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THE DISPARITY AND THE CONVERGENCE OF THE ECONOMIC GROWTH: THE STUDY OF THE NEW AUTONOMOUS REGIONS IN SUMATERA, INDONESIA

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Abstract

Purpose: As a province located outside Java Island, the provinces in Sumatera Island have diversity in economic growth among the regions which could lead to the inequality of development. This study aims to analyze the convergence of sigma and absolute beta and also to measure the speed of the convergence of the economic growth in the new autonomous regions in Sumatera.

Methodology: The research method in this study used the data panel in the form of Fixed Effect model.

Results: The result of the research showed that the convergence of sigma occurred over four years during the study period while the convergence of the absolute beta did not occur. It can be seen from the Gross Regional Domestic Product (GRDP) per capita levels of the new autonomous regions which are lower and it does not grow faster than the new autonomous regions which have higher GRDP per capita levels. The absolute convergence rate is 11 percent per year and the time it takes to close half of the initial half-time conversion (the half-time convergence) is six years.

Keywords: *New Autonomous Regions, Convergence, Economic Growth, Convergence of Sigma and Absolute Beta*.

INTRODUCTION

Indonesia is a country that consists of several islands, one of which is the island of Sumatera. Sumatera island is an island which is located in the western region of Indonesia. Sumatera island has seven provinces and district/city. The differences in the potential from each region lead to the inequality of the economic growth between regions. The government is obliged to limit the development gap between the provinces and also the district/city. The issues about the economic growth and the gap of the developmental distribution are becoming important things to be solved. The strategy used to realize the development objectives in a region is by doing the distribution of development.

The development in various regions in Indonesia aims to increase the economic growth, and equitable the development outcomes. Development in a good quality could be reflected by the decrease of the inequality of regional development and having increased in economic growth. According to Sjafrizal (2012), the inequality of the regional economic development is a phenomenon that occurs in the process of economic development of a region. Initially, the inequality is caused by the differences in demographic conditions of each region. Fan and Casetti (1994) explain the inequality of economic development among high-income regions is lower than the inequality of regional economic development of low-income regions.

Solow (1956) explained that it needs a number of investments to push the output of growth with the assumption of a return on capital at a diminishing return to capital. Thus, in the long period at the steady-state conditions, the income-per-capita between the regions will be the same or there will be the process of convergence (Sala-iMartin, 1997). The concept of convergence was continued or developed by Borts and Stein (1964), Barro and Sala-i-Martin (1991). Barro and Sala-i-Martin (1991) developed a regression model, in which economic growth acted as an independent variable by developing models using Markov Chain techniques. Both models continue to evolve and are used as convergence analysis tools until the present time.

In Indonesia, Sumatera is an area that creates some new autonomous regions. On the other hand, the areas that have the biggest district/city are East Java and Central Java. The provinces of Sumatra have a diversity of potentials between regions that can lead to development inequality. The convergence of economic development between districts and cities in Sumatera enables the high potential of imbalance in economic development between districts/cities. The research question that needs to be answered is whether the imbalance of economic development among districts/cities of new autonomous regions in Sumatera experiences convergence or divergence and how fast the process of convergence is.

The essence of autonomy is the existence of regional authority, not delegation (Saragih, 2003). Regions no longer merely execute the instructions of the central government, but actually have the freedom to increase the creativity in developing the potential that during the era of centralization can be said to be isolated (Mardiasmo, 2002). Regional autonomy does not only stop at the distribution of funds realized in the form of balancing funds, but the success of regional autonomy is also measured by how big the contribution of the local community to regional economic growth and Gross Regional Domestic Product (GRDP) is. Therefore, the implementation of regional autonomy is not only the

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responsibility of local government, namely the Regent or Mayor and other local government apparatus, but also all local communities in each region (Saragih, 2003).

GRDP is the total value added of goods and services generated from all economic activities throughout the region within a given period of time generally in one year. In the calculation of PDRB, two prices are used namely PDRB valid price and constant price of PDRB, in which price of PDRB applies the value of a goods and service which is calculated by using price in that year, and PDRB constant price is the value of a goods and service calculated by using the price in a given year which is used as the reference year or base year.

