

Analysis of the Inter-Regional Inequality Index for Districts and Cities in Central Sulawesi Province, 2020–2024

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ABSTRACT

One of the main challenges facing Indonesian development today is addressing regional inequality. Central Sulawesi Province, with its distinct natural resource endowment, is a significant contributor to this disparity. This study aims to analyze the level of inequality between the western and eastern regions and all districts/cities in Central Sulawesi Province from 2020 to 2024. The data used in this study are secondary data obtained from the Central Sulawesi Central Statistics Agency. The analysis tool used is the Williamson Index. Based on the analysis of regional development inequality in Central Sulawesi Province, it can be concluded that inequality in the western region tends to be more evenly distributed or lower, with an average IW value of 0.31 ($IW < 0.35$), due to its relatively homogeneous economic structure. Inequality in the eastern region is very high, with an average IW of 1.32 ($IW > 0.35$), primarily due to economic concentration in the Morowali and North Morowali industrial areas, which is not offset by equitable infrastructure and investment distribution. Inequality across all regions in Central Sulawesi is very high, with an average IW of 1.44 ($IW > 1$), due to differences in natural resources, geographic conditions, and industrial concentration in certain areas.

INTRODUCTION

As a country comprising thousands of islands, Indonesia has regional differences as an inevitable and logical consequence. Since regional characteristics strongly influence the formation of development patterns, development patterns in Indonesia are inevitably not uniform. This lack of uniformity affects growth potential, resulting in some regions growing rapidly while others grow slowly. These differing growth capacities ultimately lead to development disparities between regions (Sianturi, 2011).

Disparities between regions or within a region inevitably exist, whether in developing countries or even in developed nations – Indonesia is no exception. The key distinction lies in the extent of these disparities across regions or provinces. Disparities also have both negative and positive impacts. The positive impact of disparities is that they can encourage less-developed regions to compete and boost growth, improving their welfare. In contrast, the negative impacts of extreme disparities include economic inefficiency, weakened social solidarity and stability, and high levels of inequality, which are generally viewed as detrimental to the public's welfare. (Todaro in Ersad, Amir, and Zulgani, 2022).

In Eastern Indonesia (KTI), one of the regions playing a major role is Central Sulawesi Province, where the provincial capital, Palu, serves as a growth hub and a collector and distributor for Eastern Indonesia, as evidenced by the volume of goods and services flowing in and out of the province. The significant role of Central Sulawesi Province in the regional economy of the KTI is supported by the significant roles of the regions within it, including both regencies and cities. Urban areas in Central Sulawesi Province (the core region) serve as centers for trade and services, government, and residential areas, while the surrounding areas (the hinterland) function as suppliers of goods and services to the core region and even beyond the province's borders.

Economic development and growth can be observed through the value of Central Sulawesi's Regional Gross Domestic Product (PDRB) at constant prices for a specific year compared to the previous year's value. According to data from the Central Statistics Agency for the years 2020–2024, Central Sulawesi's economic growth in 2020 was 4.86 percent, then in 2021, Central Sulawesi's economic growth increased to 11.68 percent; in 2022, it rose to 15.17 percent; in 2023, it decreased by 11.91 percent; and in 2024, it stood at 9.89 percent (BPS, 2024).

Based on data from the Central Sulawesi Provincial Central Statistics Agency, per capita PDRB at current prices (ADHB) by regency/city in Central Sulawesi (in millions of rupiah) in 2023 indicates disparities in welfare across regencies/cities. Based on the averages, Morowali Regency had the highest per capita PDRB among regencies/cities in 2023. Morowali had the highest per capita PDRB among all regencies and cities in Central Sulawesi at 927.2 million rupiah; the second highest was in North Morowali Regency at 209.7 million rupiah, while Banggai Regency had a per capita PDRB of 101.8 million rupiah. The lowest figure was recorded in Banggai Kepulauan Regency at 39.9 million rupiah (BPS, 2024).

This stark disparity in per capita PDRB may indicate regional development inequality in Central Sulawesi, driven by the high concentration of economic activity in the region's growth centers. Nevertheless, the concentration of economic activity in certain regions is unavoidable and is even necessary for economic growth. This is part of the development process, while regional inequality is a natural consequence as long as it remains within reasonable limits.

