REGIONAL INEQUALITY IN JAVA: A SYSTEMATIC REVIEW OF THE LITERATURE ON INEQUALITY INDICES AND DETERMINANTS OF DEVELOPMENT

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Abstract
This study aims to systematically analyze the literature related to regional inequality in six provinces in Java. The study focused on the use of five inequality indicators: Gini Coefficient, Atkinson Index, Theil Index, Robin Hood Index, and Williamson Index. This study also explores the relationship between inequality and development factors such as Gross Regional Domestic Product (GDP), Per Capita Income (GDP), and Human Development Index (HDI). Using the Systematic Literature Review (SLR) approach which refers to the PRISMA protocol, as many as 25 articles from 2010–2024 were analyzed thematically. The findings show that increasing HDI significantly reduces inequality, while increasing PDRPC without fair distribution actually widens the gap. This article contributes to formulating regional development policy recommendations based on spatial justice and quality of life.

Keywords: *Regional Inequality, IPM, PDRPC, PDRB, Inequality Index, Systematic Literature Review.*

1. Introduction

Inclusive economic development is the main goal of various countries in the world, including Indonesia. However, rapid economic growth has not been able to effectively reduce income and regional inequality. According to the World Bank (2022), high inequality can slow long-term economic growth and weaken social cohesion. This phenomenon is also seen in Indonesia, especially on the island of Java which is the center of national economic activities.

Java contributes more than 58% to the national Gross Domestic Product (GDP), but there are quite striking regional disparities between provinces. Data from the Central Statistics Agency (BPS, 2023) shows that the poverty rate in provinces such as DI Yogyakarta and Banten is still relatively high compared to DKI Jakarta. This inequality is not only reflected in income, but also access to education, health, and infrastructure.

Various studies have highlighted regional inequality in Indonesia. For example, Lecca et al. (2023) show that skill mismatch between urban and rural areas contributes to income disparities. However, most of these studies are still limited to the use of inequality measurement instruments, predominantly using only one index such as the Gini Coefficient.

The research gap arises due to the lack of a comprehensive study that integrates several inequality measures simultaneously to analyze regional disparities, particularly in Java. In fact, each inequality index has characteristics and sensitivity to certain dimensions of inequality, as stated by Benedetti and Crezcenzi (2023).

On the theoretical side, most previous studies have used a single approach to analyzing inequality, which assumes that inequality can be represented by a single indicator. According to Adriana (2023), this single approach has the potential to ignore other dimensions of inequality that are spatial, sectoral, or structural. Therefore, there is a theoretical gap in the measurement of inequality that requires a multi-index approach.

The fundamental problem that wants to be studied in this study is how income and regional inequality in six provinces on the island of Java can be mapped more comprehensively using five inequality measurement instruments at once. It is important to understand inequality not only from one dimension, but from different aspects of income distribution and regional growth.

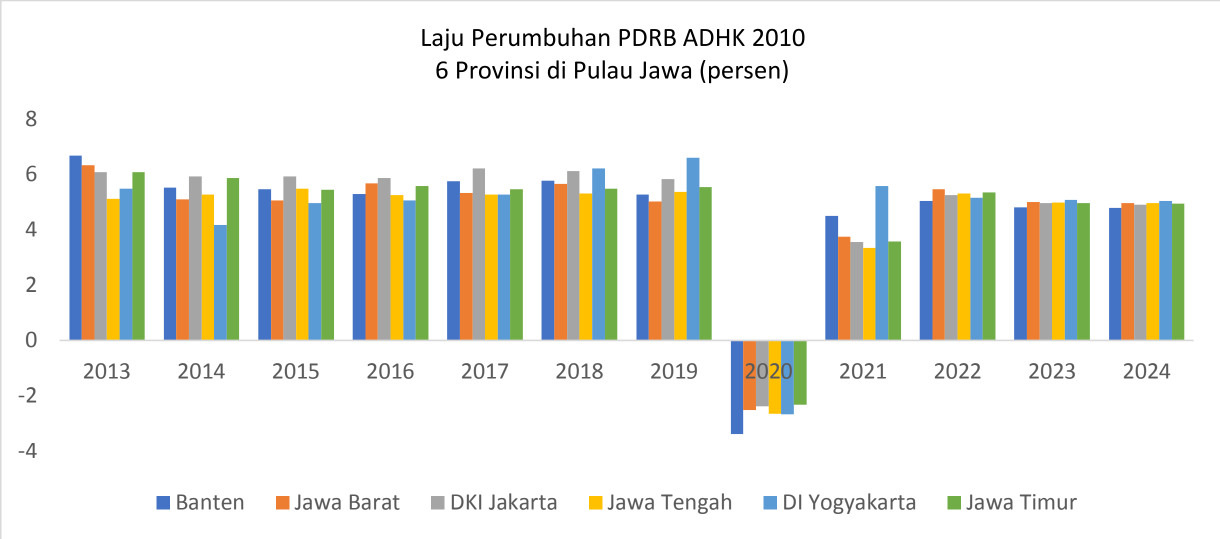
Furthermore, regional inequality on the island of Java not only has an impact on the local economy, but also poses social and political challenges. Development inequality has the potential to increase internal migration, exacerbate urbanization, and create social tensions between regions (Susetyo et al., 2022). Therefore, a deeper understanding of the factors of inequality is urgent. Methodologically, the Systematic Literature Review (SLR) approach was chosen because it can provide a broad theoretical and conceptual mapping, as well as identify patterns of findings from various previous studies. According to Kitchenham and Charters (2015), SLR is a systematic, transparent, and replicable method in examining evidence-based research questions.

