MediaTrend 20 (1) 2025 p. 58-73
Media Trend
Berkala Kajian Ekonomi dan Studi Pembangunan
http://journal.trunojoyo.ac.id/mediatrend

Analysis of Income Inequality in Java Island and Its Influencing Factors in 2012-2023

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Article Information

History of article:
Received October 2024
Approved March 2025
Published March 2025

A B S T R A C T

This study aims to analyze the effect of Economic Growth (GRDP), Human Development Index (HDI), and Unemployment on Income Inequality in Java during the period 2012-2023. The data used in this study are secondary data obtained from the Central Statistics Agency. This research uses panel data regression model with Random Effect Model (REM) approach and analyzed using Eviews12 software. The regression analysis results show that partially the variables of Economic Growth, HDI, and Unemployment have a positive and significant effect on income inequality in Java Island in 2012-2023. The simultaneous test results show that the variables of economic growth, HDI, and Unemployment have a positive and significant influence on income inequality in Java Island in 2012-2023. From the results of this study, it is expected that the government can provide appropriate policies so that the policies implemented can be realized and the government is also expected to be able to create jobs, improve the quality of education and training to reduce the level of income inequality.

Keywords: *Human Development Index (HDI), Income Inequality, Unemployment, Economic Growth*
JEL Classification Code: *E6, J1, J6, O4*

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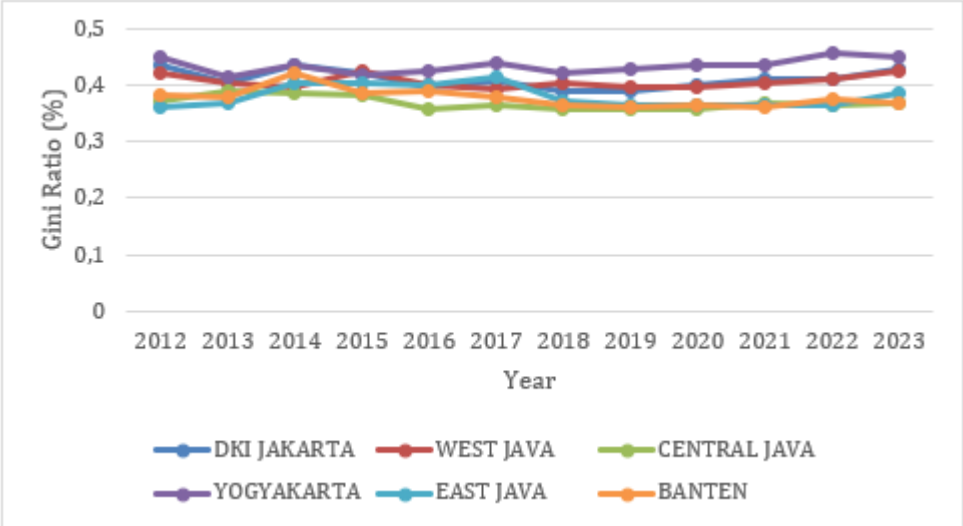
DOI: http://dx.doi.org/10.21107/mediatrend.v20i1.27803

INTRODUCTION

Economic development is the process of developing economic activities in a country that aims to increase per capita income and ultimately improve people's welfare. It is expected that high economic growth will create a Trickle Down Effect so that people's welfare will increase. However, rapid economic growth without being balanced with equity will result in income inequality in a region (Ersad et al., 2022). Income inequality refers to a significant difference between the income of rich citizens and poor citizens. In Indonesia, especially the island of Java, economic growth is increasing, but income inequality is also increasing. High growth has little benefit in solving the problem, there are still many people who have incomes below the standard of living (Vadila & Resosudarmo, 2020). So rapid economic growth does not automatically improve the standard of living of its people, such as The Trickle-Down Effect theory or the trickle-down effect of the benefits of economic growth for the poor does not occur as expected and even runs tends to be slow.

The existence of income inequality problems is an obstacle to the rate of economic growth. Java Island is the main center of economic activity in Indonesia, with the largest contribution to the national Gross Domestic Product (GDP) (Fauziah et al., 2021). Data from the Central Statistics Agency shows that the center of the national economy is still concentrated in Java. The economic activity of Java Island contributed 57.05% to Indonesia's GDP growth compared to the island of Sumatra which is almost the same size but only contributed 22.01%. Sumatra's contribution to Indonesia's GDP is significantly smaller than that of Java.