A large amount of GRDP that can be generated by a region is influenced by the number of natural resources that have been utilized, the amount and quality of human resources, government policy, geographical location and the availability of facilities and infrastructure.

The role of human capital is also a factor that affects income obtained by a region. Human capital can be a reliable human resource in increasing income if it has high quality. In this case, human resources in increasing income have an important role in relation to improving the quality of regional development and maintaining the continuity of development itself and the increase of national income.

In addition, regional economic competitiveness also affects the economic development of a region. Each region has an economic growth pattern that is different from one region to another. Regional economic development needs to recognize the economic, social and physical characteristics of the region, including its interaction with other regions. Regional economic development strategies need to pay attention to regional competitiveness in both competitive and comparative advantage. Improving regional competitiveness can be done through the development of market-oriented products and has a favorable level of technical and economic efficiency. Kuncoro, (2004), describes one of the policies taken by the government to narrow regional inequality, namely the implementation of regional development policy through the concept of the mainstay area, based on the potential of the region. The policy is expected to occur in the balance of growth rates and per-capita income between regions. The mainstay is an area designated as the prime mover, which has the criteria as a fast-growing area compared to other regions within a province, has a leading sector and economic linkages with the surrounding area (hinterland).

Regional competitiveness is a potential strategy to be implemented in the underdeveloped regions in order to improve the welfare of the community. Based on the background that has been presented, the formulation of this research problem is whether New Autonomous Region (DOB) in Sumatera Island occurs σ-convergence, β-convergence, and to find out the speed of convergence of economic growth in new autonomous regions along Sumatera Island.

METHODOLOGY

Subject of the Research

The study was conducted in all New Autonomous Region (DOB) in Sumatera which has aged more than ten years or twice the period of government. The data used is the secondary data in the form of time series in 2006-2016 that is Economic Growth, GRDP per capita of the new autonomous regions in Sumatera, Source of data consisting of data from Central Bureau of Statistics along the province of Sumatera, and the Regional Development Planning Board (BAPPEDA) of the Province of Sumatra, and other Institutions associated with this study.

Research method

Williamson's index will be used to show the inequality of the financial capacity of the new autonomous regions in Sumatera. The Williamson Index can be defined as follows:

Details :

Vw = Williamson Index

Fi = population of region i

N = total population of all regions

Yi = the variable value of fairness to be measured for region i

Y = the average of the fairness variables to be measured

The sigma convergence in this study is measured by calculating the dispersion of GRDP per capita of the new autonomous regions. To calculate the dispersion, it is calculated based on the standard deviation result of the economic growth logarithm between the new autonomous regions in Sumatera each year. Here are the formulas to estimate the coefficient of variation each year.

$$CV = \frac{\sqrt{\frac{\sum(Y_i - \bar{Y})^2}{n}}}{\bar{Y}}$$

CV = Coefficient of variation in a given year.

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Y_{ti} = GRDP per capita per DOB in Sumatera in 2011-2016.
$\bar{Y}$= Mean of per capita GDP per country in 2011-2016.
n = Total of DOB

The study also used panel data to calculate absolute convergence and to determine the model used. This study estimates panel data using:

1. The chow testis used to determine whether the panel data regression technique with fixed effect (FE) is better than the common panel effect data regression model (CE) by looking at residual sum squares.
2. Hausman test is used to determine the proper method should be used between a fixed effect or random effect, a used method developed by Hausman.
3. LM Test to find out whether the random effect model is better than the common effect method then Lagrange Multiplier (LM) test is used which is developed by Breusch-Pagan+.

