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ANALYSIS OF CONVERGENCE BETWEEN PROVINCES IN INDONESIA

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Abstract

This study aims to determine whether or not sigma convergence, whether absolute and conditional convergence occurs or not, and to determine the convergence speed. This study uses secondary data, namely Gross Regional Domestic Product (GRDP) per capita, poverty, and inequality for each province in Indonesia from 2017-2021. The method used in this study is panel data with a fixed effect approach. The results of the analysis using the sigma convergence (σ) approach show the occurrence of convergence. The results of the absolute convergence analysis explain the divergence of GRDP per capita in Indonesia with a divergence speed of 13.76% per year. The results of the conditional convergence analysis show that there is a divergence of GRDP per capita in Indonesia with a divergence speed of 13.62% per year.

Keywords: *Convergence, Growth*

JEL Classification: *O42, R11*

1. INTRODUCTION

Indonesia is a country with great diversity in terms of society, culture, human services, education, social and economic relations which very easily causes political unrest in the country. To be able to maintain political stability in the country, the central government as the highest authority who determines national policy implements a centralization policy. Centralization is the power and authority to control government activities through the central government, while regional governments carry out policies decided by the central government without the power and responsibility to control and manage government activities in their regions.

Developments in economic growth have always been the center of attention in terms of improving people's welfare, especially in developing countries. Indonesia is one of the developing countries that is always trying to increase its economic growth. The geographical situation of Indonesia is an archipelagic country, resulting in regions in Indonesia having different natural and non-natural resources. Not only that, with the status of an archipelagic country, Indonesia has a large number of people with various ethnic backgrounds and diverse customs, so this situation has given rise to disparities between regions.

The benchmark for a country's economic development success is also seen from economic growth, income disparities between residents, and the economic structure between districts/cities

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and provinces. Disparity between regions cannot be avoided because we know that each region has its own natural resource potential which can help the economic growth and development of each region, so this is the biggest factor in income disparities between regions themselves. Even though Indonesia has experienced relatively large and stable economic growth in recent decades, the problem of economic inequality remains (Sugiharti *et al.*, 2022).

The balanced budget aims to increase development in aspects such as education, health, trade, road and bridge infrastructure, agricultural, fisheries and maritime infrastructure, water and sanitation infrastructure, village infrastructure to create safety for all levels of society. With developments in this aspect, regions that are relatively neglected will be able to catch up and align themselves with developed regions by increasing regional per capita income. This pursuit process carried out by poor areas is called convergence.

The term convergence was first introduced by Solow in 1956 and popular by Barro and Sala-i-Martin (1992). The definition of integration according to many previous studies such as Barro and Sala-I-Martin (1992), Garcia and Soelistianingsih (1998), Lumir (2012) is the level of economic growth between countries that continues to decline over time. sigma convergence) and poor countries tend to grow faster or higher than developed countries (beta convergence).

Convergence philosophy reports that the level of prosperity felt by developed countries and developing countries in a certain time will reach convergence (meet at one point). Economics also says it will happencatching up effect, is when developing countries succeed in catching up with developed countries. This is based on the assumption that developed countries will face the situationsteady state, where countries whose income levels cannot increase further because capital bonuses do not increase a country's income. Meanwhile, developed countries that have stopped growing, developing countries that have good growth will catch up so they can compete with developed or developing countries.catching up effect (Gama, 2012).

Likewise, previous studies (Ramsey, 1928; Solow, 1956; Koopmans, 1965 at Barro and Sala-I-Martin (1992) which stated that the development of income per person leads to the opposite of the initial level of income per person. Considering that countries have similar preferences and levels of technology, economists assume that poor countries will catch up (catch-up) the economic level of developed countries because poor countries tend to develop faster than developed countries.