Table 1. Data on the Growth Rate of the 2010 Dhaka GDP According to 6 Provinces of Ja

Year	6 Provinces on the island of Java					
	Banten	West Java	Jakarta	Central Java	IN Yogyakarta	East Java
2013	6.67	6.33	6.07	5.11	5.47	6.08
2014	5.51	5.09	5.91	5.27	4.17	5.86
2015	5.45	5.05	5.91	5.47	4.95	5.44
2016	5.28	5.66	5.87	5.25	5.05	5.57
2017	5.75	5.33	6.2	5.26	5.26	5.46
2018	5.77	5.65	6.11	5.3	6.2	5.47
2019	5.26	5.02	5.82	5.36	6.59	5.53
2020	-3.39	-2.52	-2.39	-2.65	-2.67	-2.33
2021	4.49	3.74	3.55	3.33	5.58	3.56
2022	5.03	5.45	5.25	5.31	5.15	5.34
2023	4.81	5	4.96	4.97	5.07	4.95
2024	4.79	4.95	4.9	4.95	5.03	4.93

Source: BPS Uploaded 2025

Table 1 explains that the 2010 ADHK GDP growth rate data in six provinces of Java Island showed a positive trend before 2020, followed by a sharp contraction due to the COVID-19 pandemic, and then gradually recovered until 2024. DKI Jakarta, Banten, and East Java recorded relatively high growth, while DI Yogyakarta showed the lowest growth rate during the period.



Source: Data Processed, 2025

The figure above illustrates the trend of the growth rate of Gross Regional Domestic Product (GDP) on the basis of constant prices 2010 (ADHK 2010) in six provinces on the island of Java, namely Banten, West Java, DKI Jakarta, Central Java, DI Yogyakarta, and East Java, during the period 2013 to 2024. In general, all provinces showed relatively stable and positive economic growth in the period 2013 to 2019, with figures ranging from 4% to 6%. In 2020, there was a sharp contraction across the provinces as indicated by negative growth figures, as a direct impact of the COVID-19 pandemic that paralyzed national and regional economic activities.

After 2020, growth trends began to show a gradual recovery across the region, with an uptick back to positive growth levels from 2021 to 2024. However, the pace of recovery shows variation between provinces. DKI Jakarta, Banten, and East Java tend to record higher growth than other provinces, indicating more resilient economic capacity. Meanwhile, DI Yogyakarta has consistently recorded a lower growth rate than other provinces, both before and after the pandemic, reflecting the limitations of the region's economic structure in responding to crises and recovering. This interprovincial variability indicates a regional disparity in the dynamics of economic growth on the island of Java, which is relevant to be further studied in the context of regional inequality and inclusive regional development policies.

Using the SLR approach and five inequality indices (Atkinson Index, Gini Coefficient, Robin Hood Index, Theil Index, and Williamson Index), this study is expected to be able to produce a more holistic analysis of inequality in Java. This is in line with the need for evidence-based policies to formulate a more equitable and sustainable regional development strategy.

The purpose of this study is to analyze income and regional inequality in six provinces in Java through a Systematic Literature Review approach based on five inequality indices, as well as identify the main factors influencing these disparities. In addition, this study aims to provide policy recommendations based on multi-index analysis of regional inequality.