Based on geographical and administrative divisions, the Central Sulawesi region can be divided into two main areas: the Eastern and Western regions. This division is unofficial, but it is commonly used to group regencies and cities by geographic location. The Eastern region consists of 6 regencies, namely Banggai Laut Regency, Banggai Kepulauan Regency, Banggai Regency, Morowali Regency, North Morowali Regency, and Tojo Una-una Regency. The Western part of Central Sulawesi (the Western region) encompasses the main island of Sulawesi, which faces the Makassar Strait on the west. Its geographical features vary, ranging from coastal areas and valleys to mountains. This region consists of 7 regencies/cities, namely Palu City, Donggala Regency, Sigi Regency, Parigi Moutong Regency, Poso Regency, Toli-toli Regency, and Buol Regency.

According to 2024 data from the Central Statistics Agency (BPS), the total area of Central Sulawesi is 61,605.72 km². The province is divided into two regions: the Eastern Region and the Western Region. Based on this division, the Eastern Region covers 30,121.86 km², while the Western Region covers 31,483.87 km². Law No. 23 of 2014 on Regional Government, which was previously regulated under Law No. 32 of 2004 and Government Regulation No. 78 of 2007, stipulates that the core region (Western region) must be larger than the other regions. The city of Palu is the capital of Central Sulawesi Province and serves as the core region; it is part of the Western region. In terms of area, the Western region is larger than the Eastern region. Based on this background, this study aims to identify disparities between the Western and Eastern regions, as well as across all districts and cities in Central Sulawesi Province.

THEORETICAL REVIEW

Theory of Economic Growth

In general, theories of economic growth can be grouped into two categories: classical and modern. Classical economic growth theory, pioneered by Adam Smith, posits that economic growth is based on trust in and the effectiveness of free-market mechanisms. In contrast, in modern theory, economic growth is influenced by several key factors, namely investment, population growth, and technology (Todaro, 2006).

Mankiw (2009) defines economic growth as the extent to which economic activity generates additional income for the public over a specific period. According to Boediono (2013), economic growth is the process of increasing per capita output in the long term. Furthermore, an economy is said to be growing if real income in a given year exceeds that of the previous year. Economic growth is important in the context of a country's economy, as it is a key measure of the nation's economic progress.

Theory of Regional Economic Growth

Significant economic growth is a primary development objective in regional development plans, alongside social development; however, these targets vary considerably depending on each region's potential (Sjafrizal, 2008). The primary objective of regional economic growth analysis is to explain why some regions grow rapidly while others grow slowly. Furthermore, regional economic growth analysis can also explain why economic development disparities exist between regions. According to Arsyad (1999), the factors influencing economic growth are capital accumulation—including all new investments in land, physical equipment, and human resources; population growth; and technological advancement.

Definition of Development

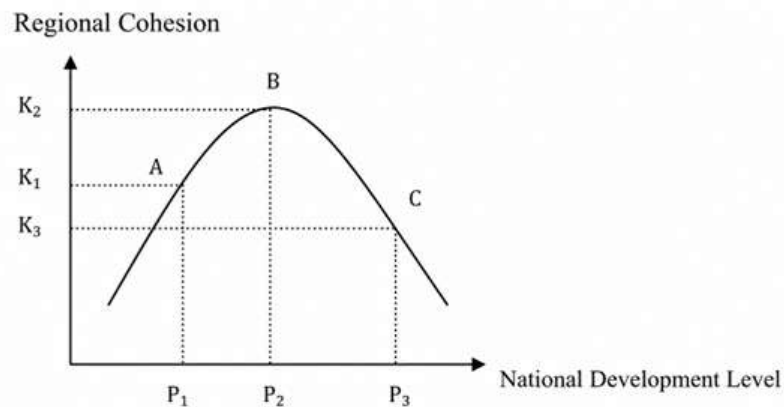
Development is broadly defined as a continuous process of improvement within a society or a social system as a whole, aimed at achieving a “better” or “more humane” life. Three core values serve as the conceptual foundation and practical guidelines for understanding the most fundamental meaning of development, namely: Sustenance, Self-Esteem, and Freedom, which are the primary goals that every individual and society must achieve through development (Todaro, 2004).

Development can also be viewed as a multidimensional process encompassing fundamental changes in social structures, societal attitudes, and existing institutions, as well as accelerating economic growth, addressing income disparities, and eradicating poverty. Thus, in essence, development must reflect a total transformation of a society or an adjustment of the social system as a whole, without neglecting the diversity of basic needs and the individual and collective aspirations of the social groups within it, in order to move forward toward a better quality of life—both materially and spiritually (Todaro, 2006).

