

Analysis of Factors Affecting Income Disparity in Indonesia

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ABSTRACT

This study analyzes the influence of GDRP, Unemployment, Dependency Ratio, and Education on income disparity in 14 provinces in Indonesia during 2012-2022. Using panel data regression in 14 provinces in Indonesia, the results of the study show that simultaneously all variables have a significant effect on income disparity. Partially, GRDP has a negative and significant effect on income disparity, Dependency ratio has a positive and significant effect on income disparity in Indonesia, while Unemployment and education have no significant effect. These results indicate the need for government policies to reduce income disparity through efforts to increase GRDP and reduce the Dependency ratio.

INTRODUCTION

Indonesia is a developing country with the largest economy in Southeast Asia, ranked 16th in the world based on nominal GDP, which still faces challenges in maintaining economic stability, namely income disparity. Income disparity is a condition in which the distribution of income between individuals or groups in a region or country is uneven or there are differences. This income difference can affect the level of community welfare, Since indicators like national income and income per capita are commonly regarded as measures of societal well-being. (Arsyad, 2017).

A widely accepted method for measuring income inequality across regions is the application of the Gini Index. (Banerjee, 2010) stated that the dominant method used by researchers to measure inequality is the Gini index. In addition, this method can also be used to measure the welfare of individuals in society, including aspects such as health, education, and others. According to (Karismawan et al., n.d.) Gini Ratio is an index that is used as a parameter for income inequality and aggregates, with values ranging from 0 to 1. The number 0 indicates perfect equality in income distribution, while the number 1 indicates perfect inequality. Thus, the Gini Ratio is an important tool in assessing income inequality and social welfare.

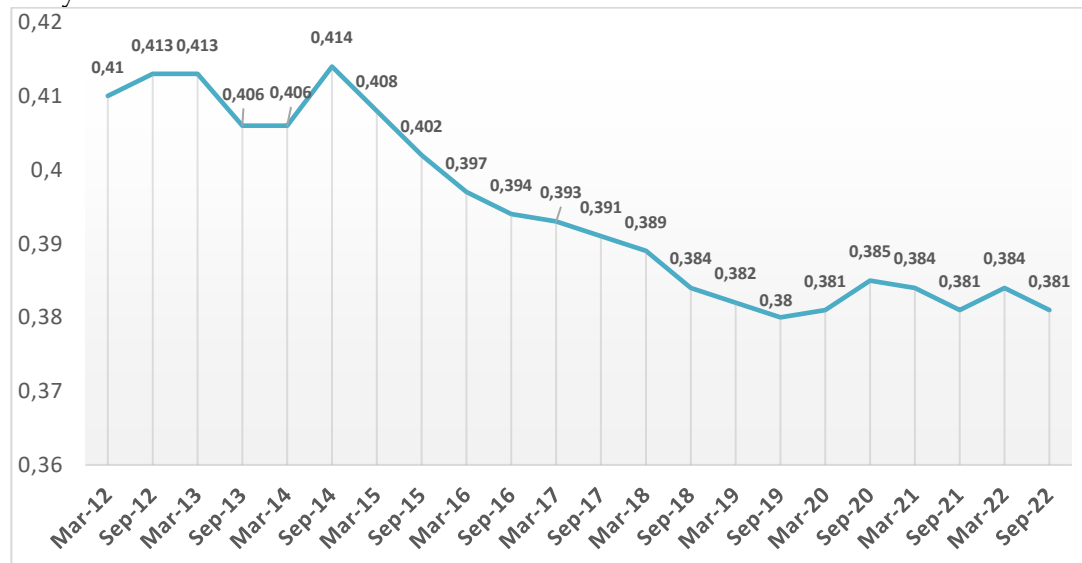


Figure 1. Gini Index Trend in Indonesia 2012-2022

Figure 1 provides a visual representation of the prevailing inequality levels in Indonesia since 2012-2022 shows a fluctuation pattern with a downward trend. This fluctuation pattern can be seen in March 2012 at 0.410 and experienced a stable increase in September 2012 and March 2013. However, the graph shows a decrease in September 2013 and March 2014 of 0.406. Then there was a peak in the fluctuation pattern with the highest Gini ratio during the period, namely in September 2014 at 0.414. Furthermore, the Gini Ratio figure showed a gradual decline from 2015, which was 0.402, to 2019 which was recorded at 0.380. However, in September 2020, the Gini Ratio figure increased again to 0.385. However, the increase was successfully overcome, and the Gini Ratio figure showed a decline again in 2021, with a figure of 0.381.