The two convergence models found in economic development analysis between countries and regions are Beta Convergence and Sigma Convergence (Barro and Sala-i-Martin, 1992). First, the beta convergence plan is the economic development of poor countries or regions that is faster than the economic development of other countries or regions, so that poor countries or regions tend to catch up with other regions. Second, sigma convergence is the formation of a reduction in the diversity of income per person over time. This means that convergence is characterized by the presence of dispersion measured through standard deviation numbers and coefficients of variation over time. If a country's income dispersion shrinks, it can be said that regional disparities are narrowing or convergence has occurred.

he design of the sigma convergence concept is the level of evaluation of the convergence situation through the dispersion of PRDB per capita, whereas in beta convergence the level of measurement can be done absolutely or conditionally, in absolute measurement it will measure the trend level of economic development (PRDB) in neglected areas faster than the level of

economic development (PRDB) in developed regions (Atmasari, Priyono and Viphindrartin, 2020). Apart from that, through measuring convergence, it will be known what the direction of economic development is in an area and what the inequality situation is in the region (Yudistira serta Sohibien, 2020).

Convergence occurs when the economic situation in neglected regions tends to grow faster than developed regions, the presence of integrated interventions through convergence can force poor regions to catch up with the per capita income gap with developed regions so that the regional development mission becomes more efficient (Wahyunadi, 2019).

Research from Vidyattama (2006) which analyzed the income gap per person between provinces in Indonesia in the period 1971-2002 revealed that the income gap per person in Indonesia's provinces was relatively large, especially between Java and outside Java. Accumulation of physical capital (physical capital), the level of trade continuity, and the position of oil and gas tend to influence the development of income per person in Indonesia. However, Vidyattama (2006) shows that due to the level of infrastructure development and community movement, there is an incentive to increase income per person in various provinces. Next, there is a need for convergence in development per person in Indonesia, where poorer provinces have a greater level of development than provinces with more.

Research conducted by Akita (2002) proves that the gap in per capita income between provinces in Indonesia increased in the period before the crisis (1993-1997), but then decreased after the crisis. The national per capita income gap in Indonesia is more due to disparities in provinces and within provinces. The results of research analysis by Tadjoeddin, Suharyo and Mishra (2001) prove that uneven development between regions leads to an increase in the threat of disintegration which continues to peak in Indonesia, which is a vertical conflict between the center and the regions, especially provinces that are rich in resources. Based on the results of searches for conflict history and analysis of various dimensions of inter-regional inequality, regional dissatisfaction is the impact of the inability to guarantee that the wealth of a region will make the people in that region more prosperous.

Jawaid and Raza (2012) conducted research on the impact of foreign investment (PMA), developments in the perception of convergence in 129 countries divided into countries with small, medium and large income. The results explain that foreign investment positively influences economic growth in countries with small and medium growth. Das *et al.*, (2013) research on divergence with the title "Remoteness and Unbalanced Growth: Understanding Divergence Across Indian District"In the period 2001-2011, the research results showed that there was no convergence or divergence between provinces in India.

Wibisono (2003) explains that the province hashuman capital large ones can grow faster. Other research conducted by Sodik and Iskandar (2007) explains that provinces with a large density have a negative relationship with the level of economic development, while provinces with a large net export have a positive correlation with the level of development in Indonesia. Amalia (2012) studied the dependence of convergence on economic development in East Java Province and concluded that there was no sigma convergence situation in the research area. Atmasari et al (2020) concluded that there was no convergence situation using sigma and beta in large cities in East Java Province, economic development was influenced by the level of the Human Development Index (HDI) and gross fixed capital formation.

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The income gap between regions is a topic that needs to be studied taking into account several reasons. The main reason why this is interesting to research is because inequality is something that can hinder regional development, especially national development in Indonesia, which has 34 provinces with relatively different regional potential. Symptoms of disparities in income per capita between provinces in Indonesia can be seen using the GRDP per capita indicator based on constant prices from 2017-2021.

2. RESEARCH METHOD

The research concept used in this research uses quantitative descriptive data from the results of processing the information that has been obtained. The information used in this research is quantitative descriptive in panel form from 2017-2021 in the form of GDP per capita on the basis of constant prices, poverty and inequality in each province. Meanwhile, this research uses convergence analysis to see whether there is convergence between provinces in Indonesia.

