BDJ Fact : Breakthrough Development Journal in Financial & Accounting
Vol 1, Issue 1, (2025), 48-56

Analysis of Income Convergence Between District/City in South Sulawesi Province Year 2019-2023

Sudarwinti*

Alauddin Islamic State University of Makassar, 92113, Gowa, South Sulawesi, Indonesia

Email
Sudarwini154@gmail.com

Received: Month, Date, Year (Required) **Revised:** **Accepted:**

Abstract

This study aims to analyze income inequality convergence among districts/municipalities in South Sulawesi, addressing the persistent issue of regional economic disparities. It seeks to fill gaps in existing research by examining subnational dynamics using a quantitative approach with panel data regression across 24 districts/cities from 2019 to 2023. The findings indicate the presence of beta convergence, evidenced by a significant initial GRDP per capita coefficient of 0.461231, although sigma convergence is absent. Results highlight that income inequality convergence is significantly influenced by policy-driven variables, such as government expenditure and the Human Development Index (HDI).

Keywords: *Inequality, convergence, economic growth*

DOI :
p-ISSN :
e-ISSN :

1. Introduction

South Sulawesi is one of the provinces located in the eastern region of Indonesia. Nicknamed "The Land of the Brave", South Sulawesi has a variety of natural resource potentials including agriculture, plantations, marine and other fields. This potential has become a major contributor to national production and is known internationally for its exports to various countries. Some of these commodities include: Cocoa, Seaweed, Coffee and Lumpung, Rice.

It is informed through the website of dpmptsp of South Sulawesi Province (2017) that ***Cocoa*** from South Sulawesi has been recognized globally. Cocoa production from South Sulawesi reaches 60% of the total national cocoa production, making Indonesia rank third in the world with a production of around 720 tons per year. ***Seaweed*** is also one of the main potentials in South Sulawesi. According to data released by the Ministry of Maritime Affairs and Fisheries (KKP), around 33.33% of the total national seaweed production comes from this area. This confirms that South Sulawesi is one of the leading seaweed producers in Indonesia. Even seaweed productivity in this area can reach around 1.5 million tons annually with a value of around 1.9 million US$. Another commodity is ***Toraja Coffee,*** this type of coffee is even the best in the world. With a percentage of 6.69% of the world's total coffee production, Indonesia is the 4th largest coffee producing country in the world. For **Lumpung Beras** , throughout 2016-2017, South Sulawesi experienced a surplus in rice production, namely 2.6 million tons of total dry milled grain (GKG) production of 5.8 million tons or the equivalent of 3.6 million tons of rice.

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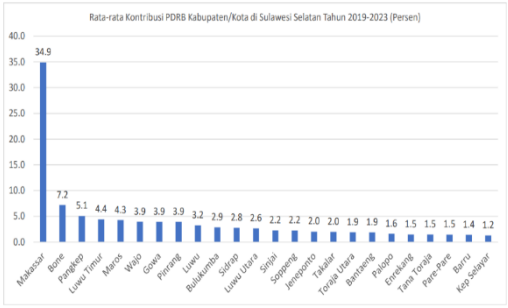
However, this situation triggers the emergence of inequality or disparity where the variation in potential possessed by each region will create differences in the process of economic growth and development in various districts/cities in South Sulawesi province. The impact is that several districts/cities experience rapid economic growth while others lag behind with slow growth. Todaro (1999) stated that income inequality is defined as the difference in income or income obtained by the community so that a striking difference in income is created in the construction of society. The implication is that rich areas will become richer and conversely poor areas will become poorer (Subrata, 2018) . The potential for income inequality between regions will always exist due to different regional conditions such as the Endowment factor. According to Sjafrizal (2008) Other factors that determine income inequality between regions are the concentration of economic activities between regions, the mobility of goods (trade) of production factors between regions, and the allocation of public and private investment across regions.