Income inequality can be measured using the Gini index or Gini ratio. The value of the Gini ratio ranges from 0 to 1, with higher numbers indicating greater levels of inequality. An area is said to have a high level of inequality if the Gini ratio value is close to 1, while a Gini ratio value close to 0 indicates an equal distribution of income (BPS, 2024). Based on Central Statistics Agency data, the level of income inequality in Indonesia is still relatively high, especially Java Island has a gini index that shows a moderate level of inequality, which is above 0.35. This indicates that the distribution of income throughout Java is



Source: Data processed, 2024

Figure 1.
Gini Ratio of Provinces in Java Island 2012-2023

unequal. Although Java Island is the largest contributor to national GDP, income differences between provinces in this region show significant inequality. The six provinces in Java, including DKI Jakarta, West Java, Central Java, DI Yogyakarta, East Java and Banten, have different economic and social characteristics that can affect people's income.

Based on the figure above, the gini ratio of the six provinces in Java between 2012 and 2023 shows fluctuations. The X-axis shows the range of years from 2012 to 2023, illustrating the dynamics of income inequality throughout the period. The Y-axis shows the value of the gini ratio, which ranges from 0 to 1, where the higher this value, the greater the level of income inequality. It can be seen that the gini ratio for the period 2012-2023 shows that all provinces have a gini coefficient value of more than 0.35, indicating a moderate level of income equality. In 2022, DI Yogyakarta Province was recorded with the highest Gini ratio among the provinces at 0.459, indicating that income inequality in this province was more than 45.9%, signaling a highly unequal income distribution, with a small proportion of the population controlling most of the income. In second place, in 2012, DKI Jakarta Province had a Gini ratio of 0.437, indicating income inequality of more than 43.7%.

On the other hand, East Java Province recorded the lowest gini ratio among the provinces, with a value of around 0.351, indicating inequality, but at a lower level of less than 35.1%. This finding indicates that although Java Island has a large contribution to the national Gross Domestic Product (GDP), the level of income inequality of more than 35% across provinces indicates the need for more attention to improve income equality in order to achieve more equitable public welfare.

Economic growth is one of the indicators of a region's economic development. With high economic growth, it can reflect the welfare of the community and is expected to be able to overcome development-related problems such as income inequality (Gordón & Resosudarmo, 2019). Economic growth in a region can provide benefits to the region, both positive and negative benefits (Khoirudin & Musta'in, 2020). GRDP is one measure of economic growth. GRDP is the average gross domestic product of all business units in a country (BPS, 2024). One way to measure economic growth is to see how the economy of a region is growing. Abdulah (2013), states that high income distribution inequality will be accompanied by high economic growth. Meanwhile, a more equitable income distribution will be accompanied by low economic growth (Putri & Erita, 2019).

Another indicator that affects income inequality is the Human Development Index (HDI). The process of income inequality in a region is largely due to significant differences in demographic conditions across regions. Different demographic conditions in each region are the main factors affecting income inequality (Pradnyadewi & Purbadharmaja, 2017). According to Ersad et al. (2022), stated that the demographic conditions of a region include aspects such as population growth, population structure, education level, health, and community characteristics. These demographic conditions have a significant influence on the work productivity of the people in the region. Good demographic conditions, such as high levels of education and health, tend to increase work productivity, due to the easy distribution of goods and services, thereby increasing regional economic growth. In addition, the most important thing to improve work productivity is the quality of human resources as seen from the Human Development Index (HDI).

Another factor that affects income inequality is the open unemployment rate. In Indonesia, particularly Java Island, the unemployment rate varies between provinces and has an impact on income distri-

bution. When a large number of individuals are unemployed, this not only reduces their income, but also impacts income inequality in society (Widyastuti & Indrawati, 2021). The imbalance between the number of jobs and the number of workers which results in fewer job opportunities can be a source of high open unemployment rate.

The Trickle Down Effect theory states that economic growth trickles down, meaning that the benefits will be felt by all levels of society. When the economy grows, companies will develop, create new jobs and increase people's income so that it will contribute to reducing income inequality and unemployment. However, in reality, economic growth tends to increase income inequality and unemployment. Income inequality can hamper the continuity of development, especially in the economic field (Prastiwi et al., 2019).

