International Journal of Economics, Business and Innovation Research
https://e-journal.citakonsultindo.or.id/index.php/IJEBIR
E-ISSN : 2964-0865
IJEBIR

Economic Convergence Study in the Eastern Region of Indonesia 2018-2022

Dara Julia Asmara Dita[1], Wiwin Priana Primadhana[2], Wirya Wardaya[3]

[1,2,3] Department of Development Economics, Faculty of Economics and Business, National Development University "Veteran" Jawa East

.

Corresponding author: 20011010010@student.upnjatim.ac.id

Abstract

Economic growth and convergence are defined as economic indicators that can characterize the extent of the difference or gap between developed and developing countries. The purpose of this study was to determine the convergence of sigma, absolute convergence, conditional convergence, the influence of HDI investment, and labor on the convergence of economic growth between provinces in the Eastern Region of Indonesia and to find out how much convergence speed is produced every year. The research was conducted in 17 provinces in the Eastern Region of Indonesia as an analysis unit. from 2018-2022. The data used is a panel, with analysis tools namely sigma convergence, beta convergence, and panel data regression using the FEM model. The results of sigma convergence, absolute beta convergence, and conditional beta convergence research show that there is a convergence of economic growth. Based on the results of the conditional beta convergence estimation, the human development index (HDI) has a positive and significant effect on economic growth. The speed of convergence with the absolute convergence analysis method, it was found that the time required to achieve a half steady state was 10.2 years and the growth to be achieved was 6.8 percent per year. Meanwhile, with the conditional convergence analysis method, it was found that the time needed to move towards a half-steady-state is 140.4 years and the economic growth that must be achieved is 0.5 percent per year.

Keywords: Convergence, GDP, investment, HDI, Labor

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Economics, Business and Innovation Research
https://e-journal.citakonsultindo.or.id/index.php/IJEBIR
E-ISSN : 2964-0865
IJEBIR

INTRODUCTION

One of the important components in national growth is regional development. In addition to increasing per capita income and the welfare of regional residents, regional development also seeks to catch up and align with areas that have developed. convergence between regions is the closing of the gap between regions. In the Solow (1956) and (1957) growth models which state that if non-rival technologies can be spread across the country's territory, then the per capita income between countries will converge, and can be the starting point of research to eliminate regional disparities or convergence. (Tombolotutu *et al.*, 2019).

Arsyad (1997) emphasized that economic growth and convergence are defined as economic indicators that can characterize the extent of the difference or gap between developed and developing countries. Economic growth is an important metric when examining a country's economic development, because the use of production factors to create goods and services is the core of economic activities, economic expansion will ultimately grow people's income. Each region has diverse economic growth, which can lead to disparities in the rate of economic growth. To overcome this inequality, the community and the government need to work together. One of the measures is to increase economic growth in less developed areas, to reduce the economic gap between regions, known as income convergence (Mankiw, 2006). Neo-classical growth theory says that the difference in per capita income between countries will converge over time. High-income countries that are leading in technology can only grow by adopting new technologies. Poor countries can grow by adopting new technologies and catching up with high-productivity sectors (Fukase and Martin, 2020).

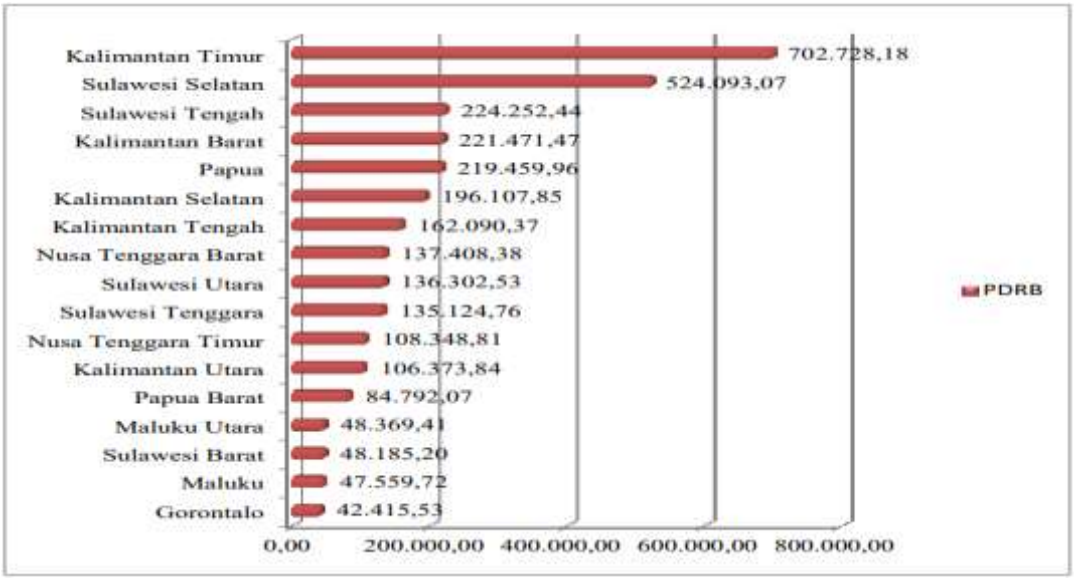
Barro and Sala-i-Martin (1992) in Convergence is a process in which poorer countries or regions reduce differences in productivity, income, wage levels, and other indicators with more developed countries or regions, thereby accelerating economic growth (Wardaya and Landiyanto, 2005). Convergence occurs when the economies of countries are developing rapidly, reducing the income gap between rich and poor regions. This happens if poor countries grow faster than rich countries, equalizing economic growth across the region (Damanik, 2022).