Figure 1: Average Contribution of GRDP of Regency/City in south Sulawesi 2019-2023



Source: Central Statistic Agency (processed data : 2025)

Inequality income between districts / cities in South Sulawesi can also seen through the PDRB Contribution diagram (income) gross regional domestic) district / city on Based on the figure above average gross regional domestic product figure during 2019-2023 South Sulawesi still dominated by several district / city namely Makassar (34.9%) followed by Bone (7.2%) and Pangkep (5.1%). Meanwhile That Archipelago The Screen become area with lowest contribution to GRDP by (1.2%)

Table 1 : Glow regional domestic product per capita based on Current Price According to District/Cities in South Sulawesi 2019-2023 (Million Rupiah)

Kabupaten/kota	2019	2020	2021	2022	2023	Rata rata
Kep Selayar	47,99	46,73	49,47	53,56	56,57	50,86
Bulukumba	33,96	33,34	35,97	38,66	41,90	36,77
Bantaeng	46,84	45,68	50,79	60,57	62,78	53,33
Jeneponto	27,74	25,70	27,28	28,74	29,32	27,76
Takalar	34,42	34,03	36,58	39,73	41,14	37,18
Gowa	27,50	28,20	30,36	32,50	35,52	30,82
Sinjai	45,05	43,74	46,99	51,13	55,29	48,44
Maros	64,60	47,73	47,96	58,55	64,69	56,71
Pangkep	77,68	74,38	79,12	86,58	91,86	81,92
Barru	41,80	40,36	43,46	47,56	50,16	44,67
Bone	47,81	45,68	48,67	53,48	57,02	50,53
Soppeng	47,83	48,42	52,67	57,95	62,58	53,89
Wajo	49,31	52,16	58,55	63,43	63,61	57,41
Sidrap	46,49	44,12	47,34	51,37	55,51	48,97
Pinrang	52,1	49,84	53,26	57,41	59,97	54,52
Enrekang	35,28	33,54	36,03	39,05	41,15	37,01
Luwu	43,04	43,91	48,30	53,38	57,36	49,20
Tana Toraja	31,66	27,10	28,53	30,57	32,38	30,05
Luwu Utara	41,65	41,07	44,20	48,65	53,45	45,80
Luwu Timur	71,34	72,85	78,71	93,36	99,49	83,15
Toraja Utara	41,08	37,37	39,12	42,07	45,03	40,93
Makassar	117,3	125,32	132,68	144,60	155,95	135,17
Pare-pare	50,06	48,50	51,03	55,78	58,78	52,83
Palopo	43,79	43,66	46,63	51,45	54,47	48,00
Sulawesi Selatan	57,18	55,68	59,50	65,35	69,70	61,48

Statistic Agency (processed data : 2025)

Inequality or Inequality in South Sulawesi can also seen in the Gross Regional Domestic Product per capita data above . Based on table 1 there is three district / city with an average GRDP per capita its territory exceed South Sulawesi province , namely Makassar, East Luwu and Pangkep . There are 21 other districts / cities has an average GRDP per capita below the average GRDP of South Sulawesi. Makassar is average area of GRDP per capita highest amounting to Rp. 135.17 million . While Jeneponto become area with per capita lowest of Rp. 27.76 million . Average data of GRDP per capita on show that income area the richest more 5% bigger than with area the poorest .

Table 2 : Rate and Average Growth of gross Regional Domestic Product per Capita by Region District/Cities in South Sulawesi 2019-2023 (Percent)