Although the Gini Ratio figure shows a decline in 2022, this achievement still does not meet the target set in the 2020-2024 RPJMN, where the Indonesian Government sets the Gini ratio at 0.370-0.374. Meanwhile, the realization of the Gini ratio figure in 2022 was at 0.381, which means that Indonesia is still at a moderate level of inequality and far from the specified target. This fact shows that the issue of income disparity is still a crucial problem, especially in Indonesia, which is a developing country that is in a transition phase towards a middle-income country, and is at risk of experiencing a middle-income trap.

To overcome these problems, the RPJPN (National Long-Term Development Plan) emphasizes the importance of creating more equitable and equal growth. In order to realize Indonesia Emas 2045, the government is targeting a reduction in the Gini Ratio to the range of 0.29–0.32 and a reduction in inequality between regions. One of the strategic indicators designed is increasing the contribution of the GRDP of Eastern Indonesia (KTI) to 28.5%, as a concrete step to encourage equitable development between regions. These targets show that equal distribution of income is a primary prerequisite for achieving equitable and equal Increase in national output.

income inequality emerges from the interaction of diverse and intricately linked variables. An essential causes is the high inequality between regions, where economic activity is still concentrated on the island of Java, while areas outside Java experience development lags behind. This inequality is exacerbated by unequal access to education and quality of human resources, which limits economic mobility, especially in rural areas and eastern Indonesia.

In addition, the dominance of the informal sector in the employment structure causes many workers to be trapped in conditions of low and unstable incomes. Inequality in ownership of productive assets, such as land and capital, also continues and strengthens the dominance of the upper economic group in the distribution of national income. On the other hand, fiscal policies that include the taxation and subsidy systems have not functioned optimally as redistribution instruments. In fact, the potential demographic bonus that should be a momentum for increasing economic growth can turn into a burden if it is not accompanied by expanding access to productive employment.

Various theoretical approaches have been developed to explain the pattern of income disparity, including that shown in the fluctuation of the Gini Ratio in Indonesia. Among the applicable theories in this case is Solow's neoclassical model of economic growth. This theory explains long-term economic growth depends on capital accumulation, labor force growth, and technological progress. In practice, income inequality can arise when these three components are not evenly distributed between regions or between community groups. For example, regions or groups that have greater access to education, productive capital, and technology will experience higher economic growth, so that the income of these regions will increase faster than other regions that are left behind. This imbalance is then shown in the high Gini Ratio in a region. Solow's theory helps assume that to reduce the Gini Ratio sustainably, a growth strategy is needed that includes equalizing the distribution of capital, improving the quality of human resources, and diffusion of technology throughout the region fairly and evenly.

Income disparities that occur can also Originate from diverse sources, involving both financial and non-financial elements, such as macroeconomic and demographic factors. One of the economic factors that influences income disparities is Macroeconomics. According to Hasyim, A. I. (2017), Macroeconomics includes the behavior of the economy as a whole or aggregate. The scope of macroeconomics includes various indicators such as GDP or GRDP, inflation, unemployment, total gross regional output, and gross regional domestic debt. So macroeconomics is a very important subject because it is related to all aspects of life and the interests of society both directly and indirectly.

In addition to economic factors such as macroeconomics, non-economic factors such as demographics also have the potential To contribute to variations in income distribution across Indonesia. Demographic factors are important Conditions influencing the scale of work productivity of people in an area. According to (M. P. Todaro & Smith, 2020) good demographic conditions tend to increase work productivity, thereby increasing economic growth in a region. In addition, it can also reduce income disparities, because a more even distribution of income can be achieved by increasing productivity. The scope of demographic factors includes Dependence Ratio, Education Level, Labor Force Participation, and Gross Regional Population.