Several studies have been conducted to explore the factors that influence income inequality in a region. Research by Amali & Syafri (2023), entitled Analysis of Factors Affecting Income Inequality in Indonesia, found that HDI, minimum wage, and unemployment rate have a significant effect on inequality in 33 provinces in Indonesia. The study entitled Analysis of Factors Affecting Income Inequality in East Java found that the Human Development Index (HDI) has a significant positive effect on income inequality, while the unemployment rate has no significant effect (Febriyani & Anis, 2021). Research by Al Aqilah et al. (2024), entitled analysis of the determinants of income inequality on the island of Sumatra which shows that GRDP and the percentage of poor people have a significant positive effect on income inequality. Meanwhile, population and UMP have a significant negative effect on income inequality. Similar findings are also presented by Kessy et al. (2021), with the title Analysis of the dynamic relationship of economic growth and income inequality in Indonesia using clustering and econometric models which shows that economic growth also has a significant positive effect on income inequality in Indonesia, especially in provinces with a combination of economic growth and high inequality. Research by Wulandari & Rahmawati (2022), found that labor indicated that its relationship with income inequality is positive but the effect is not significant. And the human development variable has a negative relationship with income inequality.

This research is important because of the contrasting conditions in Java, the region that serves as the main center of Indonesia's economic activity and the largest contributor to the national Gross Domestic Product (GDP). Despite the region's positive economic growth, income inequality in Java remains high, with the Gini Index consistently above 0.35. This suggests that the fruits of economic growth have not been equally enjoyed by all levels of society. The Trickle Down Effect theory, which states that the benefits of economic growth will trickle down and be felt by all levels of society, seems to be ineffective or slow in this region. The fact that rapid economic growth does not necessarily reduce inequality and may even exacerbate it suggests the need for an in-depth analysis of the specific factors affecting this condition in Java, using the latest data for the period 2012-2023.

This study fills some of the gaps in previous research on income inequality. This study focuses on Java, the region with the largest economic contribution in Indonesia, but which also faces serious inequality problems. Unlike other studies that cover larger areas such as the whole of Indonesia or just one province such as East Java, this study focuses on the whole island of Java with an interprovincial data approach offering a more comprehensive regional perspective. This study chooses a specific combination of independent variables, namely Economic Growth (measured by GRDP), Human Development In-

dex (HDI), and Open Unemployment Rate, to examine their simultaneous influence on income inequality in Java. This variable composition differs from previous studies that tend to use other variables. This study uses the latest panel data covering the period 2012-2023, thus providing a more up-to-date analysis of the development of income inequality and its influencing factors over the past decade. By combining the latest data, a focus on strategic regions such as Java Island, and a specific variable approach. This study is expected to provide deeper insights into the literature and is relevant to support policy formulation in addressing income inequality.

METHODOLOGY

Research Design

This research is a type of descriptive and quantitative research. Where this research aims to develop and use theories or hypotheses related to phenomena that occur derived from numerical data that can be measured and analyzed statistically. In the context of this study, researchers want to analyze income inequality and factors that affect the relationship between variables, namely Economic Growth (X1), Human Development Index (HDI) (X2) and Unemployment (X3) to Income Inequality (Y).

The type of data used is secondary data in the form of time series and cross section (panel data) using an annual time period from 2012-2023 which comes from the Central Statistics Agency. The sampling technique in this study is using non-probability sampling method with purposive sampling technique, where this sampling technique is carried out with certain considerations.

This study chose the time period 2012-2023. The reason for choosing this period is based on the need to obtain relevant and up-to-date data on Economic Growth, Human Development Index (HDI), and Open Unemployment Rate and to examine the effect of the three simultaneously on income inequality in Java. The selection of independent variables in this study is based on theoretical studies and relevant empirical findings. Economic growth, as measured by Gross Regional Domestic Product (GRDP), was selected because it is a key indicator of economic development and has the potential to affect income distribution. The Human Development Index (HDI) was chosen because it reflects the quality of human resources, which is believed to play an important role in influencing income inequality. The Open Unemployment Rate was chosen because it reflects the condition of the labor market and the imbalance between the availability of jobs and the number of workers, which can have an impact on income inequality in the community.

The selection of these variables is based on the contrasting conditions in Java, the region that serves as the main center of Indonesia's economic activity and the largest contributor to the national Gross Domestic Product (GDP). Despite the region's positive economic growth, income inequality in Java remains high, with the Gini Index consistently above 0.35. This shows that the fruits of economic growth have not been enjoyed equally by all levels of society, the Trickle Down Effect Theory, does not seem to work effectively or run slowly in this region. The fact is that rapid economic growth does not necessarily reduce inequality and can even worsen it. This study uses the most recent data for the period 2012-2023. Using more recent data allows researchers to understand the dynamics and changes that have occurred in the economy and society over the past decade, as well as their impact on income inequality.

