist differences in natural resource content, differences in demographic conditions, and lack of mobility of goods and services.

C. Poverty

Poverty is a condition of the community has not participated in the process of change because it does not have the sufficient ability, both the ability to own the factors of production and the quality of production factors so that they do not get the benefits of development results (Subandi, 2016).

D. Poverty- Economic Development Disparity Relation

Poverty is a lack of income to fulfil the needs of life, both basic and supporting needs. Poverty can cause economic development inequality it also can be caused by limited available job this will create many unemployed. Unemployment can cause economic development to be hampered by low level of education, high level of poverty (Retno, 2014). If poverty increases then economic growth remains high, implying that the high rate of poverty will not affect the rate of economic growth.

E. Per capita Income-Economic Development Inequality Relation

According to Todaro (2004) high economic growth rates do not always worsen income distribution. Economic growth is shown by the increase of the per capita gross domestic product (GDP) regardless of whether the increase in GDP is smaller or greater than population growth (Arsyad, 2014).

Following the Neo-Classic Hypothesis, thus the per capita income could be used as an independent variable in this study, which indicates the level of development of a country (Sjafrizal, 2008). Economic growth in a region reflects the progress of a region. But what becomes a challenge for an area in carrying out its economic development is whether its economic development can be an equitable economic development in all levels of society. Expectations of a high economic growth will increase per capita income from the community. When per capita income increases and is evenly distributed, public welfare will be created and inequality will diminish. In short, an increasing per capita income in one region can affect regional economic development. Subsequently, the per capita income can also have an impact on inequality of the population in the region.

III. METHOD

This study uses a mixed approach. Descriptive approach is employed as analytical tools in the form of Klassen Typology matrix, Williamson Index, and Theil Entropy Index to measure the level of income disparity across 23 regencies in Aceh, Indonesia over the period 2012-2016. All 23 regencies are Simeulue, Aceh Singkil, Aceh Selatan, Aceh Tenggara, Aceh Timur, Aceh Tengah, Aceh Barat, Aceh Besar, Pidie, Bireuen, Aceh Utara, Aceh Barat Daya, Gayo Lues, Aceh Tamiang, Nagan Raya, Aceh Jaya, Bener Meuriah, Pidie Jaya, Banda Aceh, Sabang, Langsa, Lhokseumawe, and Subulussalam. Meanwhile the quantitative approach of a panel multiple regression analysis is used to examine the effect of per capita income and poverty on inequality of economic development.

A. Klassen Typology Analysis

To measure the development and progress of economic development in 23 regencies in Aceh, the following Klassen Typology matrix illustrated in Table I is used.

TABLE I. KLASSEN TYPOLOGY MATRIX

Quadrant I Developed and Fast Growing Region $g_i > g$ dan $g_{ki} > g_k$	Quadrant II Developed But Depressed Region $g_i < g$ dan $g_{ki} > g_k$
Quadrant III Fast Growing Region $g_i > g$ dan $g_{ki} < g_k$	Quadrant IV Underdeveloped Region $g_i < g$ dan $g_{ki} < g_k$

Source: (Sjafrizal, 2008)

where g_i is the rate of economic growth in district i , g_{ki} is the per capita district revenue i , g is the provincial economic growth rate, and g_k is the average provincial per capita income.

B. Williamson Index

Next, the study also uses the following Williamson Index to find out how much the level of inequality exists in the region (Saputra, 2016):

$$IW = \frac{\sqrt{\sum_{i=1}^n (y_i - y)^2 \left(\frac{f_i}{n}\right)}}{y}$$

where IW is the Williamson Index, y_i is the regency i per capita income; y is the provincial average per capita income, f is the number of residents in regencies i , and n is the provincial population.

C. Theil Index

Finally, the study uses Theil Index as a common approach to measuring development inequality between regions. The advantage of using this index is that it can measure the strengths in the regions and between regions at once. The degree of inequality using the Theil Index is measured using the following formula (Hero, 2014):

$$I_{intra} = (y_i/Y) \cdot \text{Log}[(y_i/Y)/(n_i/N)]$$

Where I_{intra} is the Theil intra region Entropy Index, y_i is the per capita income in regency i , Y is the provincial per capita income, n_i is the total population in regency i , and N is the number of provincial population.

D. Panel Multiple Regression Analysis

This study uses the following panel regression analysis to examine the effect of poverty and per capita income on the imbalance of economic development across 23 regencies in Aceh Province:

$$Inequal_{it} = \beta_0 + \beta_1 POV_{it} + \beta_2 PINC_{it} + e_{it}$$

Where $Inequal$ is the inequality of economic development, POV is the poverty level, $PINC$ is the per capita income, β_i is the coefficient estimated variables, e is the error term, and it is the regency i at time t .