Based on the description above, the researcher formulated several reasons for conducting this research, including: (1) the high rate of income disparity in Indonesia which is still far below the target formulated in the vision As stipulated in the RPJMN (2020–2024) and the long-term strategic agenda of the RPJPN through the Golden Indonesia Vision 2025–2045 is still a major problem even though there have been various mitigation efforts, (2) Macroeconomic and demographic aspects may play a crucial role in narrowing income gaps in Indonesia. (3) This research focuses on analyzing the extent to which these variables influence income inequality. Based on these reasons, this study raises the theme "Analysis of Factors Affecting Income Disparity in Indonesia".

LITERATURE REVIEW

Solow-Swan Theory

The neoclassical economic growth theory proposed by Robert M. Solow, namely the Solow-Swan theory, 1956, which explains that long-term Economic performance is influenced by the growth and development of aggregate supply's core components, namely capital accumulation, technological progress, and labor growth. According to Solow, growth is driven by both physical investment and the improvement of human resources. and technological development. Capital accumulation includes investment in physical and human resources, while technological development involves new discoveries, increased productivity, and the spread of innovation across economic sectors.

Kuznets Theory

Kuznets' theory explains that as an economy develops, income inequality will initially increase, but over time and as the economy matures, inequality will decrease. This phenomenon can be described in an inverted U-shaped curve that

shows the relationship between economic growth (GDP per capita) and the level of income distribution. With respect to disparities in income distribution, as often indicated by the Gini ratio. (Kuznets, 1995) argues that in the early stages of industrialization, inequality tends to increase due to the concentration of income in the wealthy and certain industrial sectors, but over time, as other sectors develop and redistribution policies are implemented, income inequality will decrease, creating a more equal distribution.

Dualism Theory (Two Sectors)

According to Lewis' theory, The interplay between labor market conditions and income disparities can be observed through explained through the dualism (two sectors) of the economy. At the outset of economic progress, unemployment in the traditional sector (agriculture) increases inequality, because income is concentrated in the more productive modern industrial sector, while the agricultural sector has low income and productivity. Over time, The reallocation of labor from farming to other sectors to the industrial sector will reduce unemployment and reduce income inequality. When most workers from the agricultural sector are absorbed into industry, income inequality between the two sectors will decrease because income opportunities are more evenly distributed (Lewis, 1954).

Population Growth Theory

In Malthus's (1798) population growth theory, high birth rates, which are related to the increasing number of non-productive age population, put pressure on limited resources. Malthus argued that the population grows exponentially, while resources only grow linearly, creating an imbalance. A high dependency ratio, namely the ratio of A higher proportion of the non-working population places additional pressure on individuals of working age because their income will be largely allocated to meet the needs of the non-productive age, thus reducing the ability to invest or save. This worsens income inequality, with the poor having difficulty meeting their needs, while the rich can maintain their welfare. Thus, a high dependency ratio can worsen income disparities and hinder economic progress.

Human Capital Theory

One of the foundational theories that examines the impact of education on income inequality is the Human Capital Theory, established by Gary Becker in the 1960s. Becker argued investment in education and skills increases individual productivity, leading to higher incomes. Individuals with higher education have a greater chance of obtaining high-wage jobs, while those with less education are trapped in low-wage jobs. Limited access to education leads to income disparities, as education largely influences earnings among individuals and groups.

The following is the Thinking Framework used in this research:

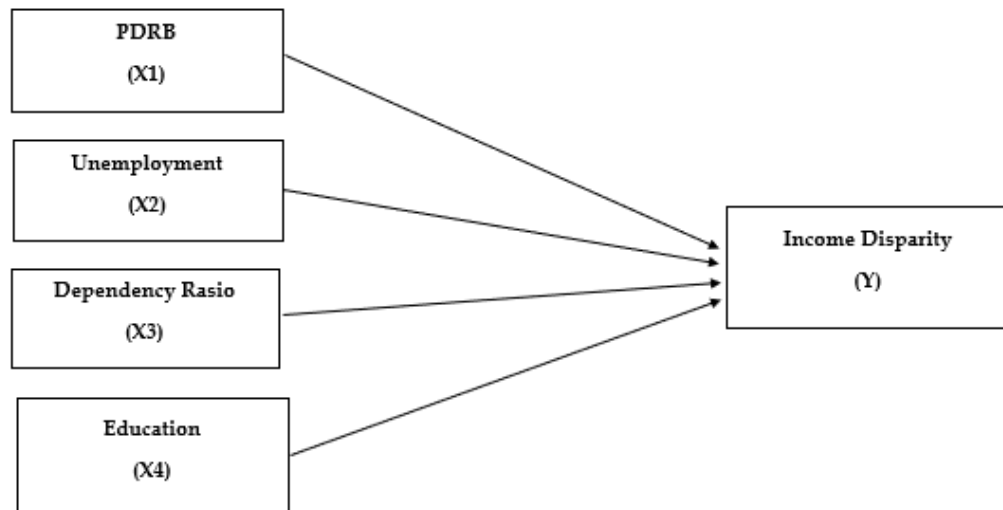


Figure 2. Conceptual Framework

METHODOLOGY

Utilizing a quantitative research framework, this study investigates the effect of macroeconomic variables (GRDP and unemployment rate) and demographic indicators (dependency ratio and education level) on income inequality in Indonesia. This approach is grounded in positivist epistemology, which supports hypothesis testing and statistical validation using empirical data. Secondary data, obtained from the Central Statistics Agency (BPS) and World Bank annual datasets, include key indicators such as the Gini Index, per capita GRDP, unemployment rates, dependency ratios, and average educational attainment. Statistical analysis is then conducted to evaluate how each factor contributes to disparities in income distribution within the country.

This research focuses on a selection of 34 provinces located across Indonesia's seven main islands, chosen based on their extremes in gross regional domestic product (GRDP) per capita during the period 2012–2022. The inclusion of provinces with both high and low GRDP per capita enables a comprehensive examination of the variables contributing to regional income disparities. The sampling strategy employed is purposive sampling, a type of non-probability sampling, which allows the researcher to intentionally select areas that meet specific, thematically relevant criteria essential to the study.

The method applied in this research is panel data regression, which combines cross-sectional and time-series observations. The analysis is performed using EViews 12 software. As explained by Widarjono (2018), panel data enables the study of economic behaviors across different units and time periods, offering richer insights than single-dimension data. This study uses panel data that includes cross-section data from 14 provinces with the highest and lowest income levels in the large islands of Indonesia, as well as time series data for 11 years, namely from 2012 to 2022. The panel regression equation adopted in this analysis is presented as:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + e_{it}$$

Information:

Y : Income inequality

α : Constant

β : Regression coefficient of independent variables

it : Variable of individual i and period 1

X1 : PDRB per capita

X2 : Open Unemployment Rate

X3 : Dependency Ratio

X4 : Education

e : Error term

To fulfill the aims of this research, the first step involves estimating panel data through three primary approaches: the Common Effect Model, the Fixed Effect Model, and the Random Effect Model. Subsequently, a series of model selection procedures are conducted, including the Chow Test, Hausman Test, and Lagrange Multiplier Test, in order to determine the most suitable model. Once the optimal model has been selected, the analysis proceeds with classical assumption testing. As noted by Gujarati (in Basuki, 2021), not all classical assumption tests are mandatory when employing the Ordinary Least Squares (OLS) method, particularly when working with secondary data that is typically well-organized. Therefore, this study only applies tests for multicollinearity and heteroscedasticity. The final phase consists of hypothesis testing, which includes the coefficient of determination (R^2), the F-test, and the t-test.

RESEARCH RESULT

Model Selection Test

Chow Test

The Chow Test is a statistical approach employed in panel data regression to evaluate whether the Fixed Effect Model provides a better fit than the Common Effect Model for the observed data. In implementing the Chow Test, it is necessary to formulate a hypothesis as a basis for testing, namely:

H0 : Common Effect Model

H1 : Fixed Effect Model

With the assumption:

If p-value > α (5%), then H0 is accepted

If p-value < α (5%), then H0 is rejected

Table 1. Chow Test Result

Effects Test	Statistic	d.f.	Prob.
Cross-section F	23.970683	(13,136)	0.0000
Cross-section Chi-square	183.458239	13	0.0000

Source : Processed Data, 2025

According to the regression results of the Chow Test, the Cross-section Chi-square yields a probability value of 0.0000, which is less than the 0.05 significance level. This indicates the rejection of the null hypothesis (H0) and acceptance of the alternative hypothesis (H1). Therefore, it can be inferred that the Fixed Effect Model (FEM) is the most suitable model for the panel data analysis, necessitating further validation through the Hausman Test.