2. Literature Review

2.1. Inequality Theory

According to Kuncoro (2006), inequality is a term that refers to the relatively same standard of living in society as a whole. This difference causes the level of development to vary in different places and regions. As a result, there are differences in well-being between these areas (Noor et al., 2010). The economy of a region often experiences inequality or disparity.

Different natural resources and demographic conditions in each region cause this to happen. With these differences, the ability of a region to encourage the development process is also different.

According to Fulgsang (2013), income inequality is most often associated with the macroeconomic conditions of a region. Non-economic factors include the demographics, environment, politics, and culture of the area. Douglas C. North created inequality between regions when he analyzed the Neoclassical Growth Theory. This theory suggests that the relationship between the level of national economic development of a country and development inequality between regions is predictable, and this hypothesis came to be known as the Neo-Classical Hypothesis.

Susetyo, et al (2022) said that inequality is a phenomenon that occurs in almost all levels of the world, whether poor countries, developing countries, or developed countries, it's just that the difference between them is the large level of inequality, so that inequality cannot be eliminated but can only be suppressed to the limit.

2.2 Growth of the Neoclassical Region

According to Sukirno (2005), the neoclassical growth theory was first proposed by Robert Solow and Trevor Swan. This theory argues that economic growth stems from the addition and development of factors that affect aggregate supply. Production factors and technological advances are the main determinants of growth. Developed regions will accumulate capital faster than other regions. Investment in underdeveloped regions will become more attractive and productive through labor migration, capital movements, and technology adoption.

2.3 Regional Economic Growth

Tarigan (2005) stated that regional economic growth is an increase in the income of the community as a whole in the region. Regional income describes the return for factors of production (land, capital, labor, technology) and also reflects regional prosperity. In addition, transfer-payments between regions also affect the amount of prosperity (Sapriadi and Hisbullah, 2015).

2.4 Regional Economic Development Theory

Nurul Huda (2015) explained that regional economic development is the process of managing local resources by the government and the community, in collaboration with the private sector to create jobs and encourage economic growth. The key to the success of development lies in strengthening local potential (endogenous development).

2.5 Basic Economic Theory

According to Lincolin Arsyad (2005), the economic base theory emphasizes that the economic growth of a region is determined by the amount of exports. Economic activity is divided into base (generating exports) and non-base (depending on local demand). The region will grow if it is able to serve external demand well. This theory is used to identify potential sectors and subsectors based on GDP. If potential sectors are developed optimally, it will have an impact on increasing regional income (Tarigan, 2015).

2.6 Per Capita Income

According to Sukirno (2004), per capita income is the average income of the population of a country in one year, calculated from the total regional income divided by the number of population. This income is used to measure welfare and development. According to Adji, Wahyu (2015), the benefits of per capita income include: First, State welfare indicators: showing prosperity that includes the number of population.; Second, the country's prosperity growth standard: as a tool of comparison between times.; Third, Economic policy guidelines: helping the government formulate data-driven policies. Comparator between countries: to group countries into low, medium, or high categories.

2.7 Human Development Index (HDI)

According to Todaro (2000), human development is more important than the wealth of natural resources. Investment in humans is able to increase productivity overall. According to UNDP, HDI is measured from: First, Longevity and health (health),; Second, Education (literacy, participation and average length of school), ; Economic ability (expenditure per capita), ; HDI is on a scale of 0–100 and shows the quality of development of an area.

2.8 Regional Disparities

Regional disparity is the difference in economic, social, infrastructure, and quality of life between regions. For example, differences in per capita income, unemployment rate, and access to basic services. According to Firdianisa & Asmara (2023), disparities make some regions lag behind compared to others. The Central Statistics Agency (2023) also noted that social inequality between regions often arises from an imbalance in access to public services, infrastructure, and education.

The analysis of panel data in this study was carried out using the Eviews 13 program.