Inequality

Interregional development disparities are a common feature of regional economic activity. Differences in natural resource endowments and demographic conditions across regions primarily cause these disparities. As a result of these differences, a region typically comprises developed and underdeveloped regions. The occurrence of these inter-regional disparities has implications for the welfare of communities across regions. Therefore, this aspect of inter-regional development disparities also has implications for the formulation of regional development policies implemented by local governments (Sjafrizal, 2008).

Economic disparities between regions essentially arise from the structure and patterns of the location and concentration of economic activities across regions (spatial economics). These structures and patterns are determined by the distribution of economic activities across spaces, which is heavily influenced by the locational advantages of each place—factors that tend to lead to the concentration of economic activities (Sjafrizal, 2017).



Source: (Sjafrizal 2017)

Figure 1. Regional inequality curve

The figure illustrates the relationship between regional inequality and the level of national development. In the early stages of development (P1), regional inequality tends to increase alongside economic growth (point A). At the intermediate level of development (P2), inequality peaks (point B), and at higher stages of development, inequality tends to decline (point C). This indicates that regional inequality can be a common aspect of a region's economic activities, arising from differences in natural resources and demographic conditions.

According to Sjafrizal (2017), economic inequality between regions essentially occurs due to the structure and patterns of the location and concentration of economic activities across spaces (spatial economics) within a region. These structures and patterns are determined by the distribution of economic activities across spaces, which is heavily influenced by the locational advantages of each place—factors that tend to lead to the concentration of economic activities.

METHODOLOGY

Statistically speaking, the Williamson Index is a coefficient of variation commonly used to measure disparities. The Williamson Index was developed by Jeffrey G. Williamson, who initially used this technique to measure development disparities between regions. Although this index has limitations—such as its sensitivity to the regional definitions used in the calculations—it is widely used to measure development disparities between regions.

The Williamson Index is used to determine the magnitude of income inequality between regions. Furthermore, a study by Sutarno and Kuncoro titled "Economic Growth and Inequality Among Subdistricts in Banyumas Regency, 1993–2000" states that the Williamson Index represents the relationship between regional disparities and levels of economic development, utilizing data from both developed and developing economies. (Sutarno & Kuncoro, 2003).

The following formula can express the mathematical formulation of the Williamson Index:

$$V_w = \frac{\sqrt{\sum_{i=1}^m (Y_i - Y)^2 (f_i/n)}}{Y}$$

Description:

- V_w : The Williamson Index;
- Y_i : PDRB per capita of the i -th regency/city;
- Y : PDRB per capita in the province;
- f_i : Population of the i -th Regency/City;
- m : The number of regencies/cities;
- n : Population

The Williamson Index measures the extent of inequality between regions, with values ranging from 0 to 1. According to Puspanika (2007), the Williamson Index is categorized into low, moderate, or high levels of inequality as follows:

- a. $IW < 0.35$: low level of inter-regional income inequality.
- b. $0.35 \leq IW \leq 0.5$: moderate level of inter-regional income inequality.
- c. $IW > 0.5$: high level of income inequality among regions.

According to Sjafrizal (2018), to assess the development of the IW status level in a region, the following four criteria are used:

- a. Development inequality is very high, with an IW value > 1
- b. Development inequality is high, with an IW value of 0.7–1
- c. Development inequality is moderate, with an IW value of 0.4–0.69

Development inequality is low, with an IW value < 0.39

The advantage of the Williamson Index is that it is easier and more practical to use for measuring interregional inequality. However, a drawback of the Williamson Index is its sensitivity to the definition of the regions used in the calculation.

RESULTS AND DISCUSSION

Research Data Description

This study uses secondary data sourced from the Central Sulawesi Provincial Statistics Agency. The data used in this study include the 2010 PDRB at constant prices and the population figures for the regencies and cities in Central Sulawesi Province for the years 2020–2024.

Analysis of the Williamson Index for the Western Region of Central Sulawesi

The results of the Williamson Index calculation for the Western Region of Central Sulawesi show an average Williamson Index value of 0.30. Based on this average value, the region can be categorized as having an IW value < 0.35 , indicating a low level of development inequality among districts. This aligns with Puspanika (2007), who states that the Williamson Index falls into the low-inequality category. Meanwhile, according to Sjafrizal (2018), development inequality is considered low when the IW value is < 0.39 .

