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Analysis Of Regional Development Inequality In East Java Province: A Klassen Typology And Theil Index Approach

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Abstract

Regional development inequality remains one of the main issues in East Java Province, despite the province being the second-largest contributor to the national economy. Previous studies generally employed a single analytical approach or had limited spatial and temporal coverage, thus failing to comprehensively capture the dynamics of development inequality. This study aims to analyze regional classification using the Klassen Typology, measure the level of development inequality using the Theil Index, and examine the contributions of between-group and within-group components through Theil Index decomposition. The research adopts a descriptive quantitative approach using secondary data from 38 regencies/cities in East Java Province over the period 2000–2025. The results indicate that most regencies/cities fall into Quadrant IV, while Surabaya City, Malang City, and Gresik Regency consistently remain in Quadrant I. The Theil Index value decreased from 0.1555 to 0.1353, and then increased to 0.1446. The decomposition of the Theil Index shows that the between-group component contributes more significantly than the within-group component. These findings suggest that development inequality in East Java Province is more strongly influenced by differences in characteristics between regional groups, implying the need for policies oriented toward more equitable development.

Keywords: development inequality, Klassen Typology, Theil Index, Theil Index decomposition, East Java Province

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INTRODUCTION

Economic development is a process aimed at improving societal welfare through sustainable economic growth and the equitable distribution of development outcomes. The success of development is not only measured by increases in regional income but also by the ability to reduce disparities in development across regions. According to Todaro & Smith (2017), economic development is a multidimensional process that encompasses changes in economic, social, and institutional structures to enhance the quality of life of the population. However, each region possesses different characteristics in terms of resources, infrastructure, and economic capacity, resulting in uneven levels of development. This condition causes regional development inequality to remain one of the main issues in regional development planning.

East Java Province is one of the largest contributors to the national economy. Based on data from Statistics Indonesia, East Java has consistently been the second-largest contributor to Gross Domestic Product (GDP) in Indonesia after DKI Jakarta. Nevertheless, economic activities in this province are still concentrated in the Gerbangkertosusila area, particularly in Surabaya City, Gresik Regency, and Sidoarjo Regency, which have developed as centers of industry, trade, and services. On the other hand, most regencies in the southern region and Madura Island still exhibit relatively low levels of economic development. This condition indicates that economic growth has not been fully accompanied by equitable development across regencies/cities in East Java Province (Badan Pusat Statistik, 2024).

Various studies on development inequality in East Java Province have been conducted using different approaches. Septiani & Endang (2022) analyzed development inequality using the Klassen Typology and Williamson Index to identify regional development levels. Nilasari & Febrianti (2025) examined the determinants of income inequality using panel data regression, while Majiid & Woyanti (2023) combined the Klassen Typology and Theil Index in the Kedungsepur region. Although these studies provide an overview of development inequality conditions, they still have limitations due to relatively restricted study areas or observation periods. Therefore, the dynamics of development inequality across all regencies/cities in East Java Province over the long term still require more comprehensive analysis.

Based on the above discussion, there remains a research gap in studies on regional development inequality in East Java Province. Previous studies generally employed only a single analytical approach or did not identify the main sources of

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inequality through Theil Index decomposition. This study combines the Klassen Typology with Theil Index decomposition to analyze the dynamics of development inequality across all 38 regencies/cities in East Java Province during the period 2000–2025. This approach is expected to provide an overview of regional development classification while also identifying the contributions of between-group and within-group inequality to total development inequality. Therefore, this study is expected to offer empirical contributions as a basis for formulating more equitable development policies in East Java Province.

LITERATURE REVIEW

Economic Development

Economic development is a continuous process aimed at improving societal welfare through changes in economic, social, and institutional aspects. In its early development, economic development was often associated with increases in Gross Domestic Product (GDP) or national income. However, this perspective has evolved, as increases in economic output do not necessarily reflect an equitable distribution of welfare. Todaro and Smith (2017) explain that economic development is a multidimensional process that includes changes in social structures, national institutions, and public attitudes, accompanied by economic growth, inequality reduction, and poverty alleviation. This concept indicates that the success of development is not solely measured by high economic growth, but also by its ability to create welfare that is more evenly distributed.