Operational Definition of Variables

Sugiyono (2021), explains that research variables are characteristics, objects, or activities that have various values, which researchers measure to draw

conclusions. The operational definition of variables ensures that these variables can be measured and studied effectively in research, providing specific guidelines for the measurement process. The following is the definition of the variables used in this study:

Gini Ratio

This coefficient is based on the Lorenz curve, which depicts accumulated expenditure and compares the distribution of certain variables. This curve also serves as an indicator that shows the extent of income disparity in society. The value of the Gini coefficient ranges from 0 to 1. A Gini coefficient of 0 indicates a perfect level of inequality, where every individual has the same income.

Economic Growth

The economic growth rate is an increase in Gross Domestic Product (GDP). To analyze economic growth in Java, calculations are made at the provincial level using the growth of Gross Regional Domestic Product (GRDP) based on constant prices (ADHK), expressed as a percentage per year. These calculations are done annually to get a clear picture of economic growth in the region.

Human Development Index (HDI)

The Human Development Index (HDI) serves as a tool to analyze the level of inequality in a region. According to (BPS, 2024), the HDI is built with an approach that covers three basic dimensions. These dimensions include longevity and health, education, and a decent standard of living.

Unemployment

Unemployment is a situation in which a person who belongs to the labor force wants to get a job but has not been able to get one. The labor force is the population aged 15 years or older who are working, workers who are temporarily unemployed but have a job, and the unemployed. The percentage of the labor force that does not have a job but is actively seeking work reflects the condition of the labor market and its impact on income inequality.

Data Collection Methods

Sugiyono (2021), explains that data collection techniques are a very strategic step in research. The type of data used is secondary data in the form of time series and cross section (panel data), with an annual period from 2012-2023 obtained from the Central Statistics Agency. This data explains the research variables, namely economic growth, Human Development Index (HDI), and unemployment, on income inequality in the Java Island province over a 12-year period. The data collection methods used in this study are shown in Table 1.

Data Analysis Method

This study uses panel data regression analysis techniques with the help of Eviews12 software to test and analyze the effect of economic growth, human development index (HDI), and unemployment variables on income inequality in Java. The following is the panel data regression equation:

$$Y_{it}=\beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it}\, \mu_{it}$$

where Y_{it} is income inequality, β_0 is constant, β_1 β_2 β_3 is regression coefficient, X1 is economic growth, X2 is human development index (HDI), X3 is Unemployment, t is Year (time series dimension), i is Country (cross section dimension), μ is error term

The model equation aims to determine the elasticity between the dependent variable and the independent variable (Nabila & Laut, 2021). There are three model approaches that can be used to estimate panel data: Common Effect, Fixed Effect, and Random Effect. Before determining the best model to apply, it is necessary to take some preliminary steps, including the Chow Test, to estimate the most suitable model. The Chow test aims to determine the best panel data estimation model between the Common Effect Model (CEM) or the Fixed Effect Model (FEM). With a probability

Table 1.
Data Collection Methods

No	Variables	Calculations	Source
1	Income Inequality (Y)	Gini Ratio	BPS
2	Economic Growth (X1)	PDRB	BPS
3	Human Development Index (X2)	HDI	BPS
4	Unemployment (X3)	Unemployment Rate (%)	BPS

Source: BPS, 2024

value of cross-section chi-square < a (5%). Then it is rejected, which means the FEM model is chosen. Meanwhile, if the probability cross-section chi-square> a (5%) then it is accepted, which means the CEM model is chosen. The Hausman test aims to determine whether it is more appropriate to use the FEM or REM model. The guidelines to be used in making the Hausman test conclusion are as follows: Probability cross-section chi-square < a (5%) then rejected, which means the fixed effect model is selected. And Probability cross-section chi-square > a (5%) then accepted, which means the random effect model is selected. The Lagrange Multiplier test aims to prove that the best model of REM or Ordinary Least Square when the probability value> chi-square. The Lm test decision is based on the Breusch-Pagan method as follows: if the Breusch-Pagan cross-section < a (5%) then it is rejected, which means that the random effect model is chosen. Meanwhile, if the Breusch-Pagan cross-section > a (5%) then it is accepted, which means that the common effect model is chosen.

