

## ANALYSIS OF FOOD SECURITY DISPARITIES IN CENTRAL JAVA: CHALLENGES AND OPPORTUNITIES FOR SUSTAINABLE DEVELOPMENT

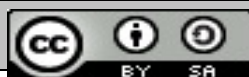
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### ABSTRACT

*The purpose of this study is to examine the degree of GDP inequality between Central Java Province's districts and cities. This study's methodology is the Theil Index, which uses secondary data from GDP based on relevant prices for the business sector in 2024 that were obtained from the Central Statistics Agency (BPS). According to the study's findings, the degree of inequality in Central Java Province is indicated by the Theil Index, which has a value of 0.837, or nearly 1. This value shows that there is an uneven distribution of GDP between regions, with Semarang City having the highest GDP at 208,797 and Magelang City having the lowest at 7,690. Although there are still disparities or inequality between districts or cities due to variations in the GDP distribution process between Central Java regions, this indicates that the amount of disparity in the region is comparatively low. The processing industry sector is the largest contributor to Central Java's GDP, while other services are the least significant contributor.*

### KEYWORDS

Disparity, GDP, Food Security, Farmer



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## INTRODUCTION

One of the primary objectives of development is the equitable economic growth of every region. In actuality, Indonesia's economic development rate is uneven throughout its many regions. Due to regional variations in economic capacity, the development of inequalities and inequality affects the fair distribution of people's welfare. There are 35 districts and cities in the province of Central Java. One of Indonesia's provinces with significant economic potential is Central Java Province. According to (Juniarsih, 2021), the Gross Regional Domestic Product (GDP) serves as a reference for planning and decision-making as well as a means of determining if government actions are successful in employing or utilising available resources. The government needs the right steps in

utilizing resources by dividing several sectors to support, manage, and run a business to support the GDP. With a total population of 38,233,933 thousand, Central Java Province is one of Indonesia's most populous provinces. Central Java has a total GDP based on the prevailing price according to employment in the 1st quarter of 2025 of 471,491.23 billion rupiah. There are several sectors that support GDP, namely the agricultural sector, mining sector, processing industry sector, transportation sector, construction sector, trade sector, and many more. Economic activities in Central Java tend to focus on big cities, while in other regions they still rely on economic activities that are still simple and available. This condition causes differences in the contribution of GDP per capita between districts/cities in Central Java.

Events that often occur in economic development in a region or region are called disparities, which are the main problems in all development problems and are the main goal in determining development policies of a country (Sayifullah, 2021). Disparities are known to determine the determination of a country's development policies, and this measurement is important to identify the extent of differences in the level of welfare between regions in Central Java. The success of the development of a country or region is shown from economic growth, high growth results in income inequality. According to Khoirudin & Musta'in, (2020) states that the increasing income inequality results in an unequal income received by the community, inequality of opinion is a description of the level of income equity of people in a region or region in a certain period. This study aims to determine the conditions of economic inequality and inequality in Central Java. Looking at the level of disparity in Central Java Province using the Theil Index analysis and in identifying the inequality of contribution from each region.

Disparities, which are the primary issue in all development issues and the primary objective in deciding on a country's development policies, are events that frequently occur in the economic growth of a region or regions (Sayifullah, 2021). It is well recognised that disparities influence a nation's development plans, and this metric is crucial for determining how much the welfare levels of Central Javan regions vary from one another. Economic growth indicates how well a nation or region is developing; rapid growth leads to income inequality. Inequality of opinion is a description of the degree of economic equity of people in a region or regions in a specific period, and Khoirudin & Musta'in, (2020) claim that rising income inequality leads to an uneven income received by the community. The purpose of this study is to ascertain the state of inequality and economic disparity in Central Java. Using the Theil Index study, we examine the degree of inequality in Central Java Province and determine the gap in contributions from each region.

## RESEARCH METHOD

This study makes use of secondary data from outside sources via journals and other accessible sources, in addition to data obtained by methodical documentation or quotations from relevant sources. The Central Statistics Agency (BPS) of Central Java as well as Central Javan districts or cities provided secondary data for this study. GDP statistics based on Applicable Prices by Business Field in 2024 is the main topic of the investigation. The calculation method used is the Theil Index.