Hausman Test

The Hausman Test is a statistical approach utilized in panel data analysis to evaluate which model between the Fixed Effect Model (FEM) and the Random Effect Model (REM) is more suitable for the dataset. In conducting this test, it is essential to establish hypotheses that serve as the foundation for the decision-making process.:

H0 : Random Effect Model

H1 : Fixed Effect Model

With the assumption:

If $p\text{-value} > \alpha$ (5%), then H0 is accepted

If $p\text{-value} < \alpha$ (5%), then H0 is rejected

Table 2. Hausman Test Result

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	45.362655	4	0.0000

Source : Processed Data, 2025

Based on Table 2, it shows that the probability value of Cross-section random is 0.0000 or < 0.05 , which means that H0 is rejected and H1 is accepted. Therefore, it can be inferred that the Fixed Effect Model (FEM) is the most suitable model for conducting panel data regression in this study.

Consequently, based on the outcomes of both the Chow Test and the Hausman Test, the Fixed Effect Model (FEM) is identified as the most appropriate model for this study. Therefore, conducting the Lagrange Multiplier Test to compare the Common Effect Model and the Random Effect Model is deemed unnecessary, as the optimal model has already been established.

Table 3. Panel Data Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.215798	0.046035	4.687650	0.0000
X1	-1.07E-06	2.41E-07	-4.450297	0.0000
X2	-0.000994	0.001636	-0.607265	0.5447
X3	0.003978	0.000775	5.131353	0.0000
X4	3.71E-07	1.96E-06	0.189001	0.8504

Source : Processed Data, 2025

Referring to the regression outcomes presented in Table 3, the resulting multiple linear regression equation can be formulated as follows:

$$Y_{it} = 0.215798 - 0,00000107 * X_{1it} - 0.000994 * X_{2it} + 0.003978 * X_{3it} + 0,000000371 * X_{4it}$$

The multiple linear regression equation presented in Table 3 can be interpreted as follows:

1. Constant = 0.215798
This means that if the variables Gross Regional Domestic Product (X1), Unemployment (X2), Dependency Ratio (X3), and Education Level (X4) increase by one unit on average, then Income Disparity (Y) will increase by 0.215798 points.
2. Regression Coefficient X1 = -0,00000107
The beta coefficient value of the Gross Regional Domestic Product variable (X1) is negative (-) at -0.00000107, meaning that if the value of other variables is constant and the X1 variable increases by 1 thousand Rupiah, the income disparity variable (Y) will decrease by -0.00000107 points and vice versa.
3. Regression Coefficient X2 = -0.000994
The beta coefficient value of the Unemployment variable (X2) is negative (-) at -0.000994, meaning that if the value of the other variables is constant and the X2 variable increases by 1 percent, the income disparity variable (Y) will decrease by -0.000994 points and vice versa.
4. Regression Coefficient X3 = 0.003978
The beta coefficient value of the Dependency Ratio variable (X3) is positive (+) at 0.003978, meaning that if the value of other variables is constant and the X3 variable increases by 1 percent, the income

disparity variable (Y) will also increase by 0.003978 points, and vice versa.

5. Regression Coefficient X4 = 0,000000371

The beta coefficient value of the Education Level variable (X4) is positive (+) at 0.000000371, meaning that if the value of the other variables is constant and the X4 variable increases by 1 percent, then the income disparity variable (Y) will also increase by 0.000000371 points, and vice versa.

Classical Assumption Test

Multicollinearity Test

The multicollinearity test is a diagnostic technique in regression analysis aimed at identifying the presence of a strong linear relationship among the independent variables. A regression model is said to be free from multicollinearity if the independent variables are not significantly correlated with one another.