Inequality between regions is a problem that often afflicts all countries in the world, both in developed countries, developing countries, and poor countries. Inequality between regions in Indonesia, such as between the Western Region of Indonesia (KBI) and the Eastern Region of Indonesia (KTI), requires serious attention. Increasing economic growth in disadvantaged areas such as Maluku, Papua, Nusa Tenggara, Kalimantan, and

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Economics, Business and Innovation Research
https://e-journal.citakonsultindo.or.id/index.php/IJEBIR
E-ISSN : 2964-0865
IJEBIR

Sulawesi in accordance with the 2020-2024 RPJMN is the key to reducing regional disparities. The Eastern Indonesia region is the eastern part of Indonesia covering 17 regions, namely West Nusa Tenggara (NTB), East Nusa Tenggara (NTT), East Kalimantan, West Kalimantan, South Kalimantan, North Kalimantan, Central Kalimantan, North Sulawesi, South Sulawesi, Central Sulawesi, Southeast Sulawesi, West Sulawesi, Gorontalo, Maluku, North Maluku, Papua and West Papua. Inequality in these 17 regions is still clearly seen in the Eastern Region of Indonesia by observing per capita income indicators in each province.



Picture 1 Graph of Average GDP Per Capita on the Basis of Applicable Prices by Business Field in 2018-2022

Source : Data processed (Central Statistics Agency, 2023)

In graph 1 above, it is explained that the contribution of GDP per capita in each province in the Eastern Region of Indonesia during 2018-2022 shows diverse trends. Some provinces experienced significant growth and several other provinces stagnated or even declined. In the Eastern Region of Indonesia, East Kalimantan Province stands out as the largest contributor to the national economy with the highest GDP per capita of 702.728 million rupiah, driven by the mining sector such as palm oil and coal. South Sulawesi followed with a GDP contribution per capita of 524.093 million rupiah, followed

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Economics, Business and Innovation Research
https://e-journal.citakonsultindo.or.id/index.php/IJEBIR
E-ISSN : 2964-0865
IJEBIR

by Central Sulawesi with a contribution of 224.252 million rupiah, while Gorontalo Province had the lowest GDP contribution per capita of 42.415 million rupiah.

The existence of inequality in the Eastern Region of Indonesia can be indicated through the difference in the average economic growth in each province in the Eastern Region of Indonesia. The following is a graph of the average economic growth in each province in the Eastern Region of Indonesia (KTI) in 2018-2022:

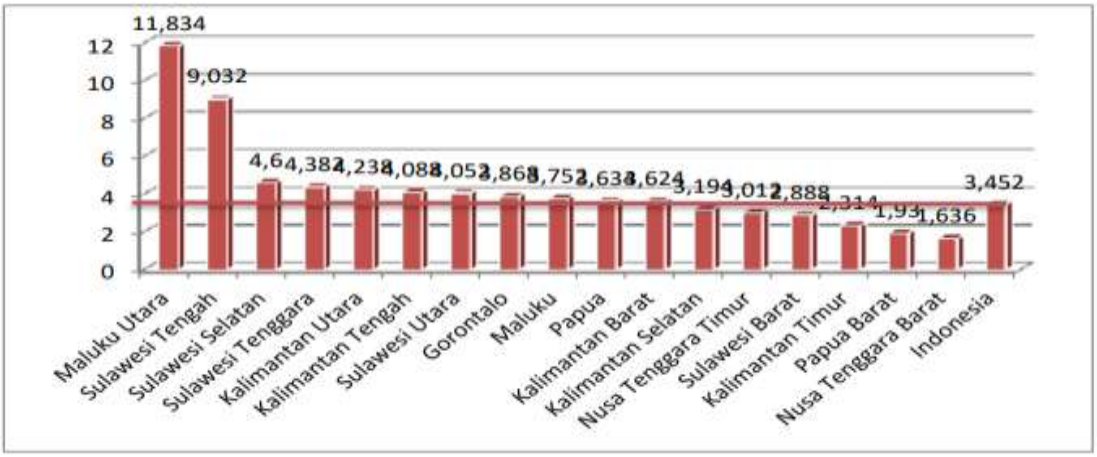


Figure 2 Graph of the Average Provincial Economic Growth Rate in the Eastern Region of Indonesia (KTI) in 2018-2022

Source: Data processed, (Central Statistics Agency, 2023)

Figure 2 shows the difference in economic growth rates in the Eastern Indonesia provinces in 2018-2022. North Maluku Province has the highest growth (11.8%), followed by Central Sulawesi (9.032%), and the lowest in West Nusa Tenggara (1.63%). Six provinces in the Eastern Region of Indonesia, including West Papua, West Sulawesi, East Kalimantan, South Kalimantan, East Nusa Tenggara, and West Nusa Tenggara, have economic growth below the national average (3.45%). This shows the inequality of development in the Eastern Region of Indonesia.

Based on the neoclassical paradigm, disparities in economic growth between countries or regions are temporary. The Solow model introduces the neoclassical growth concept assuming diminishing returns from capital and constant returns to scale, towards a steady state state. This allows for the convergence of per capita income in different regions, where capital and labor can move freely between regions with minimal barriers, leading to long-term convergence. Robert J. Barro and Xavier Sala-i-Martin's 1992 study

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

on the convergence of economic growth in 48 states of the United States used the framework of the neoclassical economic growth model. The study shows a convergence in GDP per capita, especially with a slow decline in the rate of return on capital, which is consistent with the neoclassical model (Barro and Sala-i-Martin, 1992).

From the description above, the uneven development between regions in the Eastern Region of Indonesia is an important topic to discuss. This study aims to find out in the long term, whether inequality between regions in the Eastern Region of Indonesia will be reduced and the growth of poor areas can lag behind developed regions so that there is a convergence of economic growth between provinces in the Eastern Region of Indonesia

LITERATURE REVIEW

Economic Growth Theory

Robert Solow introduced the neoclassical idea of economic growth in 1956 and 1957. According to (Mankiw, 2006) Solow's growth model (Mankiw, 2006) explains the relationship between the growth of capital stocks, labor force, and technological advances in the economy and their impact on the production of goods and services of a country. Production factors such as labor and physical capital have an impact on economic growth, with efficiency technology as an exogenous variable that affects the interaction between labor and capital. In this context, technology refers to the most effective way of running or creating something. Improving the efficiency of the use of labor and capital supports short-term economic growth, while capital accumulation plays an important role in long-term growth, creating a stable and optimal growth path.

Convergence Theory

Solow introduced the term convergence in 1956. The term was later popularized by Barro (1989), Mankiw (1992), and Barro and Sala-i-Martin (1991, 1992). This theory was developed by Barro and Sala-i-Martin (1992) using the neoclassical growth model, convergence became the central idea of growth theory in the 1990s. The empirical convergence hypothesis is an important component of this model, which has been thoroughly investigated and analyzed. It is estimated that in a closed economy, the rate of increase in production usually follows an inverse relationship with the initial level of output. Assuming that all countries have the same preferences and technologies, poor countries often expand faster than developed countries.

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Economics, Business and Innovation Research
https://e-journal.citakonsultindo.or.id/index.php/IJEBIR
E-ISSN : 2964-0865
IJEBIR

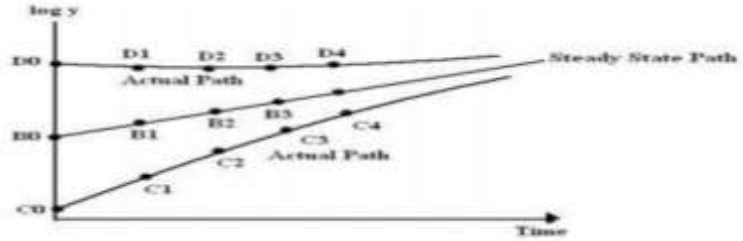


Figure 3 Convergence Towards a Steady State

Source : Valdés, B. (2003)

The figure above illustrates the states that lead to a steady state which shows the process of underdeveloped areas to pursue more advanced areas. The area that advances on the development path is between points D0 to D4. Meanwhile, the growth path in developing regions is points C0 to C4. Newly developed areas often experience constant expansion, while developed areas usually experience slow or static growth. When the expansion of the moment in the two regions reaches the steady state path, then convergence will occur between the regions.