According to Gujarati & Dawn C. Porter (2012), the advantage of using panel data is that the data obtained becomes more informative with greater variability and a low level of collinearity. The common effect panel model and fixed effect panel model use Ordinary Least Square (OLS), while the random effect panel model estimation method uses the Generalized Least Square (GLS) method. Panel data allows a more complex analysis of the behavior in the model, so classical assumption testing is not always required in panel data analysis (Gujarati & Dawn C. Porter, 2012). Because of the advantages of panel data regression, classical assumption testing is not mandatory in the panel data model. Equations that meet classical assumptions are those that use the Generalized Least Squares (GLS) method. Conversely, if using the Ordinary Least Square (OLS) method, it is necessary to test classical assumptions. Therefore, whether or not to test classical assumptions in this study depends on the results of the selection of the estimation method. If based on the selection of the appropriate estimation method for the regression equation is random effect (GLS), then there is no need to test classical assumptions. Conversely, if the regression equation uses common effect or fixed effect (OLS), it is necessary to test the classical assumptions, namely multicollinearity test and heteroscedasticity test.

Model parameter testing is conducted to ensure model feasibility and consistency of estimated coefficients with theory and hypothesis. This test includes the coefficient and determination test (R2), partial regression coefficient test (t test), and general regression coefficient test (f test). The coefficient of determination (goodness of fit) is an important measure in regression because it shows whether the regression model can be estimated or not. The R2 value reflects how much variation in the dependent variable (Y) can be

explained by the independent variable (X), or how well the model can explain the variation in the dependent variable. After testing the regression coefficient as a whole. Then the next step is to test the regression coefficient partially using the t-test. The F test is one of the statistical methods used to test hypotheses regarding the equality of variances or to determine whether there is a significant effect of one or more independent variables on the dependent variable in the regression model.

RESULTS AND DISCUSSION

Economic growth is an increase in the ability of a country or region to produce goods and services. This is shown through increased production or income per capita. Economic growth is measured by looking at the growth rate of Gross Domestic Product (GDP) or Gross Regional Domestic Product (GRDP). GRDP reflects the total value of goods and services produced in a region during one year. Economic growth can also be interpreted as an increase in overall community income, which shows the increase in added value generated from economic activity in a region. The main objective of economic growth is to build a thriving economy and a prosperous society (Al Aqilah et al., 2021). Economic growth is the process of increasing the ability of a country or region to produce goods and services, as measured by increases in production, per capita income, and value added resulting from economic activity.

The Human Development Index (HDI) is an important measure to assess how successful we are in improving the quality of human life and plays an important role in promoting sustainable development (Pradnyadewi & Purbadharmaja, 2017). HDI considers three important aspects: health, education, and income. By using HDI, we can get a more comprehensive picture of a country's progress compared to just looking at Gross Domestic Product (GDP). HDI also shows that human development is essential to enable a country to adopt modern technology and develop its full potential to achieve sustainable growth and development.

Unemployment is an economic problem that has a direct and significant impact on individuals (Widyastuti & Indrawati, 2021). The increase in population has the potential to increase the number of labor forces, but it is not always accompanied by additional employment opportunities. Competition for limited jobs can cause some people to become unemployed. High levels of unemployment can depress wages for low-income workers, which in turn exacerbates income inequality in society (Hindun et al., 2019). Unemployment is a serious problem that can lead to poverty and inequality.

Economic growth shows the extent to which a country is successful in its development. Uneven growth can lead to disparities between regions. The "Trickle-Down Effect" theory says that the benefits of economic growth will be felt by all levels of society, as companies expand, create jobs, and increase income. However, high economic growth does not always guarantee equitable income distribution. Not everyone has the same opportunity to contribute to economic growth, so income inequality can still occur. (Pradnyadewi & Purbadharmaja, 2017), shows that rapid economic growth does not always mean that income inequality is reduced, it can even worsen it, because regions that have more production factors tend to benefit more, while regions that have limited production factors, such as remote areas with poor infrastructure, will find it difficult to share in the benefits of economic growth. As a result, the income gap between rich and poor regions will widen.