3. Results and Discussion

3.1 OLS WATERS

Table 1: OLS Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PDRB	-0.009655	0.158088	-0.061076	0.9515
IPM	0.161789	0.128282	1.261199	0.2117
PDRPC	0.001166	0.000295	3.955422	0.0002
C	-5.729913	10.21529	-0.560916	0.5768

R-squared	0.254795	Mean dependent var	8.862714
Adjusted R-squared	0.220922	S.D. dependent var	3.376324
S.E. of regression	2.980126	Akaike info criterion	5.077253
Sum squared resid	586.1560	Schwarz criterion	5.205739
Log likelihood	-173.7039	Hannan-Quinn criter.	5.128289
F-statistic	7.522066	Durbin-Watson stat	0.079917
Prob(F-statistic)	0.000210		

Source: Processed Data Eviews (2025)

Table 1 explains that the results of the OLS test using the Panel Least Squares method on the variables of GDP, HDI, and PDRPC on the poverty level (POV), it is known that only the PDRPC variable is statistically significant (p-value 0.0002 < 0.05), while GDP and HDI are insignificant, with the model having an R-squared of 0.254795, F-statistic significant (0.000210), showing that simultaneously independent variables have an effect on poverty even though the power of explanation is still low

3.2 Uji Fixed Model

Table 2: Fixed Model Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PDRB	-0.101485	0.043504	-2.332767	0.0230
IPM	-0.259386	0.055233	-4.696240	0.0000
PDRPC	0.000697	0.000248	2.806965	0.0067
C	27.00304	4.449542	6.068724	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.953041	Mean dependent var	8.862714
Adjusted R-squared	0.946882	S.D. dependent var	3.376324
S.E. of regression	0.778151	Akaike info criterion	2.455729
Sum squared resid	36.93667	Schwarz criterion	2.744822
Log likelihood	-76.95053	Hannan-Quinn criter.	2.570560
F-statistic	154.7501	Durbin-Watson stat	0.669045
Prob(F-statistic)	0.000000		

Source: Processed Data Eviews (2025)

Table 2 shows that the results of the Fixed Effect Model test, the variables GDP (p=0.0230), HDI (p=0.0000), and PDRPC (p=0.0060) have a significant effect on the poverty level (POV), with an R-squared value of 0.935041 which shows that the model is able to explain 93.5% of poverty variations, as well as a statistically significant F-value (0.000000), so that this model is statistically strong and explains that the three independent variables together affect poverty between regions significantly.

3.3 Test Random Model

Table 3: Random Model Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PDRB	-0.099991	0.054277	-1.842239	0.0699
IPM	-0.251890	0.061698	-4.082657	0.0001
PDRPC	0.000682	0.000252	2.707343	0.0086
C	26.48967	5.023417	5.273238	0.0000

Effects Specification

	S.D.	Rho
Cross-section random	2.680680	0.9223
Idiosyncratic random	0.778151	0.0777

Weighted Statistics

R-squared	0.437107	Mean dependent var	0.753510
Adjusted R-squared	0.411521	S.D. dependent var	1.036478
S.E. of regression	0.793192	Sum squared resid	41.52415
F-statistic	17.08379	Durbin-Watson stat	0.585548
Prob(F-statistic)	0.000000		
	Unweighted Statistics		
R-squared	0.121948	Mean dependent var	8.862714
Sum squared resid	690.6492	Durbin-Watson stat	0.035205

Source: Processed Data Eviews (2025)

Table 3 explains that the results of the Random Effect test model of the variables HDI (p=0.0001) and PDRPC (p=0.0086) have a significant effect on poverty (POV), while the GDP is close to significant (p=0.0699), with an R-squared of 0.437107 indicating that the model explains 43.7% of the variation in poverty, and an F-statistic is significant (p=0.000000), so this model is statistically feasible and shows that most independent variables contribute to changes in poverty rates.

3.4 Chow Test

Table 4: Chow Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	181.404432	(5,61)	0.0000
Cross-section Chi-square	193.506678	5	0.0000

Cross-section fixed effects test equation:
Dependent Variable: POV
Method: Panel Least Squares
Date: 04/30/25 Time: 15:56
Sample: 2013 2024
Periods included: 12
Cross-sections included: 6
Total panel (unbalanced) observations: 70

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PDRB	-0.009655	0.158088	-0.061076	0.9515
IPM	0.161789	0.128282	1.261199	0.2117
PDRPC	0.001166	0.000295	3.955422	0.0002
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S.E. of regression	2.980126	Akaike info criterion	5.077253
Sum squared resid	586.1560	Schwarz criterion	5.205739
Log likelihood	-173.7039	Hannan-Quinn criter.	5.128289
F-statistic	7.522066	Durbin-Watson stat	0.079917
Prob(F-statistic)	0.000210		

Source: Processed Data Eviews (2025)

Table 4 The results of the Chow test show that the probability value of Cross-section F and Cross-section Chi-square is 0.0000 < 0.05, so that H0 is rejected and H1 is accepted, which means that the Fixed Effect Model (FEM) model is more appropriate than the OLS (Common Effect) model, thus the next analysis should use FEM because it is able to capture the influence of heterogeneity between cross-sections significantly in explaining poverty variation (POV) in the observed period and region.