Barro and Sala-i-Martin (1991) proposed two concepts of economic convergence. First, beta-β convergence states that regions or countries that were initially lagging behind in economic growth can catch up with developed regions or countries because their growth is faster. Second, sigma convergence σ refers to the decrease in per capita income inequality between sectors or countries over time, although confounding variables can hinder this process.

RESEARCH METHODS

Research Venue

The place of this research is 17 provinces in the Eastern Region of Indonesia as the unit of analysis. The eastern part includes 17 regions, namely West Nusa Tenggara (NTB), East Nusa Tenggara (NTT), East Kalimantan, West Kalimantan, South Kalimantan, North Kalimantan, Central Kalimantan, North Sulawesi, South Sulawesi, Central Sulawesi, Southeast Sulawesi, West Sulawesi, Gorontalo, Maluku, North Maluku, Papua and West Papua.

Data and Data Sources

The type of data used in this study is secondary data. The secondary data used is panel data, which is information that combines longitudinal series data with periodic series

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Economics, Business and Innovation Research
https://e-journal.citakonsultindo.or.id/index.php/IJEBIR
E-ISSN : 2964-0865
IJEBIR

dataThe panel data is in the form of time series data, namely from 2018-2022 and cross section of 17 provinces in the Eastern Region of Indonesia. Secondary data sources are obtained from the official website of the Central Statistics Agency (BPS). In this study, the independent variables used are the initial GDP per capita, investment, the Human Development Index (HDI), and the number of workers.

Data Analysis

Sigma Convergence

Sigma-convergence (α convergence) is measured by the initial level coefficient of GDP per capita when the growth rate of GDP per capita is regressed (in log) against the initial rate of GDP per capita. Sigma convergence is considered to occur if the coefficient is negative and statistically significant or in other words sigma convergence (σ-convergence) occurs when the dispersion of per capita income between regions decreases over time. The following formula is used to determine the coefficient of variation:

$$CV = \frac{\sqrt{\frac{\sum(Yi - \bar{Y})^2}{n}}}{\bar{Y}} x\ 100\%$$

Source: (Ramadhana, Agussalim and Sabir, 2023)

Information:

CV :Coefficient of variation in a given standard (Coefficient Variation)

SD: Standard Deviation of GDP per capita on the basis of constant prices of province I in a given year

Yi: GDP per capita of each province I in a given year Average

$\bar{Y}$: Average (mean) GDP per capita on the basis of provincial constant prices in a given year Amount

N : Number of Provinces in the Eastern Region of Indonesia

Beta Convergence

Absolute Beta Convergence

Absolute beta convergence occurs when poor areas develop faster than rich areas so that as a result, the GDP per capita level of poor areas is equivalent to that of rich areas. The model specification for checking absolute convergence is modified with the Barro and Sala-I Martin equations.:

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Economics, Business and Innovation Research
https://e-journal.citakonsultindo.or.id/index.php/IJEBIR
E-ISSN : 2964-0865
IJEBIR

$$\mathbf{Ln = \alpha + b\ Ln\ (\ y\ \left(^{yi,t}/_{yi,t-1}\right)_{i,t-1}\ ) + e_{it}}$$

Source: (Ramadhana, Agussalim and Sabir, 2023)

Information:

Ln = Growth in per capita income per year at the end of t $\left(^{yi,t}/_{yi,t-1}\right)$

(y i,t – 1) = Initial GDP per capita (rupiah)

yi = GDP per capita at the end of the year (rupiah)

α = Constant

b = Regression coefficient

e it = Error

Conditional Beta Convergence

The existence of conditional convergence shows that the model specification has other variables besides revenue from the previous year, which is expected to have an impact on the revenue growth rate. To explain the concept of conditional convergence, the following equation can be used:

$$\mathbf{Ln = \alpha + b\left(^{yi,t}/_{yi,t-1}\right)_0\ Ln\ (\ y_{i,t-1}\ ) + b1\ Ln\ (INV_{it}) + b2\ Ln(IPM_{it}) + b3\ Ln\ (TK_{it}) + e_{it}}$$