Todaro and Smith (2017) further identify three core values of economic development: sustenance, self-esteem, and freedom. Sustenance refers to the ability of individuals to meet basic needs such as food, clothing, shelter, health, and security. Self-esteem reflects a condition in which individuals possess dignity and are respected as human beings, while freedom refers to the ability of individuals to make life choices without being constrained by poverty, ignorance, or other limitations. These three values emphasize that economic development is not only oriented toward income growth but also toward improving the overall quality of life.

The evolution of development concepts has increasingly placed human beings at the center of the development process. Sen (1999) views development as the expansion of individual freedoms, suggesting that welfare should not be measured solely by income levels but also by access to education, healthcare, and economic opportunities. High economic growth does not necessarily indicate successful development if its benefits

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remain concentrated in certain groups or regions. This condition highlights that equitable distribution of development outcomes is an integral part of improving societal welfare.

Economic Growth Theory

Economic growth is one of the key indicators used to assess the economic development of a region. It is reflected in the increase of Gross Domestic Product (GDP) or Gross Regional Domestic Product (GRDP), which indicates a rise in the production of goods and services over a certain period. According to Sukirno (2010), economic growth is defined as the development of economic activities characterized by an increase in production capacity, which in turn improves societal welfare. In contrast to economic development, which encompasses structural changes and equitable distribution of welfare, economic growth focuses more on the quantitative increase in output. Arsyad (2016) also explains that economic growth merely reflects an increase in output without considering changes in economic structure or income distribution.

Economic growth is influenced by various interrelated factors, including natural resources, human resources, capital accumulation, investment, and technological progress. Todaro and Smith (2017) argue that optimal utilization of resources, improvement in labor quality, and sustainable investment can enhance a region's production capacity. Technological advancement also plays a crucial role in improving efficiency and productivity, resulting in higher output levels. In the context of regional development, economic growth is generally measured using GDP or GRDP at constant prices, as it reflects real output changes without being affected by inflation. This indicator serves as a fundamental basis for evaluating the economic performance of a region over time.

Regional Economics

Regional economics is a branch of economics that studies economic activities based on spatial or regional dimensions. Unlike conventional economics, which tends to overlook location aspects, regional economics emphasizes regional characteristics as key factors influencing development and economic growth. Tarigan (2014) explains that economic activities always occur within specific spaces characterized by different geographical conditions, resources, and economic structures. These differences result in varying capacities among regions to generate economic growth. The study of regional economics is therefore essential in explaining why economic development differs across regions.

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The scope of regional economics includes the analysis of regional economic structures, regional growth, distribution of production factors, and economic interactions among regions. Sjafrizal (2018) states that regional economics examines economic issues at the provincial, regency, and city levels as a basis for formulating regional development policies. This analysis not only considers economic activities within a region but also interregional linkages through flows of capital, labor, technology, and trade. Differences in the distribution of these production factors influence variations in economic development levels across regions. Understanding these conditions is necessary to ensure that development policies align with the characteristics and potentials of each region.

In regional economic studies, several theories are used to explain the processes of regional growth and development, including the Economic Base Theory, Growth Pole Theory, and Cumulative Causation Theory. These theories suggest that economic growth does not occur evenly but tends to be concentrated in regions with leading sectors, high investment, and strong economic linkages with other regions. This condition causes some regions to develop faster than others, resulting in regional development inequality. These concepts provide a theoretical foundation for understanding the dynamics of regional development, including inequality in East Java Province.

Regional Development Inequality

Regional development inequality refers to a condition in which the level of economic development across regions is uneven due to differences in geographical characteristics, socio-economic conditions, and resource availability. Sjafrizal (2018) defines regional inequality as differences in development levels and economic activities between regions, which can be observed through indicators such as per capita income, infrastructure, poverty levels, and human resource quality. Tarigan (2014) adds that inequality arises because each region has different potentials and capacities to utilize available resources. Meanwhile, Kuncoro (2019) views inequality as a consequence of the development process, particularly when economic activities are initially concentrated in regions with comparative advantages. If this condition persists, it may lead to various social and economic problems, such as uncontrolled urbanization, welfare disparities, and weakening development equity.