Kabupaten/kota	2019	2020	2021	2022	2023	Rata rata
Kep Selayar	7,68	-1.78	4,02	3,67	3,68	3,45
Bulukumba	5,49	0,43	4,76	3,81	4,11	3,72
Bantaeng	10,75	0,52	8,86	15,45	5,56	8,23
Jeneponto	5,47	0,16	5,40	3,81	1,90	3,35
Takalar	6,87	-0,61	5,05	4,64	3,86	3,96
Gowa	7,46	1.76	7,26	4,59	5,82	5,38
Sinjai	6,12	1,55	5,23	4,87	5,71	4,70
Maros	1,24	-10,87	1,36	9,13	5,00	1,17
Pangkep	6,41	-1,69	3,46	4,93	4,75	3,57
Barru	7,41	0,87	4,77	5,11	3,51	4,33
Bone	7,01	-0,25	5,53	5,23	3,77	4,26
Soppeng	7,69	2,19	6,15	6,18	3,33	5,11
Wajo	4,06	-1,17	6,77	2,38	1,43	2,69
Sidrap	4,65	-0,59	5,54	4,86	3,28	3,55
Pinrang	6,53	0,44	5,04	4,53	2,18	3,74
Enrekang	5,43	1,25	6,36	3,71	2,33	3,82
Luwu	6,26	1,30	6,03	5,69	5,64	4,98
Tana Toraja	7,22	-0,28	5,19	5,12	3,66	4,18
Luwu Utara	7,11	-0,59	3,90	4,54	5,12	4,02
Luwu Timur	1,17	1,46	-1,39	1,99	9,66	2,58
Toraja Utara	7,56	0,17	4,05	5,27	3,94	4,20
Makassar	8,79	-1,27	4,47	5,40	5,31	4,54
Pare-pare	6,65	-0,08	4,41	5,93	3,88	4,16
Palopo	6,75	0,45	5,41	5,83	4,34	4,56
Sulawesi Selatan	6,91	-0,71	4,64	5,10	4,51	4,09

Statistics Agency (processed data : 2025)

Based on table 2 above , the average growth of GRDP per capita in South Sulawesi experienced Positive growth by 4.09% during 2019-2023. The data above is also at the same time show areas that have a GRDP per capita tall like East Luwu has a relatively high average growth rate more low compared to with areas that have income more per capita low like Bulukumba, which has an average GRDP growth of more than tall by 3% and Gowa which has an average GRDP growth of more tall by 2%. Even Jeneponto , Tana Toraja and Gowa as 3 areas with income per capita lowest , rate per capita GRDP growth Still more large 1.2%, 1.6% and 2.1%. This is indicates that area with income per capita low capable grow more fast compared to with area income per capita tall .

From the description above , the research aiming For know whether in Long term inequality income between districts / cities in South Sulawesi will the more decrease and growth poor areas are able to chase lag behind to area proceed so that happen convergence income between districts / cities in South Sulawesi. In addition , the study also looked at index development human development (HDI) and expenditure government For area (Gi) against Growth of GRDP per capita districts / cities in South Sulawesi.

2. Literature Review

The Concept of Convergence

Barro & Sala-i-Martin, (2004) Explaining that convergence is an economic condition with a lower per capita income level, in other words, stated relative to its steady state per capita income level which

tends to grow faster. The concept of convergence emphasizes the assumption that welfare in developed and developing regions will eventually meet at the same point or converge (Wahyuni & Parameswari, 2017) . There are two concepts about the occurrence of convergence, the first concept is related to dispersion between regions while the second concept, namely convergence, appears if the economy with low output tends to grow faster than the economy with high output so that the economy in poor regions tends to catch up with prosperous regions in terms of per capita income levels (RJ Barro & Sala-i-Martin, 1990) .

The first concept is called sigma convergence with a focus on observations regarding the reduction in inequality or disparities that occur between regions. There are several ways that can be used to see the occurrence of sigma convergence, including: Coefficient of Variation, Unweighted Coefficient of Variation . Sigma convergence analyzes the development of income distribution between regions throughout a certain period (Yustiana, 2022) .