Source: (Ramadhana, Agussalim and Sabir, 2023)

Information:

Ln $\left(^{yi,t}/_{yi,t-1}\right)$	= Growth in per capita income per year at the end of the year t
(y i,t – 1)	= GDP per capita at the beginning of the i region (rupiah)
(yi,t)	= GDP per capita at the end of the year t of the i region (rupiah)
INVit	= Provincial investment in the first year of t
IPM it	= Provincial Human Development Index i year t
TK	= Number of provincial workforce i year t
A	= Constant
B	= Regression coefficient

e it = error term.

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Economics, Business and Innovation Research
https://e-journal.citakonsultindo.or.id/index.php/IJEBIR
E-ISSN : 2964-0865
IJEBIR

Then the results of the analysis were tested for convergence process tendencies, convergence speed, and half-life of convergence. The measure in calculating the convergence velocity is as follows:

$$\lambda = -\ln(1+\beta 1)\tau$$

The measure *of the half-life of convergence* or the time it takes to close half of the inequality using the following formula:

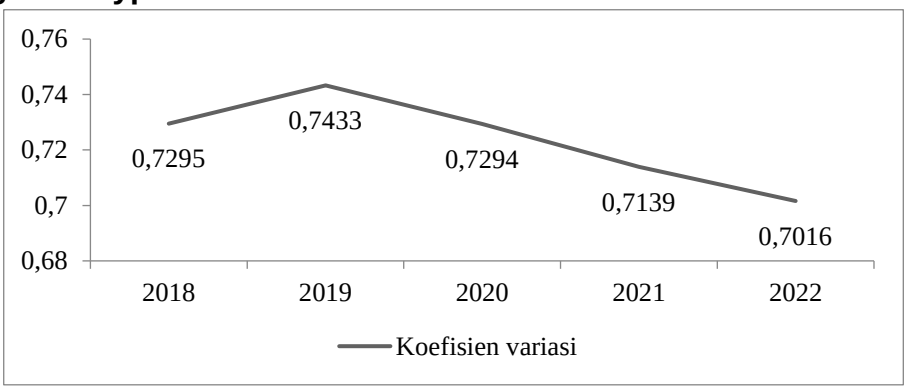
$$-\ln(2)/\beta.$$

Panel Data Model Estimation

A statistical technique called panel data regression analysis is used to test the impact of multiple predictor changes on a single response change when dealing with panel data as its data format (Alamsyah *et al.*, 2020).

RESULT

Sigma Convergence Hypothesis



Graph 4 Sigma Convergence of Economic Growth in 17 Provinces in Eastern Indonesia in 2018-2022

Source : Research data processed, 2024

The average GDP per capita in 17 provinces in the Eastern Region of Indonesia shows an increase, namely in 2018 it was only Rp. 39. 211,000 to Rp. 42,079,000 in 2022. Convergence in 17 provinces in the Eastern Region of Indonesia is based on sigma convergence analysis because there is a possibility where economic growth in poor areas

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

can grow faster than rich areas if the area is able to optimize its potential. As per data released by the Central Statistics Agency in 2022, where the provinces of East Kalimantan (6.22%), Central Sulawesi (11.91%), North Sulawesi (5.48%) and North Maluku (20.49%) are the 4 provinces from Eastern Indonesia that recorded the highest economic growth rate. North Maluku Province is the province with the highest growth rate because the area is a mining-producing area. Then followed by Central Sulawesi, East Kalimantan and North Sulawesi which have the highest growth rate.

Conditional Beta Convergence
Results of Absolute Beta Convergence Analysis
Panel Data Model Selection

Table 1 Results of the Chow Test and the Hausman Test

Test	Chi-Square Test Statistics	P- Value
Chow Test	42,186564	0,0025
Hausman Test	9.903520	0,0016

Source : eviews data processing, 2024

Based on the results of the analysis of the Chow test, the probability value of part F of 0.0025 is smaller than the significance level of 0.005. Therefore, the test results concluded that the selected model was a fixed effect model, then a hausman test was carried out to find out which model is better between the fixed effect model and the random effect model. It can be seen that the analysis results of the hasuman test show that the probability value in the cross section random is 0.016 < 0.05, which means that the better estimation model used is the fixed effect model and the LM test does not need to be done.