Three models of panel regression analyses could be used in this study, namely: Common Effect, Fixed Effect, and Random Effect. To test which model is the best suited for our analysis, the F-statistics is conducted to test whether the Common Effect model or the Fixed Effect model is the best. Then, the Hausman test is employed to test whether the Fixed Effect Model or the Random Effect model is the suitable model to be adopted in this study.

IV. RESULTS AND DISCUSSION

Before the study measure the income inequality and its determinants, the classical assumption tests of multicollinearity and heteroscedascity will be conducted first.

TABLE II. MULTICOLLINEARITY TEST RESULTS

	<i>POV</i>	<i>PINC</i>
<i>POV</i>	1.0000	-
<i>PINC</i>	-0.0075	1.0000

As observed from Table II the study found no relationship between independent variables of poverty and per capita income, indicating that there was no multicollinearity exists between variables.

Table III shows the heteroscedasticity test finding. Table III shows the probability value of Obs*R-Squared (3.997) is greater than 0.05, indicating the variables are homoscedasticity.

TABLE III. HETEROSCEDASTICITY TEST

F-statistic	764.7089	Prob. F(2,1)	0.0256
Obs*R-squared	3.9974	Prob. Chi-Square(2)	0.1355
Scaled explained SS	0.0815	Prob. Chi-Square(2)	0.9601

A. Inequality of Economic Development

Table IV reports the Klassen Typology Matrix of the inequality of economic development across 23 regencies in Aceh over the period 2012-2016.

TABLE IV. KLASSEN TYPOLOGY MATRIX

No	Regencies	Year			
		2013	2014	2015	2016
1	Simeulue	III	III	III	III
2	Aceh Singkil	III	IV	IV	III
3	Aceh Selatan	III	III	IV	III
4	Aceh Tenggara	III	III	IV	III
5	Aceh Timur	III	IV	III	III
6	Aceh Tengah	I	I	II	I
7	Aceh Barat	II	II	II	II
8	Aceh Besar	II	I	II	II
9	Pidie	IV	III	III	IV
10	Bireuen	IV	IV	IV	III
11	Aceh Utara	II	I	I	II
12	Aceh Barat Daya	IV	IV	IV	IV
13	Gayo Lues	IV	III	IV	III
14	Aceh Tamiang	III	IV	IV	IV
15	Nagan Raya	II	II	II	I
16	Aceh Jaya	IV	IV	IV	IV
17	Bener Meuriah	III	III	I	I
18	Pidie Jaya	III	IV	III	II
19	Banda Aceh	I	I	I	I
20	Sabang	II	I	I	I
21	Langsa	III	III	III	III
22	Lhokseumawe	II	I	I	II
23	Subulussalam	III	III	III	III

As reported in Table IV, the regencies in Aceh could be categorized into four conditions based on the Klassen typology matrix. There are several districts that are in first quadrant, second quadrant, third quadrant, and fourth quadrant. The regencies in the first quadrant include Aceh Tengah and Banda Aceh. These regencies are fast-developing and fast-growing regencies, where its economic growth and per capita income are higher than the average economic growth and per capita income of Aceh Province.

Next, the regencies in the second quadrant include Aceh Barat. This means that the district is an area or region that is developed but depressed, where its economic growth is lower than the province, and per capita income is higher than the province. This could be due to several factors supporting its economic development, namely high unemployment and high poverty. The district has the potential to advance, but is still depressed by the socio-economic problems. Meanwhile, the regencies in the quadrant comprise Simeulue, Langsa, and Subulussalam. In this quadrant, the regencies are in a region that is growing rapidly and very potential to move from a rapidly developing region towards an advanced region.

Finally, the regencies in the fourth quadrant include Aceh Tenggara and Aceh Jaya. These districts have economic growth rate lower than the provincial economic growth, and their per capita income are lower than the provincial average per capita income. This means that the area or region is relatively underdeveloped.

Table V shows the value of the inequality index in Aceh Province over the period 2013 and 2016 is at a high level where the value is more than 0.35, based on the Williamson Index. This means that the economic development disparity exists across the regencies in Aceh Province, Indonesia.

TABLE V. THE WILLIAMSON INDEX

Year	Williamson Index
2013	0.44
2014	0.41
2015	0.37
2016	0.38

Finally, the inequality level of regencies in Aceh is reported in Table VI based on the Theil Index. The inequality across 23 regencies in the province of during the 2013-2016 has a value of Theil Index below 0.15, indicating many people in the regencies living inequality level of income between layers of society, indicating the existence of imbalances between regions in Aceh Province