The dynamics of regional inequality can be explained through the concepts of convergence and divergence. Convergence theory, rooted in neoclassical growth

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theory, suggests that less developed regions have the potential to grow faster and gradually catch up with more developed regions. In contrast, divergence theory explains that developed regions tend to maintain or even expand their advantages due to their greater ability to attract investment, labor, and technological progress. According to Sjafrizal (2018), both convergence and divergence processes are influenced by regional characteristics, the mobility of production factors, and development policies. Tarigan (2014) also explains that these processes may occur simultaneously, meaning that the direction of regional development depends on the effectiveness of policies aimed at promoting equitable growth.

The phenomenon of regional development inequality is also explained through Growth Pole Theory and Cumulative Causation Theory. François Perroux argued that economic growth tends to concentrate in regions with leading sectors, forming growth centers that can stimulate development in surrounding areas. On the other hand, Gunnar Myrdal explained that development processes may generate a backwash effect, where investment, labor, and economic activities become concentrated in more developed regions, while less developed regions lose some of their resources. Although there is also a spread effect that allows development benefits to diffuse to surrounding areas, its impact is often weaker than the backwash effect, causing inequality to persist. These theories provide a foundation for explaining differences in development levels across regencies/cities, which will be analyzed in this study.

METHOD

This study employs a descriptive quantitative approach to describe the condition of regional development inequality in East Java Province based on available data. The quantitative approach is selected because the study utilizes numerical data to analyze phenomena within a specific population, while the descriptive approach is used to portray the condition of development inequality without examining causal relationships between variables. The study area covers all regencies/cities in East Java Province, consisting of 29 regencies and 9 cities. The observation period spans from 2000 to 2025, which is divided into three sub-periods: the early decentralization period (2000–2010), the infrastructure development and pandemic period (2011–2020), and the post-pandemic recovery period (2021–2025).

The data used are secondary quantitative data obtained from publications of Statistics Indonesia (BPS) and BPS East Java Province, including East Java in Figures and Gross Regional Domestic Product (GRDP) of Regencies/Cities in East Java. The

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variables in this study include Gross Regional Domestic Product (GRDP) at constant prices, GRDP per capita, economic growth rate, population, and regional development inequality. This study applies a total sampling method, where all 38 regencies/cities are used as units of analysis due to the completeness of their data throughout the study period.

Data analysis is conducted using two methods: Klassen Typology and the Theil Index. Klassen Typology is used to classify regencies/cities based on their economic growth rates and GRDP per capita relative to the average of East Java Province. Meanwhile, the Theil Index is used to measure the level of development inequality across regions. To identify the main sources of inequality, the Theil Index is further decomposed into between-group and within-group components based on the results of the Klassen Typology classification.

Klassen Typology Analysis

Klassen Typology analysis is used to compare the economic condition of each regency/city with the average of East Java Province as the reference region. The classification is based on two main indicators: economic growth rate and GRDP per capita. The results of the analysis group each region into four quadrants representing different levels of regional economic development.

Table 1. Klassen Typology Quadrants

GRDP per Capita (Y) / Growth Rate (r)	Y1>Y	Y1<Y
R1>r	Advanced and Rapidly Growing Region	Rapidly Developing Region
R1<r	Advanced but Stagnant Region	Relatively Underdeveloped Region

Source: Sjafrizal (2018)

Quadrant I represents regions with both economic growth rate and GRDP per capita above the provincial average, categorized as advanced and rapidly growing regions. Quadrant II consists of regions with above-average GRDP per capita but below-

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average economic growth. Quadrant III represents regions with high economic growth but below-average GRDP per capita. Meanwhile, Quadrant IV includes regions with both economic growth rate and GRDP per capita below

Theil Index Analysis

The Theil Index is used to measure the level of development inequality among regencies/cities in East Java Province. The calculation compares the proportion of GRDP and population of each region to the provincial total, allowing for a more representative measurement of inequality. A Theil Index value closer to zero indicates a more equal distribution of development, while a higher value indicates greater inequality. The Theil Index is calculated using the following equation:

$$T = \sum_{i=1}^{n} \left(\frac{Y_i}{Y}\right) \log\left(\frac{Y_i/Y}{P_i/P}\right)$$

T = Theil Index
Yi = GRDP of region i
Y = total GRDP of East Java Province
Pi = population of region i
P = total population of East Java Province

The calculation is conducted for each study period (2000–2010, 2011–2020, and 2021–2025). A value closer to zero indicates lower inequality, whereas a higher value indicates greater development inequality.