Absolute Beta Convergence Results

Table 2 Absolute Convergence Estimation Results

Variable	Coefficient	Std.Error	t-Statistics	Probability
C	3.024187	0.914360	3.307435	0.0015

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Economics, Business and Innovation Research
https://e-journal.citakonsultindo.or.id/index.php/IJEBIR
E-ISSN : 2964-0865
IJEBIR

PDRBt-1	-0.288455	0.087932	-3.280434	0.0016

F-stats = 2.604500
Prob (F-stat) = 0.002829
R2 = 0.245124

Source : eviews data processing, 2024

In the table above, the equation in absolute beta convergence in the Eastern Region of Indonesia is formed as follows:

$$\text{Ln}\left({}^{yi,t}/_{yi,t-1}\right) = 3.024187 - 0.2884559(\text{Yi,t-1}) + \text{eit}$$

Based on the absolute beta convergence theory, there is economic convergence between provinces in the Eastern Region of Indonesia due to a negative correlation between the initial GDP per capita and economic growth (β < 0). The initial GDP per capita coefficient in the table shows a significant value of -0.288455 at the 5% level, indicating that provinces with lower initial GDP per capita tend to lag behind the more developed provinces in the study period.

Results of Conditional/Conditional Beta Convergence Analysis
Determination of the Panel Data Model

Table 3 Model Estimation Results Using Various Methods

Estimation Method	Absolute Convergence	Conditional Convergence		
		CEM	FEM	REM
Variable				
PDRB_T_1	-0.288455*** (0.0016)	-0.028237** (0.0367)	-0.024386** (0.0362)	-0.032570** (0.0501)
INV		0.001693 (0.8470)	-0.002812 (0.7116)	-0.000392 (0.9629)
HDI		0.357494** (0.0458)	0.394081** (0.0114)	0.407737** (0.0485)
KINDERGARTEN		-0.011817 (0.3594)	-0.007071 (0.5238)	-0.010296 (0.4845)
Obsession	85	85	85	85

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Economics, Business and Innovation Research
https://e-journal.citakonsultindo.or.id/index.php/IJEBIR
E-ISSN : 2964-0865
IJEBIR

Heteroscedasticity test		0.780970 (0.540842)	1.498925 (0.113055)	0.201980 (0.936582)
Multicollinearity test			No multicollinearity occurs	
R-Square	0.397896	0.099414	0.369492	0.069392
Adj R2	0.245124	0.054384	0.303123	0.022862
Test F	2.604500 (0.002829)	2.207755 (0.075499)	5.567220 (0,000015)	1.491331 (0.212649)
Chow Test (CEM-FEM)	0.0025	0,0041		
Hausman Test (FEM –REM)	0,0016		0,0038	

) Significant level 1%, **) Significant level 5%, *) Significant level 10%

Therefore, the results of the test concluded that the selected model was a **fixed effect model**

Conditional Beta Convergence Results

Table 4 Conditional Beta Convergence

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.268861	0.659575	-1.923756	0.0581
PDBR_T_1_	-0.024386	0.011435	-2.132640	0.0362
INV	-0.002812	0.007579	-0.371039	0.7116
HDI	0.394081	0.151962	2.593296	0.0114
KINDERGARTEN	-0.007071	0.011042	-0.640414	0.5238
F-stats = 5.567220 Prob(F-stat) = 0.000015				
R2 = 0.303123				

Source : eviews data processing, 2024

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Economics, Business and Innovation Research
https://e-journal.citakonsultindo.or.id/index.php/IJEBIR
E-ISSN : 2964-0865
IJEBIR

Based on the table above, the conditional beta convergence equation for the Eastern Region of Indonesia is formed as follows:

$$\text{Ln} = -\left({}^{yi,\,t}/_{yi,\,t-1}\right) 1.268861 - 0.024386\ (y_{i,t-1}) - 0.002812\ (\text{INV}_{it}) + 0.394081\ (\text{IPM}_{it}) + 0.007071\ (\text{TK}_{it}) + e_{it}$$

The PBRBt-1 variable is the PBRB per capita of the previous year (initial GDP per capita). The initial per capita income coefficient was -0.024386, indicating a significant negative direction towards economic growth, greater than the absolute convergence value. Other variables in the conditional beta convergence model also contributed to the acceleration of economic growth in the Eastern Region of Indonesia in 2018-2022.