TABLE VI. THE THEIL INDEX OF THE REGENCIES IN ACEH

No	Regencies/City	Year			
		2013	2014	2015	2016
1	Simeulue	0.007	0.007	0.008	0.008
2	Aceh Singkil	0.002	0.002	0.002	0.002
3	Aceh Selatan	0.005	0.005	0.005	0.005
4	Aceh Tenggara	0.004	0.004	0.004	0.003
5	Aceh Timur	0.039	0.031	0.017	0.015
6	Aceh Tengah	0.002	0.008	0.009	0.009
7	Aceh Barat	0.012	0.012	0.013	0.013
8	Aceh Besar	0.005	0.005	0.006	0.006
9	Pidie	0.006	0.006	0.007	0.006
10	Bireuen	0.011	0.011	0.011	0.110
11	Aceh Utara	0.013	0.013	0.013	0.013
12	Aceh Barat Daya	0.014	0.013	0.014	0.014
13	Gayo Lues	0.017	0.017	0.019	0.019
14	Aceh Tamiang	0.004	0.003	0.004	0.004
15	Nagan Raya	0.014	0.014	0.015	0.015
16	Aceh Jaya	0.009	0.009	0.008	0.008
17	Bener Meuriah	0.020	0.019	0.020	0.020
18	Pidie Jaya	0.013	0.012	0.014	0.014
19	Banda Aceh	0.009	0.009	0.009	0.009
20	Sabang	0.000	0.000	0.000	0.000
21	Langsa	0.028	0.025	0.030	0.031
22	Lhokseumawe	0.047	0.047	0.051	0.052
23	Subulussalam	0.002	0.002	0.003	0.004

B. Findings from Panel Regression Analysis

In this study, the panel data used is a combination of 4-year time series and 23 cross-section regencies in Aceh, Indonesia. This study uses the panel data regression model of Random Effect. Table VII reports the findings of relationship between poverty and per capita income on the inequality of economic development across the regencies.

TABLE VII. FINDINGS FROM THE RANDOM EFFECT MODEL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-7.9227	1.6551	-4.7867	0.0000
POV	-0.0086	0.0968	-0.0892	0.9291
PINC	0.3355	0.1357	2.4729	0.0154
F-Stats = 2.9409; P-value = 0.0582				

As observed from Table VII, the level of poverty is found to be insignificant in affecting economic development inequality, while the per capita income positively affected the imbalance of economic development in the province of Aceh. The insignificance of poverty- inequality relation in Aceh Province could be due to no different level of poverty of citizens across regencies. As for the per capita income-inequality relationship, the study found that per capita income positively affected the inequality of economic development in Aceh Province. This means that the higher the per capita income of the population, the higher the level of income imbalances across 23 regencies in Aceh Province. This further implies that the per capita income has been not equally distributed. Some citizens enjoyed more benefits from economic development, while some other enjoyed less benefits from the economic development. Inclusive economic development has not been materialized in the Province of Aceh, Indonesia. This could be due to lacking of job opportunities that cause higher levels of unemployment and poverty. The agenda of economic development in Aceh failed to promote the just welfare of the community.

The findings of this study provide important policy ramifications for ensuring the equal distribution of income across the regencies. To provide equal benefits of development for all citizens, it is suggested that the focus on the development should be emphasized on the lower-middle income groups. Development programs should promote their welfare thus reduces the imbalances of economic development. Specific program of elimination of imbalances across the regencies should focus more on the regencies, which record relative higher of income inequality by designing a proper inequality reduction agenda such as providing more working capital for the micro, small and medium enterprises and training for the entrepreneurs. To ensure the benefits of economic development to be enjoyed equally by the citizens, the imbalances of development across the regencies should be part and parcel of economic development target by designing a proper strategies focusing on lower-middle group income group in the 23 regencies in Aceh, Indonesia.

V. CONCLUSION

This study empirically explores the influences of poverty and per capita income on inequality of economic development across 23 regencies in Aceh Indonesia over the period 2012-2016. To measure the inequality of economic development, the classical typology method of Williamson Index and Theil Index are adopted. Meanwhile, the panel multiple regression model is used to investigate the influences of poverty and per capita income on inequality of economic development in the region. Based on the Klassen typology analysis, the found that majority of the regencies are categorized as less developed, while only 2 regencies, namely Aceh Tengah and Banda Aceh are categorized as the fast-developing regencies. The existences of inequality of income across the regencies over the 2012-2016 period are further confirmed by the Williamson Index. However, the inequality of economic development in Aceh Province was found to be relative lower from one to another regency based on the Theil Index analysis.

As for the determinant of inequality of economic development, the study documented that the level of poverty did not affect the imbalance of economic development, while the per capita income positively impacted the inequality of economic development. This finding implied that to further reduce imbalance of economic development across the regencies, the government should distribute a just income so that all citizens could equally enjoy it.

To provide a comprehensive causes of inequality of economic development, more determinants covering individual citizens' characteristics, socio-demographic, and macroeconomic variables over a longer period of study and including more the regencies nationwide should be included in further studies.

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