According to Barro and Sala-i-Martin (1995), to calculate the speed of beta convergence is as follows: β is the coefficient of predictor variable and T is the length of the time period. The coefficient on GDP per capita at the beginning of period [(1-e-βT) / T, in equation 1 will be seen decreasing with the length of time interval T.The coefficient value will approach 0 as T approaches infinity time while the other side will approach β as T approaches 0. The determination of the halftime convergence time can be done as follows (Barro, 1995): ln [y (t)] = (1 - e -βT). Ln (y *) + e -βT .ln [y (0)].The T-time required for ln [y (t)] to eliminate the gap between ln [y (0)] and ln (y *) is required to satisfy the conditions e -βT =, then half-time convergence is:

$$t = \frac{-\ln(0,5)}{\beta} \text{atau } t = \frac{\ln(2)}{\beta}$$

DISCUSSION

The Results of Research

The Williamson index obtained lies between 0 (zero) to 1 (one).

a. If Williamson's inequality is close to 0 then the inequality of income distribution between the autonomous regions in Sumatra is low or economic growth between the regions evenly distributed.
b. If Williamson's inequality is close to 1 then the inequality of income distribution between the autonomous regions of Sumatra is high or the economic growth between regions is uneven. The results of the calculation of the Williamson index can be seen in Table 1.

Table 1: Williamson Index

Year	Williamson Index
2011	0.7573
2012	0.7418
2013	0.7121
2014	0.6920
2015	0.6799
2016	0.6665

Source: Processed Data (appendix 1)

Based on the above table it can be said that inequality in the new autonomous regions in Sumatera in each year is decreasing. Although the annual inequality decreases but the average inequality is still high at 0.7083 because the value is almost close to 1. The movement of inequality of DOB in Sumatra every year can be seen through the graph below:

Based on the graph above it can be said that inequality in the new autonomous regions of Sumatera every year has decreased. It can be seen that in 2011 the inequality happened to reach 0.7573, then in 2012, it decreased to equal to 0.7418. In 2013 the inequality happened to reach 0.7121. Inequality decreased in 2014 to as much as 0.6920. In 2015 the inequality happened around 0.6799. In 2016 it decreased to as big as 0.6665.

From the result of Sigma Convergence, the result obtained can be seen as follows:

Table 2: The Coefficient of the variation of Sigma Convergence

Year	*Coeffisient Variation* (CV)	Details
2011	0.9253	-

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2012	0.9281	Divergent
2013	0.9115	Convergent
2014	0.8996	Convergent
2015	0.8957	Convergent
2016	0.8879	Convergent

Source: Processed Data (Appendix 2)

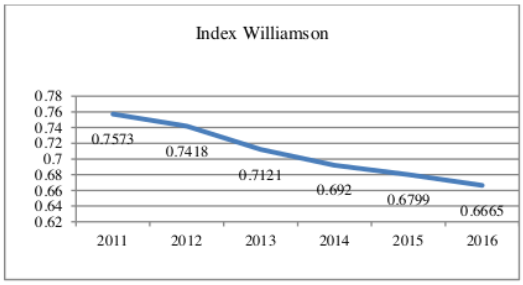

Figure 1: Graph of the inequality of new autonomous regions in Sumatera in 2011-2016.

Source: Process Data, 2017

Disparities can be measured by calculating the coefficient of variation of GRDP per capita per year. If the coefficient of a certain year variation is smaller than the coefficient of variation in the previous year, then the sigma convergence occurs (Barro and Salla-i-martin, 1992). Conversely, if the coefficient of variation of a particular year is greater than the previous year, then there is no sigma convergence. That is when the coefficient of variation of a certain year is smaller than the previous year indicates that the disparities that occur in the District/City in Sumatera are decreasing in that year. Based on Table 2, the coefficient of variation of GRDP per capita shows that in new autonomous regions in Sumatera experience convergence in the period of four years during the 2011-2016 study period that is on every year except in 2012. The dispersion in per capita income in the new autonomous regions in Sumatera is amounted to 0.9253 in 2011 to 0.8879 in 2016. In 2011-2012 the dispersion had increased from 0.9253 in 2011 to 0.9281 in 2012, but after that, the dispersion continued to decline until the year 2016.