### 1. Theil Index

According to Sirtama, (2021) states that the Theil Entropy index is used to identify the measurement of economic inequality or inequality of a region, as well as provide an overview of GDP data to show the magnitude of inequality in the economic development of a region. The formula of the Theil Entori Index is:

$$I(y) = \sum (Y_j/Y) \times \log\{(Y_j/Y)/(X_j/X)\}$$

Keterangan :

- IET* = Theil Entropy Index  
*Y<sub>j</sub>* = GDP Per Capita of each Regency/City in Central Java Province  
*Y* = Average Per Capita GRDP of all Regencies/Cities in Central Java Province  
*X<sub>j</sub>* = Population of Each Regency/City in Central Java Province  
*X* = Number of Population in Central Java Province

- If the results of the Theil Index show that the value of the number is close to 0, then the inequality of opinion is small
- If the results of the Theil Index show that the value of the numbers is close, then the inequality of opinion is high

## RESULT AND DISCUSSION

The purpose of this study is to determine the level of disparity or inequality, as well as identify the contribution of each region to total inequality using the Theil Index. Measurements were carried out from 35 districts or cities in Central Java Province using Gross Domestic Product (GDP) data on the basis of applicable prices according to employment.

### 1. Theil Index

Table 1 Results of Theil Index Data Processing Between Sectors

Sector	Sum	Row
Agriculture Sector	236.883,11	0,290144309
Mining Sector	39.211,80	0,094581707
Processing Industry		0,365895136
Sector	616.195,96	
Electricity and Gas Sector	1.676,02	0,007530431
Construction Sector	207.039	0,271993176
Trade Sector	245.177,13	0,294733624
Hotel Sector	64.731,12	0,134717949
Transport Sector	74.443,94	0,14806226
Other Service Sectors	29.586,58	0,076865683
<b>Total</b>	<b>1.514.944,66</b>	<b>1,684524274</b>
<b>Theil Index</b>		<b>0,766660036</b>

Source: Results of the Calculation of the Theil Sector Index in Central Java Province, 2025

Based on table 1, the index results in each sector that contributes to Central Java's GDP of 0.766, this shows a numerical value that is close to 1, so that each sector contributes unevenly. The sector that has the highest contribution is the processing industry amounting to 616,195.96 with a value of *Rij* 0.365 and contributing 41%. The sector that contributed the least was electricity and gas with a total of 1,676.02 with a value of *Rij* 0.0075. The economy of Central Java is dominated by the processing industry sector, this is due to manufacturing activities such as textiles, clothing, furniture, and in terms of food and beverage products which are the main drivers of economic growth in Central Java. Meanwhile, the low contribution of the electricity and gas sector shows the limitations of support in the use of energy and infrastructure compared to other sectors.

Inequality of contribution between sectors in Central Java has a variety of natural and economic potentials, but economic development still relies on certain sectors, so it needs to be developed from other sectors such as agriculture, fisheries, trade, and tourism. Central Java as a large province must be able to meet food security in all regions, not only

meeting the food needs of the people of Central Java but also playing a role as one of the national rice buffer countries. According to Prabayanti *et al.*, (2022) stated that 29 districts and 6 cities in Central Java produce rice, thus making Central Java one of the rice buffer provinces. The increasing population of Central Java has resulted in an increase in rice consumption, making it a challenge for Central Java in realizing food security.

Table 2 Results of Theil Index Data Processing Inter-Regency/City

Regency/City	$X_{ij}$	$R_{ij}$
Cilacap	123.770,55	0,32138332
Banyumas	59.871,46	0,203134793
Purbalingga	28.569,94	0,108882684
Banjarnegara	23.857,79	0,094930161
Kebumen	30.903,78	0,118741165
Purworejo	18.543,26	0,076838463
Wonosobo	20.908,76	0,084324741
Magelang	35.665,37	0,126590179
Boyolali	39.133,98	0,141223174
Klaten	45.365,87	0,156059956
Sukoharjo	40.293,96	0,139994471
Wonogiri	33.531,83	0,125616354
Karanganyar	44.848,13	0,150958587
Sragen	46.044,33	0,157297157
Grobogan	30.711,11	0,117049594
Blora	28.089,65	0,109814033
Rembang	21.374,93	0,087043745
Pati	49.707,65	0,170463078
Kudus	120.844,91	0,265502599
Jepara	33.957,67	0,125571808
Demak	30.275,34	0,113091133
Semarang	53.727,00	0,175903955
Temanggung	24.692,22	0,095769382
Kendal	51.877,52	0,171187343
Batang	26.152,19	0,100907778
Pekalongan	24.934,35	0,098758591
Pemalang	29.138,44	0,111777974
Tegal	40.595,91	0,145063364
Brebes	21.442,15	0,083437481
Magelang City	7.690,39	0,036401611
Surakarta City	42.551,84	0,144157444
Salatiga City	13.810,36	0,058389034
Semarang City	208.797,15	0,481626865
Pekalongan City	11.419,46	0,050949645
Tegal City	16.012,26	0,067206375
<b>Total</b>	<b>1.479.111,51</b>	<b>4,816</b>
<b>Theil Index</b>		<b>0,837</b>