Theil Index Decomposition

To identify the main sources of regional development inequality, the Theil Index is further decomposed into two components: between-group inequality and within-group inequality. In this study, regional grouping is based on the results of the Klassen Typology classification, enabling the identification of whether inequality is primarily driven by differences between regional groups or by variations within each group. The decomposition of the Theil Index is generally expressed as follows:

$$T = T_w + T_b$$

T = total Theil Index
Tb = between-group inequality
Tw = within-group inequality

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Between-group inequality is used to measure differences in the average level of development between regional groups. In this study, regional groups are formed based on the Klassen Typology classification. The calculation of between-group inequality is expressed as:

$$T_b = \sum_{g=1}^{G} \left(\frac{Y_g}{Y}\right) \log\left(\frac{Y_g/Y}{P_g/P}\right)$$

Tb = between-group inequality
Yg = total GRDP of group g
Y = total GRDP
Pg = population of group g
P = total population
G = number of regional groups

Meanwhile, within-group inequality is used to measure variations in development levels within each regional group. The calculation is expressed as:

$$T_w = \sum_{g=1}^{G} \left(\frac{Y_g}{Y}\right) T_g$$

Tw = within-group inequality
Tg= Theil Index of group g
Yg = total GRDP of group g
Y = total GRDP

The results of the decomposition are used to identify the main sources of regional development inequality in East Java Province. If the value of Tw is greater than Tb, inequality is more dominant within groups. Conversely, if Tb is greater than Tw, inequality is primarily driven by differences between regional groups (Akita et al., 1999).

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RESULTS

Klassen Typology Analysis Results

The Klassen Typology analysis was conducted by comparing the economic growth rate and GRDP per capita of each of the 38 regencies/cities with the provincial average of East Java. The analysis was performed over three observation periods: 2000–2010, 2011–2020, and 2021–2025. The results indicate that regencies/cities in East Java Province are distributed across four quadrants, with compositions that change in each observation period. A summary of the number of regencies/cities in each quadrant is presented in Table 2.

Table 2. Number of Regencies/Cities by Klassen Typology in East Java Province, 2000–2025

Quadrants	2000-2010	2011-2020	2021-2025
I – Advanced and Rapidly Growing	3	8	8
II – Advanced but Stagnant	7	3	2
III – Rapidly Growing	8	5	7
IV – Relatively Underdeveloped	20	22	21
Total	38	38	38

Source: Processed data, 2026.

Based on Table 2, the number of regions in Quadrant I increased from three regencies/cities in 2000–2010 to eight in 2011–2020 and remained stable in 2021–2025. In contrast, the number of regions in Quadrant II declined from seven to two by the end of the study period. Quadrant III shows fluctuating changes, while Quadrant IV consistently represents the group with the largest number of regencies/cities across all three periods. This indicates that most regencies/cities in East Java Province are still classified as relatively underdeveloped based on the Klassen Typology.

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Table 3. Classification of 38 Regencies/Cities in East Java Province, 2000–2025 Based on Klassen Typology

Regency/City	2000-2010	2011-2020	2021-2025
Pacitan Regency	IV	IV	IV
Ponorogo Regency	IV	IV	IV
Trenggalek Regency	IV	IV	IV
Tulungagung Regency	III	IV	III
Blitar Regency	IV	IV	IV
Kediri Regency	IV	IV	IV
Malang Regency	II	II	III
Lumajang Regency	IV	IV	IV
Jember Regency	IV	IV	IV
Banyuwangi Regency	II	I	IV
Bondowoso Regency	IV	IV	IV
Situbondo Regency	IV	IV	IV
Probolinggo Regency	IV	IV	IV
Pasuruan Regency	IV	I	I
Sidoarjo Regency	II	I	I
Mojokerto Regency	IV	I	I
Jombang Regency	IV	IV	III
Nganjuk Regency	III	IV	IV
Madiun Regency	IV	IV	IV
Magetan Regency	IV	IV	IV
Ngawi Regency	IV	IV	IV
Bojonegoro Regency	III	I	II