At the absolute convergence based on the Show Test, and LM Test then estimation model which is selected is Fixed Effect Model. The following regression result of absolute convergence of districts/cities in Sumatera can be seen as follows:

LogYit = 0,473396 + 0,937699LogYit-1

Po = (0,0080) (0,0000)

R^2 = 0,999952

DW = 2,540261

The regression equation has the following meanings:

Coefficient of GRDP per capita of the previous year / initial DOB income in Sumatera amounted to 0.9376 which means that an increase or decrease of 1% GRDP per capita of DOB in Sumatera will have an impact on increasing or decreasing GDP per capita by 0.93 percent. Based on the estimation result, the coefficient of GRDP per capita of the previous year, it shows a positive value which means that there is no absolute convergence in the new autonomous regions of Sumatera in 2011-2016. During the 2011-2016 period, autonomous regions in Sumatra with lower per capita GRDP have not been able to grow faster than the new autonomous regions in Sumatra where the initial conditions are better.

Convergence Velocity

Referring to an estimate of the GRDP per capita of a given year with the GRDP per Capita of the previous year / Initial Income, the coefficient of predictors is the coefficient of the initial income of the period at absolute convergence of 0.937699 and then the figure is entered into the formula for looking for beta convergence value that is equal to:

$$\beta = \frac{[\ln (0{,}937699+1)}{6} = 0,1102$$

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The beta convergence value of 0.1102 indicates that there is an 11 percent gap that can be reduced between the GDP per capita of the beginning period with steady-state income conditions within 1 year. The positive sign identifies the increasing point of GRDP which tends to be low and it does not grow faster than the DOB in Sumatera which have high GRDP per capita. In other words, it does not show the catch up between the new autonomous regions in Sumatera. From the beta convergence value of 0.1102, it can be known that half-life convergence is the time required to close half of the initial gap, and it will achieve: T = 0.6931 / 0.1102 = 6.2894. So the time required to close half the gap from the initial gap is six years. It took six years to pursue the gap of the GRDP per capita that took place in DOB in Sumatera.

The effect of the change of the initial income between the new autonomous regions in Sumatera between time to time toward the GRDP per capita in each district/city can be seen as follows:

Table 3: Individual Effect

		Coefficient
C		0,473396
LN_YIT_1		0,937699
District/city	Fixed Effect Coefficient	Individual Effect
Mentawai Island	0,002592	0,475988
RokanHulu	0,000736	0,474132
Siak	0,016999	0,490395
RokanHilir	-0,174760	0,298636
Dumai	0,020143	0,493539
Karimun	0,015642	0,489038
Natuna	0,052933	0,526329
Batam	0,026372	0,499768
Muaro Jambi	0,009084	0,48248
T. JabungTimur	0,028880	0,502276
Tebo	0,006185	0,479581
Lampung Timur	0,001645	0,475041
Way Kanan	-0,006457	0,466939
Metro	0,00000591	0,473402

Source: Processed Data (2017)

The estimation result shows that the value of interception coefficient from every DOB along Sumatera has a different value. The existence of different values of interception coefficient is possible because the area studied have different characteristics from one to each other. The value of this interception coefficient shows the differences in the behavior of each region. Areas with positive interception coefficient indicate that the district/city area has a higher GRDP per capita than another district/city. On the other hand, districts/cities that have negative interception coefficient have lower GRDP per capita than other districts/cities.

CONCLUSION

Based on the results of data analysis and discussion that has been done, the conclusion can be concluded as follows that during the study period, it showed that there was the occurrence of sigma convergence in new autonomous regions in all Sumatera with the average value of CV 0.9080. Sigma convergence occurred because the coefficient of variation of GRDP per capita of a certain year was smaller than the coefficient of variation of GRDP per capita in the previous year which means a decrease in the disparity of income per capita.For absolute convergence, the results showed that there was no absolute convergence in new autonomous regions in Sumatera, since the previous year's GRDP per capita coefficient showed a positive value which meant that lower-income GRDP per capita did not experience faster growth than the one in higher-income autonomous regions.The absolute convergence rate was 11 percent per year and the time is taken to close the half of the initial half-time conversion was six years.

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