Hypothesis Test

Test F

Table 5 F-Statistical Test

F-statistic	5.567220
\Prob(F-statistic)	0.000015

Source : eviews data processing, 2024

Based on the results of the F-Statistical Test, it shows that the probability value of F-statistic is 0.000015 where the value is less than α = 0.05, then the H1 hypothesis is accepted and H0 is rejected. It can be concluded that there is a significant influence between initial per capita income, investment, HDI, and labor on economic growth in the Eastern Region of Indonesia in 2018-2022.

Test T

Table 6 T-Statistical Test

Variable	t-Statistic	Prob.	**Information**
PDBR_T_1_	-2.132640	0.0362	Significant
INV	-0.371039	0.7116	Insignificant
HDI	2.593296	0.0114	Significant
KINDERGARTEN	-0.640414	0.5238	Insignificant

Source : eviews data processing, 2024

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Economics, Business and Innovation Research
https://e-journal.citakonsultindo.or.id/index.php/IJEBIR
E-ISSN : 2964-0865
IJEBIR

If the probability value < α = 0.05, then H0 is rejected and H1 is accepted. From the results of the t-statistical test in the table above, conclusions can be drawn:

1 The initial per capita income variable (PDBR_T_1_) has a probability value of 0.0362 where the value is < α = 0.05. Then H0 is rejected and H1 is accepted.
2 The investment variable (INV) has a probability value of 0.7116 where the value is > α = 0.05. Then H0 is accepted and H1 is rejected.
3 The human development index (HDI) variable has a probability value of 0.0114 where the value is < α = 0.05. Then H0 is rejected and H1 is accepted.
4 The labor variable (TK) has a probability value of 0.5238 where the value is > α = 0.05. Then H0 is accepted and H1 is rejected.

Determination Coefficient Test (R-Square)

Table 7 R-Square Test

R-squared	0.369492
Adjusted R-squared	0.303123

Source : eviews data processing, 2024

Based on the results of the R-square test in the table above, it can be known that the Adjusted R-squared value is 0.303123. The results show that the variables of initial per capita income, investment, HDI, and labor are able to explain the change in the economic growth variable by 30% while the remaining 70% is explained by other variables outside the study.

Speed of Convergence and Half-Time Convergence

Table 8 Convergence and Half-Time Convergence Velocity

Convergence	**Convergence Speed (%)**	**Half-Time Convergence**
Absolute Convergence	6,8%	10,2
Conditional Convergence	0,5%	140,4

Source : processed data, 2024

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

The results of the estimation were found in the initial GDP per capita variable at absolute convergence that the province has a small GDP per capita, the minimum growth that must be achieved is 6.8 percent per year and to reach a half of the steady state it takes 10.2 years to close half of the economic growth inequality. Meanwhile, the estimation results for the initial GDP per capita variable in the convergence of conditions are influenced by investment variables, human development index, and labor force that provinces with small GDP per capita must achieve the minimum growth that must be achieved is 0.5 percent per year to move towards a steady state and take 140.4 years to close half of the economic growth inequality.

DISCUSSION

The effect of investment on economic growth

Based on calculations in the conditional beta convergence model, investment variables have a negative and insignificant effect on economic growth. These results are in line with the research conducted Alvaro (2021) and (Tvaronavičius and Tvaronavičiene, 2008) that investment does not have a significant effect on economic growth. Results (Alvaro, 2021) and (Tvaronavičius and Tvaronavičiene, 2008), said that the impact of investment on economic growth is not significant, because the impact of investment on economic growth varies at each step of a country's economic development, and the impact of investment on economic growth will change along with the development of the country.

The effect of the human development index (HDI) on economic growth

Based on the results of the analysis of the conditional beta convergence model, it can be obtained that the human development index variable has a significant positive influence on economic growth in the Eastern Region of Indonesia. This research is in line with the research (Rahmawati, 2019) that the increase in the human development index from year to year has an impact on Indonesia's economic growth. Improving health, education and living standards commensurate with human resources will encourage economic growth. Therefore, in the short term, it can be concluded that higher HDI will have a positive and significant impact on economic growth.

The influence of labor on economic growth

Based on the results of calculations from the conditional beta convergence model, it can be obtained that the labor variable has a negative and insignificant effect on

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

economic growth. This is not in line with the hypothesis put forward (Simanjuntak, 1985) who said that the expansion of employment opportunities and full utilization, as well as the provision of appropriate wages and rewards, have a decisive role for long-term economic and social growth. And this research is in line with the research (Asrinda and Setiawati, 2022) entitled The Influence of Foreign Investment, Net Exports and Labor on Indonesia's Economic Growth with the results of the study showing that labor has no effect on economic growth.