The Human Development Index (HDI) is an important indicator to assess the quality of the population in a region. A high HDI indicates good quality of education,

health and living standards. An increase in HDI is expected to reduce income inequality as it increases the ability of individuals to participate in economic activities. The higher the HDI, the greater the opportunity for each individual to contribute to the progress of their region. If other regions do not experience the same increase in HDI, there will be an income gap between regions (Putra & Lisna, 2020). This occurs because of unequal access to and quality of education and health in various regions. To reduce income inequality, it is necessary to strive for HDI equity in each region.

The open unemployment rate is an indicator that is closely related to income distribution and community welfare. A high open unemployment rate indicates that people's income and welfare are still low (Khoirudin & Musta'in, 2020). This is because high unemployment reflects the inability of the economy to provide enough wage- or income-generating jobs. This can worsen the income gap between the poor and the rich, as those who are unemployed have no source of income to improve their welfare.

Descriptive analysis, as explained by (Sugiyono, 2021), is a statistic used to describe the data collected without drawing general conclusions. The results of descriptive analysis for the variables of Income Inequality, Economic Growth, Human Development Index (HDI), and Unemployment are as follows table 2.

Based on the table above, the descriptive statistical analysis presented includes four variables with 72 observations for each variable. The Income Inequality variable (Y) has a relatively small range, with a minimum value of 0.351000 and a maximum of 0.459000. The average income inequality is 0.39856 with a standard deviation of 0.026994, indicating that income inequality is relatively stable and not far from the average. The Economic Growth variable (X1) shows a wider range, with a minimum value of -2.670000 and a maximum of 7.030000. The average economic growth is 4.956667, but the large standard deviation (2.174061) indicates that there is significant variation in economic growth among observations. The Human Development Index (HDI) variable (X2) has a minimum value of 66.06000 and a maximum of 82.46000, with a mean of 73.43083 and a standard deviation of 4.770002. This indicates a considerable difference in the quality of human development in various regions. The variable Unemployment (X3) has a minimum value of 2.720000 and a maximum of 13.74000, with a mean of 6.516111 and a standard deviation of 2.471458. This shows the variation in the unemployment rate among observations. Descriptive analysis shows that income inequality is relatively stable, while economic growth, HDI, and unemployment rate show significant variation among observations.

In estimating the model using panel data, there are several approaches that can be taken, namely Pooled Least Square (PLS)/ Common Effect Model (CEM), Fixed Effect Model (FEM) and Random Effect Model (REM). The analysis results show the consistency of the relationship of each independent variable to the dependent

Table 2.
Descriptive Statistical Analysis

Variables	N	Min	Max	Mean	Std. Dev
Y	72	0.3510	0.4590	0.3986	0.0270
X1	72	-2.6700	7.0300	4.9567	2.1740
X2	72	66.060	82.460	73.431	4.7700
X3	72	2.7200	13.740	6.5161	2.4715

Source: Data Processing (2024)

variable. The following panel data regression results with three approaches are shown in Table 3.

This test aims to determine the most appropriate model between the Pooled Least Square (PLS)/Common Effect Model (CEM) or the Fixed Effect Model (FEM). The null hypothesis (H0) states that the CEM model applies, while the alternative hypothesis (H1) states that the FEM model applies.

If the probability of chi-square > 0.05, then H_0 is rejected.

If the probability of the chi-square <0.05, then H_1 is accepted.

Based on the estimation results, the resulting probability value is 0.0000 <0.05, so the conclusion is Ho is rejected and H1 is accepted, which means that the best model is the Fixed Effect (FEM) model. The next test that must be done is the Hausman test to choose which model is more appropriate, namely fixed effect (FEM) or random effect (REM).

This test will use the probability chi-square value so that the decision to select the two models, namely Fixed Effect or Random Effect, can be determined statistically. Tests can be used where the hypothesis is

Ho: Random Effect Model

H1 : Fixed Effect Model

Based on the estimation results, the resulting probability value of 0.3102 is greater than 0.05. Therefore, the null hypothesis (H0) is accepted and the alternative hypothesis (H1) is rejected. This indicates that the best model is the Random Effect Model (REM). Furthermore, the Hausman test is carried out to determine the more appropriate model

Table 3.
Panel Data Regression Analysis with PLS/CEM, FEM and REM

Variable	Regression Coefficient		
	PLS	FEM	REM
X1	0.0920	0.0083	0.0131
X2	0.0000	0.0000	0.0000
X3	0.3920	0.0023	0.0080
C	0.0090	0.5772	0.9252
R-squared	0.3940	0.6084	0.4370
Adjusted R-squared	0.3673	0.5587	0.4122
F-statistic	14.738	12.237	17.596
Prob(F-statistic)	0.0000	0.0000	0.0000