3.5 Hausman Test

Table 5: Hausman Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.593324	3	0.1332

Cross-section random effects test comparisons:

Variable	Fixed	Random	Where(diff.)	Prob.
PDRB	-0.101485	-0.099991	0.000006	0.5459
IPM	-0.259386	-0.251890	0.000037	0.2197
PDRPC	0.000697	0.000682	0.000000	0.8493

Cross-section random effects test equation:
Dependent Variable: POV
Method: Panel Least Squares
Periods included: 12
Cross-sections included: 6
Total panel (unbalanced) observations: 70

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	27.00304	4.449542	6.068724	0.0000
PDRB	-0.101485	0.043504	-2.332767	0.0230
IPM	-0.259386	0.055233	-4.696240	0.0000
PDRPC	0.000697	0.000248	2.806965	0.0067

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.953041	Mean dependent var	8.862714
Adjusted R-squared	0.946882	S.D. dependent var	3.376324
S.E. of regression	0.778151	Akaike info criterion	2.455729
Sum squared resid	36.93667	Schwarz criterion	2.744822
Log likelihood	-76.95053	Hannan-Quinn criter.	2.570560
F-statistic	154.7501	Durbin-Watson stat	0.669045
Prob(F-statistic)	0.000000		

Source: Processed Data Eviews (2025)

Table 5 The results of the Hausman test show a probability value of 0.1332 > 0.05, so H0 is accepted and H1 is rejected, which means that the Random Effect Model (REM) model is more appropriate than the Fixed Effect Model (FEM), because the difference between cross-sections is not statistically significant; thus, the REM model was chosen for the final analysis because it was assumed that the differences in individual effects were not correlated with independent variables, as well as being more efficient in estimating the parameters on the data panel used.

Based on the Chow test (Prob. 0.0000) the best model is the Fixed Effect Model (FEM), which is strengthened by the Hausman test (Prob. 0.1332 > 0.05) so that the Random Effect Model (REM) is more accurately used. However, the analysis of the estimation model shows that the variables of GDP and HDI have a significant negative effect on poverty, while the PDRPC has a significant positive effect, which as a whole concludes that economic improvement and human development reduce poverty, but the distribution of consumption must be considered.

4.1 Discussion

This study analyzes regional inequality in six provinces of Java using panel data from 2013–2024. The variables analyzed included economic growth, per capita income, and human development index (HDI). The study used three estimation models: Common Effect, Fixed Effect, and Random Effect to obtain the most accurate results in explaining the relationship between variables to regional inequality.

Through the Chow test, a probability value of 0.0000 was obtained which showed that the Fixed Effect model was more appropriate to use than the Common Effect. The Hausman test also supports the use of the Fixed Effect model rather than the Random Effect. This model is considered the most appropriate because it can capture specific differences in characteristics between provinces.

The regression results show that only the per capita income variable is significant to regional inequality, with a probability value of 0.0001. Meanwhile, the variables of economic growth and HDI did not show a significant influence. The coefficient of determination (R^2) of 12.2% indicates that the model's ability to explain the variation in inequality is still limited. A Durbin-Watson value of 0.035 indicates a very strong positive autocorrelation, which can affect the validity of the estimation results. This is an important note for the improvement of the model and methodological approach in subsequent research.

4.2 Conclusion

This study concludes that there is a significant development inequality between six provinces on the island of Java during the period 2013–2024. Analysis using the Fixed Effect model shows that per capita income has a significant effect on regional inequality, while economic growth and the human development index (HDI) do not show a significant influence. DKI Jakarta and East Java are recorded as provinces with relatively better levels of equity than other provinces, supported by a balance between the contribution of GDP and the level of HDI. On the other hand, the highest inequality occurs in provinces that have a high GDP contribution but low HDI achievement, which indicates that economic growth has not been followed by an equal improvement in people's quality of life.

The novelty of this study lies in the use of long-term panel data specifically in the Java Island region, as well as the finding that HDI and economic growth do not necessarily reduce inequality, highlighting the importance of redistributing development results to have a more equitable impact between regions. These findings can be the basis for more inclusive and equity-based development policies.

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