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Regency/City	2000-2010	2011-2020	2021-2025
Tuban Regency	III	IV	III
Lamongan Regency	IV	III	IV
Gresik Regency	I	I	I
Bangkalan Regency	IV	IV	IV
Sampang Regency	IV	IV	IV
Pamekasan Regency	IV	IV	IV
Sumenep Regency	II	II	IV
Kediri City	II	II	II
Blitar City	III	III	III
Malang City	I	I	I
Probolinggo City	II	III	III
Pasuruan City	II	IV	III
Mojokerto City	III	IV	IV
Madiun City	III	III	I
Surabaya City	I	I	I
Batu City	III	III	I

Source: Processed data, 2026.

The classification of each regency/city across the three periods is presented in Table 3. Based on the results, Gresik Regency, Malang City, and Surabaya City consistently remain in Quadrant I throughout the study period. In contrast, several regions—including Pacitan, Ponorogo, Trenggalek, Blitar, Kediri, Lumajang, Jember, Bondowoso, Situbondo, Probolinggo, Madiun, Magetan, Ngawi, Bangkalan, Sampang, and Pamekasan—consistently fall into Quadrant IV. Additionally, several regencies/cities experience shifts between quadrants over time, indicating dynamic changes in economic growth and GRDP per capita across regions in East Java.

Theil Index Analysis Results

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The Theil Index is used to measure the level of development inequality among regencies/cities in East Java Province based on the proportion of GRDP and population in each region. The calculation is performed for the same three periods as the Klassen Typology analysis. The results are presented in Table 4.

Table 4. Total Theil Index of East Java Province, 2000–2025

Period	Theil Index (T)
2000-2010	0,1555
2011-2020	0,1353
2021-2025	0,1446

Source: Processed data, 2026.

Based on Table 4, the Theil Index shows variation across periods. It decreased from 0.1555 in 2000–2010 to 0.1353 in 2011–2020, and then increased to 0.1446 in 2021–2025. Although the value increased in the final period, it remains lower than in the initial period. These results indicate that development inequality in East Java Province fluctuated over the 2000–2025 period.

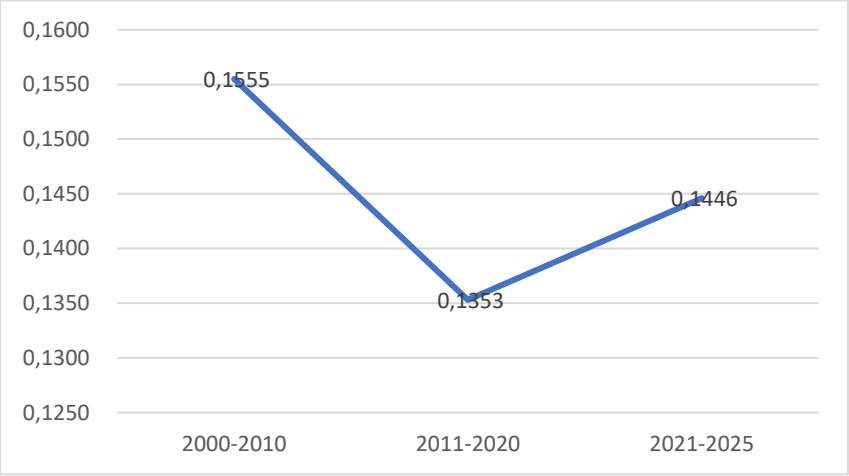


Figure 1. Trend Graph of Theil Index in East Java Province, 2000–2025

Figure 1 illustrates the trend of the Theil Index over time. The graph shows a declining trend during 2011–2020, followed by an increase in 2021–2025. Despite this

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increase, the level of inequality remains below its initial level, indicating that the pattern of development inequality in East Java has not been stable throughout the observation period.