The second concept is called beta convergence. This concept is based on the convergence that occurs when regions with lower per capita income levels tend to grow faster than regions with higher per capita income levels (RJ Barro & Sala-i-Martin, 1992) . There are two types of beta convergence, namely absolute convergence and conditional convergence. Absolute convergence is an analysis to understand the relationship between economic growth and initial per capita income levels. If the relationship is negative, it can be concluded that regions with high initial per capita income levels have slower economic growth compared to regions with low initial per capita income levels. Furthermore, conditional convergence is an analysis that shows the relationship between economic growth which is not only influenced by initial per capita income but also by other economic factors (Yustiana, 2022) .

Inequality

Inequality is a condition in which there are striking differences in various aspects of life, especially in terms of economy, social, and development between individuals or groups of people (Rahman, 2017) . In the context of economics, inequality often refers to income inequality and development inequality between regions.

According to Asrahmaulyana, (2023) Economic inequality is defined as the difference in economic development between one region and another, both vertically and horizontally. This causes disparities or inequality in the distribution of resources, income, and economic opportunities in society. Inequality can be seen from various dimensions, such as: Income in the form of differences in the amount of income received by individuals or groups, Access to Education in the form of the availability and quality of education that can be accessed by the community,

Income per capita

Per capita income is a measure used to describe the average income received by each individual in a country. Mathematically, per capita income is calculated by dividing a country's total national income by its population. Per capita income serves as an indicator to assess the level of welfare and prosperity of a society. The higher the per capita income, the more prosperous the society (KUMARA, 2022)

Human Development Index

The Human Development Index (HDI) describes the proportion of basic achievements in the main components of human development, namely: long and healthy life, education, and standard of living (United Nations Development Programme, 2020) . Human development is a concept that makes humans the end result of development. To assess the achievement of the Human Development Index (HDI) between regions, it can be categorized into groups based on the Human Development Index criteria, namely: HDI <60: low HDI, 60 ≤ HDI <70: moderate HDI, 70 ≤ HDI <80: high HDI, and HDI ≥ 80: very high HDI (Purba et al., 2021) .

Mankiw (2020) stated that if the HDI score of a region increases, it can be interpreted that the level of community welfare in that region has also increased, which is measured through the components of purchasing power (income), education, and public health. Conversely, if the HDI score of a region decreases, the level of community welfare in that region also decreases.

Government Expenditure

Government Expenditure or Government spending reflects government policy. When the government makes a decision to purchase goods and services, government spending reflects the costs that must be incurred by the government to implement the policy (Mangkoesoebroto, 2002) . Government spending has a theoretical basis that can be seen from the identity of the national income balance, namely Y = C + I + G + (XM), which is the legitimacy of the Keynesian view of the relevance of government intervention in the economy. From this equation, it can be understood that an increase or decrease in government spending will increase or decrease national income. There are many considerations that underlie government decision-making in managing their spending (Dumairy, 2006)

3. Research Design and Method

Data Types and Sources

The study used quantitative methods, while the analysis used the RJ Barro & Sala-i-Martin (1990) equation and panel data regression analysis. In the study, the number of districts analyzed to calculate convergence was 24 districts/cities in South Sulawesi province.

The data used in the study came from the Central Statistics Agency (BPS), namely data in the form of annual statistical reports of South Sulawesi and data from the Ministry of Finance of the Republic of Indonesia (djpk kemenkeu). The data includes: regional domestic income (PDRB) per capita of each district/city in the province of South Sulawesi, Human Development Index (HDI) and Government Expenditure.

Data Analysis Methods

Sigma convergence is calculated by calculating the value of the standard deviation of the logarithm of the per capita GRDP growth of all districts/cities in South Sulawesi province in 2019-2023. Convergence is stated to have occurred if the dispersion shows a decrease over time.