CONCLUSION

Based on the results of sigma convergence estimates, it shows that there is a convergence of economic growth in the Eastern Region of Indonesia. Based on the results of the estimate of absolute beta convergence and conditional beta convergence, it shows that there is a convergence of economic growth in 17 provinces in the Eastern Region of Indonesia, which is seen from the negative relationship between the growth rate and the initial per capita income. Based on the results of the conditional beta convergence estimation, the human development index (HDI) has a positive and significant effect on economic growth. The speed of convergence with the absolute convergence analysis method, it was found that the time required to achieve a half steady state was 10.2 years and the growth to be achieved was 6.8 percent per year. Meanwhile, with the conditional convergence analysis method, it was found that the time needed to move towards a half-steady-state is 140.4 years and the economic growth that must be achieved is 0.5 percent per year.

SUGGESTION

Based on the research, the researcher provides suggestions for the academic government. The government is indispensable in making strategic policies to overcome inequality between regions. The results suggest increasing physical investment in disadvantaged areas, expanding access to education and health services, and improving the economic welfare of people in the Eastern Region of Indonesia to reduce unemployment and encourage economic growth and welfare. For academics, the researcher is further advised to add technological variables that affect regional convergence and extend the research period to date.

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

REFERENCES

Alamsyah, I.F. et al. (2020) 'Panel Data Regression Analysis to Determine the Factors Affecting the Number of Poor People in East Kalimantan', Ideas PublishingPp. 1–95.

Alvaro, R. (2021) 'The Influence of Investment, Labor, and Exports on Economic Growth', Budget Journal: State Financial Issues and Problems, 6(1), pp. 114–131. Available at: https://doi.org/10.22212/jbudget.v6i1.78.

Asrinda, D. and Setiawati, R.I.S. (2022) 'The Influence of Foreign Investment, Net Exports and Labor on Indonesia's Economic Growth', Equilibrium : Scientific Journal of Economics, Management and Accounting, 11(2), p. 50. Available at: https://doi.org/10.35906/equili.v11i2.1114.

Barro, R.J. and Sala-i-Martin, X. (1992) 'Covergence', Journal of Politzcal Economy, 100(2), pp. 223–251. Available at: https://doi.org/10.1145/3546931.

Damanik, D. (2022) 'Convergence Analysis of Economic Growth on Sumatra Island', Proceedings of The International Conference on Economics and Business, 1(2), pp. 406–417. Available at: https://doi.org/10.55606/iceb.v1i2.192.

Fukase, E. and Martin, W. (2020) 'Economic growth, convergence, and world food demand and supply', World Development, 132, p. 104954. Available at: https://doi.org/10.1016/j.worlddev.2020.104954.

Mankiw, N.G. (2006) 'Introduction to Macroeconomics. Third Edition', in. Jakarta: Salemba Four.

Rahmawati, Y.O. (2019) 'Analysis of the Influence of the Human Development Index (HDI), Labor Force Participation Rate (Tpak), and Government Expenditure in the Health and Education Sectors on Economic Growth in Indonesia for the Period 1995-2017', Student Scientific Journal of FEB Universitas Brawijaya, pp. 10–10.

Ramadhana, T.D., Agussalim and Sabir (2023) 'Convergence of regional economic growth in South Sulawesi Province', (Doctoral dissertation, Hasanuddin University) [Preprint].

Simanjuntak, P.J. (1985) Introduction to Human Resource Economics. Publishing Institution of the Faculty of Economics, University of Indo.

Tombolotutu, A.D. et al. (2019) 'Convergence analysis and spatial dependency of economic growth in the districts/municipality in Central Sulawesi Province', IOP Conference Series: Earth and Environmental Science, 235(1). Available at: https://doi.org/10.1088/1755-1315/235/1/012098.

Tvaronavičius, V. and Tvaronavičiene, M. (2008) 'Role of fixed investments in economic

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

growth of country: Lithuania in European context', Journal of Business Economics and Management, 9(1), pp. 57–64. Available at: https://doi.org/10.3846/1611-1699.2008.9.57-64.

Valdés, B. (2003). An Application of Convergence Theory to Japan's Post-WWII "Economic Mir-
acle". Journal of Economic Education, 34(1), 61-81.

Wardaya, W. and Landiyanto, E.A. (2005) 'Growth in East Java : Convergence or Divergence?', East, pp. 1–21.

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.