Theil Index Decomposition Results

The sources of development inequality in East Java Province are further analyzed through Theil Index decomposition into between-group and within-group components. The grouping of regions is based on the results of the Klassen Typology classification. The decomposition results are presented in Table 5.

Table 5. Theil Index Decomposition in East Java Province, 2000–2025

Period	Tb	Tw	% Tb	% Tw
2000-2010	0,0936	0,0618	60,23%	39,77%
2011-2020	0,0720	0,0633	53,24%	46,76%
2021-2025	0,1079	0,0367	74,62%	25,38%

Source: Processed data, 2026.

Based on Table 5, the contribution of the between-group component (Tb) is consistently greater than that of the within-group component (Tw) across all periods. The contribution of between-group inequality declined from 60.23% in 2000–2010 to 53.24% in 2011–2020, then increased significantly to 74.62% in 2021–2025. In contrast, the contribution of within-group inequality increased from 39.77% to 46.76%, before declining to 25.38% in the final period. These results indicate that inequality between regional groups is more dominant than inequality within groups throughout the study period.

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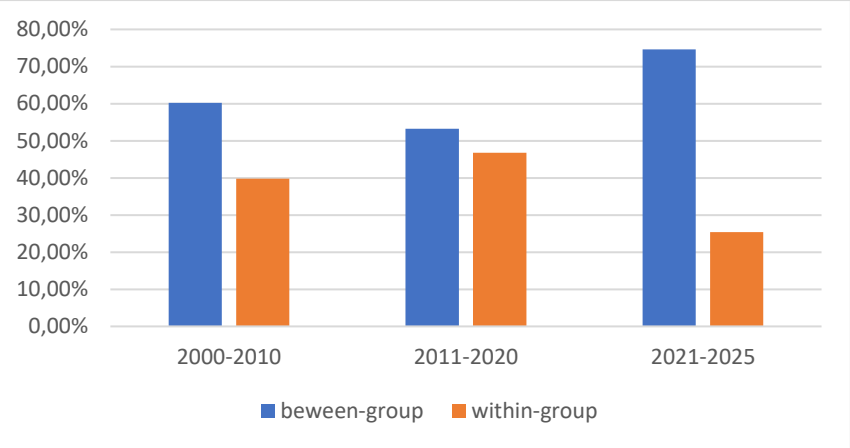


Figure 2. Proportion Graph of Between-Group and Within-Group in East Java Province, 2000–2025

Figure 2 illustrates the proportion of between-group and within-group contributions. The graph shows an increasing trend in between-group contribution in the final period, while the within-group contribution declines. This indicates that development inequality in East Java Province is more strongly influenced by differences in characteristics between regional groups rather than variations within the same group.

DISCUSSION

Discussion of Klassen Typology Analysis Results

The results of the Klassen Typology analysis indicate that the economic development of regencies/cities in East Java Province during the period 2000–2025 still shows disparities in development levels across regions. This is reflected in the changes in the number of regions within each quadrant across the three observation periods, although some regencies/cities consistently maintain their positions in the same quadrant. The increase in the number of regions in Quadrant I suggests an improvement in the level of economic development in several areas, while the dominance of Quadrant IV indicates that most regencies/cities are still classified as relatively underdeveloped regions. These findings suggest that the process of economic development in East Java Province has not yet fully achieved regional equity. This result is consistent with the findings of Al Majiid and Woyanti (2023) and Wahyuningtiyas et al. (2025), which state that regional economic development is influenced by differences in regional potential, economic structure, and each region's ability to utilize its resources.

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Gresik Regency, Malang City, and Surabaya City consistently remain in Quadrant I throughout the three observation periods. This indicates that these regions are able to maintain economic growth rates and GRDP per capita above the provincial average. This phenomenon aligns with Growth Pole Theory proposed by François Perroux, which suggests that economic growth tends to be concentrated in regions with leading sectors, adequate infrastructure, and strong economic linkages. Surabaya has developed as a center of trade and services, Gresik is supported by the manufacturing sector, and Malang has grown through education, services, and tourism sectors. These findings also support Tarigan (2014), who argues that growth centers tend to develop faster than other regions due to their stronger investment attractiveness and higher levels of economic activity.