Source: Theil Index Calculation Results in Central Java Province, 2025

Based on table 2 regarding the results of Theil index data processing, Central Java Province in 2024 will be at 0.837, showing that regional inequality between districts/cities in Central Java province is very high, shown by the theil index value close to 1, which indicates that economic conditions in districts/cities in Central Java province are uneven and there is high inequality. This Central Java has regional inequality between districts/cities, due to several factors that cause differences in income from a region. Economy, industrial level, different quality of human resources underlie the balance between districts/cities, urban areas have more income potential because economic activities are more modern, trade and industrial centers, but in rural areas still depend on

traditional processes in terms of agricultural processes so that added value is relatively lower.

On table 2, It demonstrates that the highest number of *Xij* is Semarang City of 208,797.15 and the number of *Rij* is 0.481626865. Semarang City is the capital of Central Java Province, so it is the center of government, trade, and services. According to Rahmadhani & Achdiani, (2024) states that the economy, trade, city instructors, education, and tourism in Semarang City are growing rapidly. The rapid development in Semarang City has increased economic activity from various sectors that make significant contributions to the city's GDP. The city of Semarang has a port called Tanjung Emas port, making Central Java's main logistics transportation place from Semarang City so that activities are faster and more effective in the process of distributing goods or services. According to Putri & Wahyuningsih, (2024) states that the largest and most active port throughout the day in Indonesia is Tanjung Emas Port. The existence of a strategic port not only facilitates domestic or international trade flows, but also increases the economic growth of Semarang City.

On table 2, It demonstrates that the lowest number of *Xij* is Magelang City 7,690.39 and the number of *Rij* is 0.036401611. Magelang City is one of the cities with the smallest area in Central Java at 18.12 km<sup>2</sup>. The condition of small cities limits the space for large-scale economic development, so that economic activities are more dominated by the service sector, local swords, and tourism. According to Febrianti & Sarfiah, (2022) stated that one of the leading sectors that is good to be developed is the electricity and gas doubling sector, transportation, and other services in Magelang City. Magelang City has limitations from large-scale industries and infrastructure, so that the increase in Magelang City's income runs slower than Semarang City which is the center of the city. This resulted in Magelang City making a low contribution in Central Java Province. The difference in the level of contribution to GDP between each region is high and low shows that the level of the economy is uneven in each region in Central Java. Based on a report by Bappenas (2020), the concentration of economic growth on the island of Java and its surrounding areas continues to widen the gap between the Western and Eastern regions of Indonesia. This is coupled with limited access to infrastructure, which hinders economic growth in more remote areas. This suggests that this inequality is even more pronounced, with the Williamson Index describing inequality getting higher and higher year after year. At the global level, it emphasizes the importance of overcoming inequality by improving connectivity and the quality of human resources in underdeveloped regions in order to create more inclusive development (Rozaki, 2021).

## CONCLUSION

The conclusion in this study is that the Theil Index results that Central Java Province in 2024 will be at 0.837, showing that regional inequality between districts/cities in Central Java province is very high, shown by a theil index value close to 1, which indicates that economic conditions in districts/cities in Central Java province are uneven. Central Java has regional inequality between districts/cities, due to several factors that cause differences in income from a region, with inequality between Semarang City with the highest score and Magelang City with the lowest score. Central Java has the sectors that contribute to GDP with the sectors that contribute the highest are the processing industry sector and the lowest sectors are electricity and gas

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