Absolute Convergence is analyzed using an econometric model estimation consisting of only one explanatory variable, namely the log of initial gross regional domestic product growth, assuming other factors are in ceteris paribus. Because the economy is moving towards the initial condition, absolute convergence is stated to occur if the resulting regression coefficient is less than 1 (<1). Simply put, the equation formed to calculate absolute convergence is:

$$log\ Y_{it} = \alpha + \beta_1 log\ Y_{it-1} + \varepsilon_{it}$$

Information:

Y_{it} = GRDP per capita for each district/city
Y_{it-1} = GRDP per capita for each initial district/city
β = Regression Coefficient that can be used to calculate the convergence rate
ε_{it} = Error Term

Meanwhle, the equation formed to calculate conditional convergece is:

$$log\ Y_{it} = \alpha + \beta_1 log\ Y_{it-1} + \beta_2 log\ IPM_{it} + \beta_3 log\ Gi_{It} + \varepsilon_{it}$$

Information:

Y_{it} = GRDP per capita for each district/city
Y_{it-1} = GRDP per capita for each district/city at the beginning (previous year)
IPM_{it} = Human Development Index (i= district/city and t= year)
Gi = Regional expenditure for districts/cities

$\beta_1, \beta_{2,}, \beta_3$= Regression Coefficient that can be used to calculate the convergence rate
ε_{it}= Error Term

Next, the conditional convergece speed is calculate through:

$$Kecepatan\ Konvergensi = Koefisien\ \beta \times 100\%$$

4. Results and Discussion

Research result

1. *Sigma convergence*

the last five years, there has been no sigma convergence between districts/cities in South Sulawesi province.

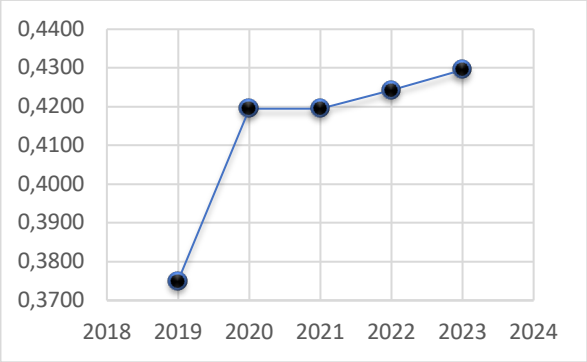
Table 3 : Sigma Convergence

Year	Coefficient of Variation of GRDP Per Capita District/City Areas in South Sulawesi Province
2019	0.3750
2020	0.4196
2021	0.4726
2022	0.4242
2023	0.4295

Source : Central Statistics Agency of South Sulawesi (processed data : 2025)

Table 3 above shows that sigma convergence based on the value of the coefficient of variation of GRDP per capita between districts/cities in South Sulawesi province did not occur. In the last five years, there has been an increase over time from 2019 by 0.3750 to 0.4295 in 2023, although there was a decline from 2021 to 2022 but it increased again in 2023.

Graph 1 : Increase in the Value of the Variation Coefficient of GRDP per capita



Source: Central Statistics Agency of South Sulawesi (processed data : 2025)

2. *Beta Convergence*

Two analyzes used in Beta Convergence are absolute convergence and conditional convergence. Both of these analyzes are carried out using econometric analysis based on panel data. To calculate absolute convergence using the *Fixed Effect Model* (FEM) approach after testing (Chow test and Hausman test). In addition, the calculated beta convergence value shows absolute convergence between districts and cities in South Sulawesi Province from 2019 to 2023. The results of the regression estimation for beta convergence are shown in Table 2.

Based on the results of the regression estimation in Figure 2, it can be seen that the initial GRDP per capita regression coefficient of 0.461231 <1 indicates that there is absolute convergence between districts/cities in South Sulawesi province.