This condition indicates that economic development in the Western Central Sulawesi region tends to be more evenly distributed compared to regions with higher index values. This may occur due to a relatively homogeneous economic

structure (dominated by the agricultural sector), resulting in less pronounced income disparities among districts.

However, the average score of 0.30, which falls within the moderate category, also indicates that the potential for inequality remains. If not balanced by equitable development, increased investment, and the even distribution of infrastructure, inequality may increase in the future. Therefore, policies are needed to ensure that economic growth remains inclusive across the entire western region of Central Sulawesi.

Intervention strategies and measures that need to be implemented by the local government, provincial government, and central government for the western region of Central Sulawesi to prevent development inequality from increasing and keep the Williamson Index score low include the: strengthening growth centers by enhancing distribution networks between districts/cities in the western region, developing central markets and regional logistics hubs, and promoting downstream processing of commodities from the districts to prevent all value-added activities from being concentrated in Palu. Besides that, the development of inter-regional connecting infrastructure is a key factor often driven by unequal access. Furthermore, the intervention strategy involves improving connecting roads and village-city access, strengthening ports and maritime transport in coastal areas, and expanding internet and telecommunications networks. Development of Key Strengths by District/City: Each region must be developed based on its local strengths to avoid reliance on a single economic hub. This aims to create widespread growth (spread effect).

Analysis of the Williamson Index for the Eastern Region of Central Sulawesi

The results of the Williamson Index calculations for the Eastern Region, as shown in **Table 1**, indicate that the average inequality in the Eastern Region of Central Sulawesi for the years 2020–2024 was 1.32, indicating very high inequality ($WI > 1$). The highest Williamson Index values occurred in 2022 and 2023, at 1.39.

The regional disparity in the eastern part of Central Sulawesi Province stood at 1.12 in 2020; entering the 2021–2023 period, the Williamson Index value increased significantly. A decrease of 0.01 occurred in 2024. This indicates a very high level of inequality in the Eastern region of Central Sulawesi. It can therefore be assumed that the distribution of development and economic activity across regions remains uneven. Several key factors contribute to this, including the concentration of major industries in specific areas – such as Morowali and North Morowali, which host large-scale nickel mining and smelting operations. The concentration of economic activity in these areas has led to a sharp surge in local revenue. Meanwhile, other areas in the eastern region lack industries as strong as those in the western region. The high disparity in the Eastern Central Sulawesi region (above 1) is primarily caused by economic concentration in industrial zones (Morowali and surrounding areas) that is not balanced by equitable infrastructure, investment, human resource quality, and economic diversification.

Table 1. The Williamson Index for the Eastern Region of Central Sulawesi Province 2020–2024

No	Year	The Williamson Index	The change
(1)	(2)	(3)	(4)
1.	2020	1.12	-
2.	2021	1.33	0.21
3.	2022	1.39	0.06
4.	2023	1.39	- 0.01
5.	2024	1.38	- 0.001
Average		1.32	-

The following describes the intervention strategies and measures that need to be implemented by local, provincial, and central governments in the eastern region of Central Sulawesi to prevent widening development disparities.

The eastern region of Central Sulawesi, which includes Banggai, Morowali, and North Morowali, has experienced high economic growth, driven primarily by the mining, manufacturing, oil and gas, and maritime sectors. However, this high growth has the potential to create disparities if economic benefits are concentrated only in industrial zones and specific areas. Meanwhile, other regencies—namely Banggai Laut, Banggai Kepulauan, and Tojo Una-Una—do not experience high economic growth.

Equitable Distribution of Infrastructure and Regional Connectivity

The government needs to ensure that development is not concentrated solely in industrial zones, to reduce disparities in access and logistics costs. The measures that need to be taken by the central and provincial governments include the following: improvements to national and provincial roads connecting industrial zones with their hinterlands, strengthening of ports, maritime transport, and inter-island connectivity, and expanding access to electricity, clean water, and the internet in island regions and remote villages.

Inclusive Downstreaming and the Dissemination of Value Added

The mining industry needs to provide broader benefits to local communities. The goal is to create economic value for the community, ensuring it is not enjoyed solely by large companies. The measures that need to be taken by the central, provincial, and district governments are as follows: promoting downstream industries based on minerals, fisheries, and agriculture, investment incentives for processing industries outside major industrial zones, and local content policies and partnerships with micro, small, and medium-sized enterprises.