Source: Data Processing (2024)

Table 4.
Chow Test Results

Effect Test	Statistic	d.f.	Prob
Cross-section F	6.899669	(5,63)	0.0000
Cross-section Chi-square	31.44245	5	0.0000

Source: Data Processing (2024)

Table 5.
Hausman Test Results

Test Summary	Chi-sq. Statistic	Chi-Sq. d. f.	Prob.
Cross-section random	3.582705	3	0.3102

Source: Data Processing (2024)

between the Fixed Effect Model (FEM) or the Random Effect Model (REM). After going through the estimation model test, chow test and hausman test, the final conclusion is obtained for the use of the best and appropriate model, namely Random Effec (REM). The Random Effect panel data regression results are stated in the following table:

Table 6.
Reliability Test Results

Variable	*Random Effect Model*
X1	0.0131
X2	0.0000
X3	0.0080
C	0.9252
R-sqared	0.437029
Adjusted R-squared	0.412192
F-statistic	17.59592
Prob(F-statistic)	0.000000

Source: Data Processing (2024)

Based on the test selection, the estimation method obtained is random effect (GLS), so there is no need to test classical assumptions. Below are the results of the random effect estimation test.

The random effect model test results show an F-Statistic value of 17.59592 with a prob. value (F-Statistic) of 0.000000 (< 0.05). So it can be concluded that the Independent Variable (X), namely Economic Growth, Human Development Index (HDI), and Unemployment have a significant effect simultaneously on the Independent Variable (Y), namely Income Inequality.

The t test is used to determine the significance of the influence of each independent variable on the dependent variable. Based on the evaluation of the variables:

1. The X1 variable has a t-Statistic value of 2.547102 with a Prob. (Significance) value of 0.0131 (<0.05), then H1 is accepted and it can be concluded that the X1 variable has a significant effect on the Y variable.
2. The X2 variable has a t-Statistic value of 7.262094 with a Prob. (Significance) value of 0.0000 (<0.05), then H1 is accepted and it can be concluded that the X2 variable has a significant effect on the Y variable.
3. The X3 variable has a t-Statistic value of 1.733780 with a Prob. (Significance) value of 0.0080 (< 0.05) then H1 is accepted and it can be concluded that the X3 variable has a significant effect on the Y variable.

The coefficient of determination test results in Table 3 REM show that the Adjusted R Square value is 0.412192 or 41%. This means that 41% of the variation in income inequality can be explained by the variables of economic growth, HDI, and unemployment. The rest of the variation in income inequality is explained by other variables not included in the model.

The regression results show the regression coefficient values for each of the variables that affect income inequality in Java, namely Economic Growth, Human Development Index (HDI), and Unemployment, which can be formulated as follows:

$$Y = 0.0051 + 0.0026X1 + 0.0049X2 + 0.0037X3$$

From the regression results, the t-Statistic value is 2.547102 with a Prob. (Significance) value of 0.0131. The regression analysis results show that the economic growth variable has a regression coefficient of 0.0002614, which indicates a

positive influence on income inequality. In other words, every 1% increase in economic growth will increase the level of income inequality by 0.002614. This means that as economic growth increases in the Java provinces, the level of income inequality as measured by the Gini Ratio also tends to increase. The finding in this study, a positive relationship between economic growth and inequality, is consistent with the earlier part of the Kuznets curve. This theory states that in the early stages of economic development, income inequality will tend to increase as per capita income or economic growth increases. Only after reaching a certain turning point, inequality will start to decline as development continues (forming an 'inverted U' pattern).

This research is in line with (Dernasari, 2020), stating that the process of economic development of a country at an early stage is generally accompanied by a considerable deterioration in income distribution, and only reverses towards a better equalization at a further stage of development. As per capita income increases, income inequality will also increase and then decrease, known as the inverted U hypothesis

This suggests that economic growth is not enjoyed equally by the entire population, with some groups contributing more than others. This is because economic growth in its early stages tends to focus on certain sectors, such as capital-intensive industries or highly skilled services in urban areas. As a result, the benefits of growth accrued to those with more capital or skills, while the majority of the population, especially those working in agriculture or the informal sector, were left behind.