The data analysis technique uses convergence analysis. Convergence theory reports that the prosperity level felt by developed and developing countries will eventually converge (meet at one point). To analyze convergence according to Barro and Sala-i-Martin (1992), the following measures are used:

1. Gross convergence or Sigma (σ) convergence measures the level of dispersion of GDP per capita. Gross convergence or sigma (σ) can be measured using a measure of dispersion, in this case the coefficient of variation and standard deviation of the GRDP per capita logarithm value at constant prices.
2. Beta Convergence (β) can be known from the predicted factors that determine the level of convergence. According to Barro and Martin in Prasasti (2006) the formula for calculatingbeta (β) convergence are as follows:

$$\beta = \frac{[\ln(b+1)]}{T} \quad (1)$$

Where:
β = Beta convergence
b = Coefficient of predictor variable
T = Length of time period

The procedure that must be carried out to test beta convergence is to first find out whether there is absolute convergence, and test conditional convergence. The model specifications used for absolute convergence are as follows:

$$\text{Log (Y)} = a + b \text{ Log } (Y_{t-1}) + uit \quad (2)$$

Where:
Y : Provincial GDP per capita during 2017-2021
Y_{t-1} : GDP per capita of the province in the previous year
u_{it} : Component error th individuali at time t

On the other hand, conditional convergence considers the advantages of panel data, so in this research a panel data regression technique is used to identify which variables are predicted to

trigger the convergence of GRDP per capira between provinces. The detailed form of panel information to be used is interpreted in the following equation:

$$Y_{it} = \alpha + \beta_1 PDRB_{t-1\,it} + \beta_2 P0_{it} + \beta_3 giniratio_{it} + u_{it} \quad (3)$$

Dimana:

Y	= GRDP per capita
α	= Constant
$PDRB_{t-1}$	= GDP per capita year
P0	= Poverty Percentage
Gini ratio	= Inequality
$\beta_{1,2,3,4}$	= Independent variable coefficient
i	= Unit *cross-section* in Indonesia
t	= Unit *time series* 2017- 2021
u_{it}	= Component *error*

3. RESULT AND DISCUSSION

Convergence Analysis

a. Gross Convergence or *Sigma (σ) convergence*

Sigma convergence occurs when there is a decrease in the dispersion of the natural logarithm of GDP per capita between regions throughout the year. The results obtained from calculating the coefficient of variation and standard deviation explain that there is a dispersion in the logarithm value of GRDP per capita for 34 provinces in Indonesia which tends to decrease during the observation period. Based on the results presented, it can be seen that the standard deviation and coefficient of variation of the logarithm of GRDP per capita decreased from 2017 to 2019 (De Silva and Sumarto, 2014), but again showed an increase in 2020 and decreased again in 2021. This is presented in following table:

Table 1. Standard Deviation and Coefficient of Variation of GDP Per Capita Between Provinces 2017-2021

Tahun	Standar Deviation (SD)	*Coefficient Variation (CV)*
2017	0,5649	0,0539
2018	0,5524	0,0527
2019	0,5481	0,0523
2020	0,5530	0,0528
2021	0,5273	0,0503

Source: Data processed, 2022

This reduction in the digression standard indicates that the development of GDP per capita in Indonesia has experienced instability from year to year within the observation period, so we can know that the development of real GDP per capita is not normal between provinces in

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Indonesia, in other words, if there is uneven development between provinces in Indonesia. The results using graph are present in the following figure