In addition to regions consistently in Quadrant I, this study also finds that Kediri City remains in Quadrant II throughout the study period. This position indicates that the region has a GRDP per capita above the provincial average but experiences economic growth below the provincial average. This suggests that the region has achieved relatively high welfare levels but is experiencing slower economic growth compared to other developing regions. Meanwhile, Blitar City consistently falls into Quadrant III, indicating relatively high economic growth but GRDP per capita still below the provincial average, suggesting that additional time is needed to reach the welfare levels of more advanced regions. These findings indicate that high economic growth does not always directly translate into increased income levels.

Conversely, Pacitan, Ponorogo, Trenggalek, Blitar, Kediri, Lumajang, Jember, Bondowoso, Situbondo, Probolinggo, Madiun, Magetan, Ngawi, Bangkalan, Sampang, and Pamekasan Regencies consistently fall into Quadrant IV. This indicates that these regions still have economic growth rates and GRDP per capita below the provincial average. This phenomenon can be explained by Myrdal's Cumulative Causation Theory, which states that developed regions tend to continuously attract investment, labor, and economic activities (backwash effect), while less developed regions receive relatively smaller benefits from development (spread effect). As a result, disparities between regions may persist over time if not supported by effective equalization policies. These findings are also consistent with Sjafrizal (2018), who emphasizes that differences in economic potential, infrastructure quality, and human resource capacity are key factors contributing to regional inequality.

In addition to regions consistently occupying certain quadrants, several regencies/cities also experience shifts between quadrants over time. These shifts

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indicate that regional economic development is dynamic and influenced by changes in economic growth rates and GRDP per capita. From the perspective of convergence and divergence concepts, this condition suggests that some regions are beginning to approach the characteristics of more advanced areas, while others continue to lag behind. According to Tarigan (2014), convergence and divergence processes are influenced by a region's ability to attract investment, improve productivity, and utilize local economic potential. Therefore, these findings indicate that regional development in East Java still requires more targeted policies to ensure that economic growth is not only concentrated in growth centers but also contributes to improving welfare across all regions.

Discussion of Theil Index Analysis Results

The results of the Theil Index analysis show that development inequality among regencies/cities in East Java Province fluctuated during the period 2000–2025. The Theil Index decreased from 0.1555 in 2000–2010 to 0.1353 in 2011–2020, before increasing again to 0.1446 in 2021–2025. Although the index increased in the final period, it remains lower than in the initial period. This pattern indicates that efforts to achieve equitable development have contributed to reducing inequality during certain periods, but these improvements have not been sustained over time. These findings are consistent with Aulia and Sari (2025) and Al Majiid and Woyanti (2023), which suggest that regional disparities continue to evolve due to differences in regional economic growth dynamics.

From the perspective of convergence and divergence, the changes in the Theil Index indicate that the equalization process in East Java has not been consistent. The decline in the Theil Index during 2011–2020 suggests a convergence trend, where less developed regions begin to reduce disparities with more advanced regions. In contrast, the increase during 2021–2025 indicates a divergence trend, where disparities widen again due to differences in regional capacity to sustain economic growth. Tarigan (2014) explains that convergence and divergence may occur simultaneously depending on regional characteristics, factor mobility, and the effectiveness of development policies. These findings are also in line with Gunawan et al. (2026), who argue that a region's ability to utilize investment, improve productivity, and strengthen economic structure determines the direction of regional convergence or divergence.

The observed pattern of inequality can also be explained using the Regional Kuznets Hypothesis proposed by Williamson. This hypothesis suggests that regional inequality initially increases, reaches a turning point, and then declines as development

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becomes more evenly distributed. However, the pattern of Theil Index changes in East Java does not fully form an inverted U-curve, as inequality decreased during 2011–2020 but increased again in 2021–2025. This indicates that East Java has not yet reached the turning point toward sustained development equality. According to Sjafrizal (2018), inequality reduction requires broader investment distribution, improved regional connectivity, and effective government intervention to reduce economic concentration in specific areas.