Strengthening the Non-Mining Economy

Reliance on mining risks exacerbates inequality. Measures the government can take include economic diversification through agriculture, fisheries, plantations, and tourism; the development of centers for key local commodities; and financial and marketing support for the community's productive sectors. The aim is to create more equitable sources of economic growth.

Improving the Quality of Local Human Resources

An increase in workforce capacity must accompany industrial growth. The measures that need to be taken by provincial and central governments include vocational training and workforce certification, aligning education with industry needs, and providing scholarships and strengthening vocational education. The goal is to ensure that the local workforce has equal access to employment opportunities.

The Williamson Index for all regions in Central Sulawesi Province

This calculation of the Williamson Index covers all regions in Central Sulawesi, comprising 13 regencies and cities. Based on the Williamson Index calculation, the average inequality across all regencies and cities in Central Sulawesi Province for the years 2020–2024 is 1.44, indicating very high inequality ($WI > 1$). From these results, it can be seen that the inequality values in Central Sulawesi indicate extremely high development inequality – specifically, above the threshold of 1. As a measure of inequality, a Williamson Index value close to 0 indicates low inequality or greater equity in a region, whereas a value exceeding 1 signifies extremely high or widening inequality.

Development inequality across Central Sulawesi Province during 2020–2024 is driven by differences in regional economic growth. Some areas, such as Morowali and North Morowali, have experienced rapid development due to the presence of nickel mining and processing industries. In contrast, other areas remain dependent on the traditional agricultural sector, which grows more slowly. This has led to an uneven distribution of income among regions.

In addition, inequality is also influenced by disparities in natural resources, geographical conditions, and the concentration of industry in specific regions. The impact of the COVID-19 pandemic at the beginning of the period further exacerbated the situation, as many people lost their jobs. At the same time, economic recovery has not been evenly distributed across all regions.

On the other hand, disparities between urban and rural areas, along with the dominance of the informal sector, have further widened the gap. Incomes in urban areas tend to be higher but unevenly distributed, whereas in rural areas they are more evenly distributed but relatively low. Overall, economic growth in Central Sulawesi has not yet been fully inclusive, so its benefits have not been felt equally by the entire population.

A comparison of the Williamson Index values for the Western region, the Eastern region, and Central Sulawesi as a whole reveals differences in the levels of development inequality across regions. This situation indicates that the processes of development and economic growth in each region have not proceeded evenly. The following table presents the results of the Williamson Index calculations for the Eastern and Western regions, as well as all districts/cities in Central Sulawesi.

Table 2. The average value of the Williamson Index in the western region, the eastern region, and the entire province of Central Sulawesi

No	The Williamson Index	Western Region	Eastern Region	The entire region
(1)	(2)	(3)	(4)	(5)
1	Average Score	0.30	1.32	1.44

Based on the results of the Williamson Index calculation, the Eastern region shows a higher level of development inequality than the Western region, at 1.32, while the overall IW value for Central Sulawesi, at 1.44, indicates an accumulation of disparities between regions. The concentration of industry and mining influences the high level of inequality in the Eastern region. In contrast, the Western region tends to have a more even distribution of economic activity across the trade, agriculture, and fisheries sectors. Thus, the difference in these IW values indicates that development patterns between regions in Central Sulawesi remain imbalanced.

CONCLUSIONS AND RECOMMENDATIONS

Based on the discussion above, the researcher concludes that inter-regional inequality in the western region of Central Sulawesi is low or more equitable, with an average Williamson index value of 0.31; inter-regional inequality in the eastern region of Central Sulawesi is very high, with an average Williamson index value of 1.32; Overall inequality among districts/cities in Central Sulawesi Province is very high, with an average Williamson index value of 1.44.

Recommendations

The government needs to ensure equitable infrastructure development, including the construction of connecting roads and ports, as well as improved access to electricity, clean water, and telecommunications networks, to strengthen connectivity between districts so that economic distribution is more equitable; there is a need for more equitable investment distribution and to encourage investment not only to be concentrated in the western region (such as Palu City) but also in the eastern region; there must be a strengthening of regional flagship sectors; for the eastern region, the mining, fisheries, and maritime sectors should be optimized. For the western region, continue strengthening the trade and services sectors, and there is a need to develop downstream processing so that the region can enjoy the added value, not just raw materials.

FURTHER STUDY

Further research is recommended to examine this study using more detailed analytical methods, combining the Williamson Index, the Theil Entropy Index, and Klassen's typology.

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