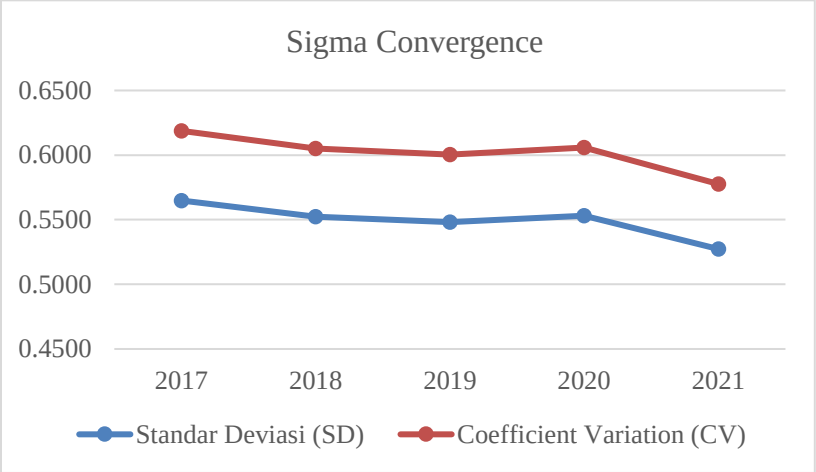

Figure 1. Sigma Convergence

b. **Beta Convergence (β)**

Beta convergence analysis is carried out by including factors that influence and see whether absolute convergence and conditional convergence between provinces in Indonesia occurs or not. Absolute convergence and conditional convergence analysis are explained as follows:

1. Absolut Convergence

Absolute convergence analysis was carried out using the current equation of the estimated GDP per capita of 34 provinces in Indonesia with the GDP per capita of 34 provinces in Indonesia the previous year(Distributed Lag). The research results are explained in the following table:

Table 2. Absolut Convergence

	Fixed Effect
Lnpdrb_lag1	0.993***
	(0.006)
_cons	0.094
	(0.064)
Observasi	169

Values in parentheses arestandard error/robust standard error.
(*) (**) (***) explains the significance level (10) (5) (1) percent.
Source: Stata, 2022

Based on the results above, the GDP coefficient per capita of 34 provinces in Indonesia in the previous year (Lnpdrb_lag1) using the research modelfixed effect is 0.993, the research model above explains a positive relationship, this reflects the occurrence of divergence or a tendency for increasing inequality between provinces in Indonesia. The coefficient of

Lnpdrb_lag1 is used to calculate the speed at which divergence occurs. The results of research and calculations explain that the divergence value between provinces in Indonesia is 13.76%.

2. Conditional Convergence

Analysis with conditional convergence can see the factors that cause inter-provincial growth in Indonesia. The research results use the modelfixed effect explained in the following table:

Table 3. Conditional Convergence Result

	Fixed Effect
Lnpdrb_lag1	0.982***
	(0.006)
Poverty	-0.002*
	(0.001)
Inequality	0.023
	(0.078)
_cons	0.222
	(0.080)
Observation	169

Values in parentheses are standard error/robust standard error. (*) (**) (***) explains the significance level (10) (5) (1) percent. Source: Stata, 2022

Based on the results above, the GDP per capita coefficient of 34 provinces in Indonesia in the previous year (Lnpdrb_lag1) was 0.982 and had a positive relationship, this reflects the occurrence of divergence or a tendency for increasing inequality between provinces in Indonesia. The coefficient of Lnpdrb_lag1 is used to calculate how fast the divergence speed occurs. The conditional convergence results explain the divergence speed of 13.62%.

So it can be concluded that using both absolute and conditional convergence also explains the divergence between provinces in Indonesia. The results of research using both sigma convergence and beta convergence explain the same results as previous research conducted by Yulisningrum (2015) which explains that sigma convergence has fluctuating results and beta convergence explains the occurrence of divergence between provinces in Indonesia.

4. CONCLUSION

The results of research using sigma convergence explain that from 2017 to 2019 growth between provinces in Indonesia experienced convergence, but increased again in 2020, which means that there is again divergence between provinces in Indonesia. The results of other research explain that there is divergence between provinces in Indonesia using both absolute convergence and conditional convergence, where the results explain that the speed of divergence between provinces in Indonesia is 13.76% and 13.62% respectively.

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