Figure 2 : Estimation of Absolute Convergence Regression with Fixed Effect Approach

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.792361	0.902148	-1.986769	0.0498
LOG(PDRB KAPITA AWAL)	0.461231	0.231848	1.989369	0.0495
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.219976	Mean dependent var		0.001851
Adjusted R-squared	0.022917	S.D. dependent var		0.234614
S.E. of regression	0.231910	Akaike info criterion		0.098118
Sum squared resid	5.109317	Schwarz criterion		0.678845
Log likelihood	19.11294	Hannan-Quinn criter.		0.333954
F-statistic	1.116297	Durbin-Watson stat		1.449488
Prob(F-statistic)	0.342043			

Source: data processesd, 2025

Furthermore, to calculate the conditional convergence, an econometric regression technique is used involving the variables of local government expenditure (Gi) and the Human Development Index (HDI) as well as the explanatory variable of the initial log of GRDP per capita (YCit-1). The *Random Effect Model* (REM) method is used to conduct panel data regression analysis to calculate the conditional convergence. This model is based on the LM, Hausman and Chow tests.

Figure 3 : *Conditional Convergence Regression Estimation* Using *Random Effect Approach*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.224416	1.879113	0.119427	0.9051
LOG(PDRB KAPITA AWAL)	0.244854	0.074538	3.284951	0.0013
LOG(IPM)	-0.326287	0.458136	-0.712205	0.4778
LOG(GE)	0.030208	0.063848	0.473123	0.6370
R-squared	0.118867	Mean dependent var		0.001851
Adjusted R-squared	0.096079	S.D. dependent var		0.234614
S.E. of regression	0.223059	Akaike info criterion		-0.129999
Sum squared resid	5.771600	Schwarz criterion		-0.037082
Log likelihood	11.79992	Hannan-Quinn criter.		-0.092265
F-statistic	5.216235	Durbin-Watson stat		1.271227
Prob(F-statistic)	0.002051			

Source: data processed, 2025

Based on Figure 3, it can be seen that the initial log variable of GRDP per capita, log of government expenditure (Gi) and the Human Development Index (HDI) together have a significant effect on the variable of GRDP per capita growth between districts/cities in South Sulawesi province. The initial per capita income regression coefficient of 0.002051 <1 indicates that there is convergence based on a decrease in inequality between districts/cities

3. Convergence Speed Analysis

Convergence speed interprets the magnitude of the speed produced by each coefficient β of *absolute convergence* and *conditional convergence* of districts/cities in South Sulawesi province in 2019-2023.

Table 4 : Convergence Speed

Mark	*Absolute Convergence*	*Conditional Convergence*
Beta	0.461231	0.244854
Convergence Speed (%) per year	46.1%	24.5%

Source: data processed, 2025

Table 4 shows that the district/city areas in South Sulawesi province experienced an absolute convergence of 46.1% per year between 2019-2023. This finding indicates that the per capita income gap between provinces in Indonesia tends to decrease by an average of 46.1% per year based on absolute convergence. Meanwhile, the conditional convergence between districts/cities in South Sulawesi province experienced a convergence of 46.1% per year. This shows that based on the calculation of conditional convergence, the per capita income gap between districts/cities in South Sulawesi province also decreased at an average rate of 24.5% per year.

Discussion

The absence of sigma convergence is in line with previous research conducted by Akbar (2020) on the Analysis of Sigma and Beta Convergence of Gross Regional Domestic Product (GRDP) Per Capita of Regencies/Cities in Banten Province in 2007–2017, which found no sigma and beta convergence in GRDP per capita of regencies/cities in Banten Province from 2007 to 2017. According to Yustiana (2022), inequality based on the coefficient of variation value can be divided into three categories: low inequality with a coefficient of variation value of less than 0.3, moderate inequality with a coefficient of variation value between 0.3 and 0.7, and high inequality with a coefficient of variation value of more than 0.7.

Furthermore, in table 4j it can be seen that the conditional convergence rate is lower than the absolute convergence rate. This is influenced by various factors that determine economic growth, such as government spending that varies in each region and the Human Development Index that varies between provinces in Indonesia (Malik, 2014) .

5. Conclusions

Limitations of these findings include the possibility of unmeasured external factors that could influence the results, as well as variations that may exist outside the model used. Therefore, although there are indications of beta convergence, further research is needed to understand the dynamics underlying this inequality and to explore factors that may drive future sigma convergence.

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