The increase in the Theil Index during 2021–2025 also suggests uneven economic recovery across regions following the pandemic. Regions with stronger economic structures recover more quickly, while those dependent on low-productivity sectors experience slower recovery. These differences in recovery capacity contribute to rising inequality, even though the level remains below the initial period. This finding highlights that economic growth alone is insufficient to achieve equitable development without strengthening the economic capacity of lagging regions. Therefore, development policies should focus not only on growth but also on investment distribution, local economic development, human capital improvement, and interregional connectivity to support sustainable convergence.

Discussion of Theil Index Decomposition Results

The decomposition results of the Theil Index show that the between-group component consistently contributes more to inequality than the within-group component across all observation periods. The contribution of between-group inequality decreased from 60.23% in 2000–2010 to 53.24% in 2011–2020, before increasing significantly to 74.62% in 2021–2025. Meanwhile, the within-group contribution increased from 39.77% to 46.76%, then declined to 25.38% in the final period. These findings indicate that development inequality in East Java is more strongly influenced by differences between regional groups rather than variations within the same group. This result is consistent with Halim et al. (2025), who found that regional disparities are more influenced by inter-group differences than intra-group variations.

The dominance of between-group inequality suggests that disparities primarily occur between developed and underdeveloped regional groups. This is reflected in the consistent position of Gresik Regency, Malang City, and Surabaya City in Quadrant I, while most regencies in Quadrant IV maintain their positions throughout the study period. These findings indicate that differences in economic characteristics between regional groups remain the main drivers of inequality. This result aligns with the Economic Base

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Theory (Tarigan, 2014), which suggests that regions with strong base sectors grow faster due to their ability to generate external income flows. This condition is evident in the Gerbangkertosusila area, supported by manufacturing, trade, and service sectors, while regions in Madura and the southern coastal areas still rely on primary sectors with lower value-added.

The decomposition results also indicate that the third hypothesis in this study is rejected, as between-group inequality is proven to be more dominant than within-group inequality across all periods. This suggests that efforts to reduce inequality in East Java should not only focus on reducing disparities within groups but also on narrowing the gap between developed and underdeveloped regional groups. These findings reinforce the argument that differences in economic structure, base sectors, and development levels remain the primary drivers of regional inequality.

The implications of these findings suggest that development policies in East Java should focus on reducing inter-group disparities through more equitable investment distribution, development of local economic potential, improvement of infrastructure quality, and strengthening of regional base sectors according to local characteristics. This approach is expected to reduce the concentration of economic activity in developed regions while enhancing the competitiveness of lagging areas. In line with Todaro and Smith (2017), the success of development should not only be measured by economic growth but also by the ability to achieve equitable welfare and improve quality of life. Therefore, the results of the Theil Index decomposition provide empirical evidence that development policies in East Java should be more oriented toward inter-group equity to sustainably reduce regional inequality.

CONCLUSION

This study shows that development inequality among regencies/cities in East Java Province persisted during the period 2000–2025. The results of the Klassen Typology analysis indicate that most regencies/cities remain in Quadrant IV (relatively underdeveloped regions), although the number of regions in Quadrant I (advanced and rapidly growing regions) increased from three to eight regencies/cities. The results of the Theil Index analysis reveal that the level of development inequality fluctuated, decreasing from 0.1555 in 2000–2010 to 0.1353 in 2011–2020, before increasing again to 0.1446 in 2021–2025. Meanwhile, the decomposition of the Theil Index shows that between-group inequality contributes more significantly than within-group inequality across all observation periods. These findings indicate that differences in development

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levels between regional groups remain the primary source of development inequality in East Java Province.

The findings of this study imply that regional development policies need to be more strongly directed toward reducing disparities between regional groups through equitable investment distribution, strengthening regional leading sectors, improving infrastructure quality, and enhancing human resource development, particularly in relatively underdeveloped regions. This study has limitations, as it only employs Klassen Typology and the Theil Index as analytical tools and does not consider causal factors influencing development inequality. Future research is expected to combine inequality analysis with econometric or spatial analysis methods to provide a more comprehensive understanding of the factors affecting regional development inequality.

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