However, this study is not in line with research conducted by (Asmaiyah & Nugroho, 2022), that GRDP growth has a negative and significant effect on income inequality. That the high value of Gross Regional Domestic Product (GRDP) reflects the success of a region or region in optimizing its owned and available resources, so as to reduce income distribution inequality.

The t-Statistic value is 7.262094 with a Prob. (Significance) value of 0.0000 (>0.05), then the Human Development Index (HDI) variable has a significant effect on the Income Inequality variable.

Regression analysis shows that the Human Development Index (HDI) has a positive influence on income inequality, with a regression coefficient of 0.004853. This means that any increase in HDI tends to be accompanied by an increase in income inequality. A 1% increase in HDI is predicted to increase income inequality by 0.004853. This is due to the unequal distribution of HDI benefits. HDI gains tend to be concentrated in urban areas, while remote areas still struggle to access adequate health, education and infrastructure services. As a result, income inequality between regions is widening, which in turn affects the level of community welfare. This gap is reflected in the quality of human resources, with more developed regions having better human quality compared to remote areas.

The results of this study are in line with research conducted by Ariesta et. al, (2022), where the results of HDI have an effect on positive income inequality explaining that although HDI in DIY shows a high number, the increase is not evenly distributed throughout the region. Developed regions with a high HDI experience a more significant increase, while underdeveloped regions still have difficulty accessing quality health and education services. As a result, the welfare gap is widening and leading to high income inequality. This study contradicts research (Ersad et al., 2022), stating that HDI has no effect on income inequality because in Southern Sumatra, the agricultural, mining, and industrial sectors are the main contributors to Gross Regional Domestic Product (GRDP). These three sectors generally do not require labor

with a high level of education (high HDI). Instead, they require a lot of labor to carry out their production activities. Therefore, the HDI level does not have a significant influence on per capita income in the region.

The t-Statistic value is 1.733780 with a Prob. (Significance) value of 0.0080 (>0.05), so the Unemployment variable has a significant effect on the Income Inequality variable. The regression analysis shows that unemployment has a positive influence on income inequality, with a regression coefficient of 0.003688. This means that every 1% increase in the unemployment rate is predicted to increase income inequality by 0.003688. People migrating from villages to cities driven by the desire to find work are often faced with the fact that they lack adequate abilities, skills and education levels. As a result, they are often trapped in low-wage informal jobs or even become unemployed.

The high unemployment rate in Java indicates that there are still many people who do not have jobs and do not have the opportunity to develop their productivity. This has an impact on their low income and contributes to income inequality in the region. According to research conducted by (Yusica et al., 2018), states that unemployment has a positive and significant effect on income inequality. This shows that to reduce income inequality, one of the most effective ways is to create new jobs so as to reduce the unemployment rate. In research (Khoirudin & Musta'in, 2020), found a positive relationship between unemployment and income inequality. Where in the group of low-income countries and developing countries emphasizes the importance of the quality of job creation and a policy to support employment can reduce inequality and encourage more inclusive growth. This research is not in line with research conducted by Hindun et al. (2019), stating that the unemployment variable has no effect on income inequality in Indonesia. The lack of effect of unemployment on income inequality is because the policies carried out by the government can ease the burden on the community because the needs of life can be met, although it is still not evenly distributed throughout Indonesia.

CONCLUSIONS

Based on the results of the analysis, it can be concluded that economic growth has a positive and significant effect on income inequality. This means that an increase in economic growth will lead to an increase in income inequality. Then the results show that the human development index (HDI) has a positive and significant effect on income inequality. This indicates that an increase in the human development index (HDI) will lead to an increase in income inequality, due to the existence of uneven human development between regions. Regions with high HDI progress more rapidly, while regions with low HDI are left behind, leading to an increase in income inequality. And the results show that unemployment has a positive and significant effect on income inequality. This means that the higher the unemployment rate, the higher the income inequality. This is because many people are unemployed, so they do not have a steady income and contribute to widening income inequality. Therefore, the government can make policies related to access to education, infrastructure development, and social assistance programs. The government is advised to focus development policies on sectors that directly empower low-income communities, such as MSMEs, local tourism, and farming businesses. This policy is expected to encourage more equitable and inclusive economic growth. In addition, the distribution of subsidies and social assistance needs to be better targeted to achieve equity. Improving access to health and education facilities is also crucial to improve the quality of human resources

and ultimately reduce income inequality. This study is limited to Java Island, and only uses panel data regression analysis method with the period 2012-2023.

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