Table 4. Multicollinearity Test Result

	X1	X2	X3	X4
X1	1.000000	0.548732	-0.614522	0.448037
X2	0.548732	1.000000	-0.168029	0.489840
X3	-0.614522	-0.168029	1.000000	-0.272288
X4	0.448037	0.489840	-0.272288	1.000000

Source : Processed Data, 2025

Referring to the correlation results presented in Table 4, there is no indication of a significant relationship among the independent variables. The correlation coefficients between all independent variables (GRDP X1, Unemployment X2, Dependency Ratio X3, and Education X4) are below 0.8, indicating weak linear associations. This suggests that the regression model is free from multicollinearity issues, and thus, the estimation of regression coefficients is not adversely affected by multicollinearity.

Heteroscedasticity Test

The heteroscedasticity test aims to determine the presence of unequal variance in the error terms (residuals) of a regression model. One of the common

techniques used to detect indications of heteroscedasticity is the Glejser test method.

Table 5. Heteroscedasity Test Result

Variabel	Prob.
C	0.6914
X1	0.3869
X2	0.2739
X3	0.0696
X4	0.4315

Source : Processed Data, 2025

The presence of heteroscedasticity in the regression model can be assessed using the Breusch-Pagan or Glejser tests, with the determination based on the resulting probability value. If the probability exceeds the significance level of $\alpha = 0.05$, it indicates the absence of heteroscedasticity symptoms. Conversely, a probability value below 0.05 suggests the existence of heteroscedasticity within the model.

Referring to the heteroscedasticity test results presented in Table 4.9, the probability values (p-values) for each independent variable are as follows: the constant (C) is 0.6914, X1 is 0.3869, X2 is 0.2739, X3 is 0.0696, and X4 is 0.4315. Since all of these p-values exceed the 0.05 significance level, it can be concluded that the regression model does not exhibit significant signs of heteroscedasticity and meets the assumption of homoscedasticity, namely the residual variation is relatively constant across all predicted values or passes the heteroscedasticity test.

Statistic test

t-Test (Partial Test)

Table 6. T Test Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.215798	0.046035	4.687650	0.0000
X1	-1.07E-06	2.41E-07	-4.450297	0.0000
X2	-0.000994	0.001636	-0.607265	0.5447
X3	0.003978	0.000775	5.131353	0.0000
X4	3.71E-07	1.96E-06	0.189001	0.8504

Source : Processed Data, 2025

Based on the results of the T test in table 6, the probability of each research variable is obtained as follows:

- a) The t-test results for the Gross Regional Domestic Product (GRDP) Per Capita variable (X1) in relation to Income Disparity (Y) show a t-statistic of 4.450297 with a significance value of 0.0000. Since the significance level is less than 0.05, it indicates that the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted. This means that the GRDP Per Capita variable has a statistically significant partial effect on income disparity in Indonesia.
- b) The t-test results for the Unemployment variable (X2) with respect to Income Disparity (Y) yielded a t-statistic of 0.607265 and a significance value of 0.5447. Since the p-value exceeds the 0.05 threshold, the alternative hypothesis (H1) is rejected and the null hypothesis (H0) is accepted. This indicates that the Unemployment variable does not have a statistically significant partial effect on income disparity in Indonesia.
- c) The t-test outcome for the Dependency Ratio variable (X3) in relation to Income Disparity (Y) shows a t-statistic of 5.131353 with a significance value of 0.0000. Since the p-value is less than the 0.05 significance level, the null hypothesis (H0) is rejected while the alternative hypothesis (H1) is accepted. This suggests that the Dependency Ratio variable has a statistically significant partial influence on income disparity in Indonesia.
- d) The t-test result for the Education variable (X4) with respect to Income Disparity (Y) yielded a t-statistic of 0.189001 and a p-value of 0.8504. Since the significance value exceeds the 0.05 threshold, the alternative hypothesis (H1) is rejected and the null hypothesis (H0) is accepted. This indicates that, on a partial basis, the Education variable does not have a statistically significant impact on income disparity in Indonesia.

f-Test (Simultaneous Test)

Table 7. F Test Result

F-statistic	24.01451
Prob(F-statistic)	0.000000

Source : Processed Data, 2025

Referring to the F-test outcome in Table 7, the obtained F-statistic is 24.01451 with a probability value of 0.000000. Since this value is below the significance threshold of 0.05 ($0.000000 < 0.05$), it indicates that the null hypothesis (H0) must be rejected and the alternative hypothesis (H1) is accepted. Therefore, it can be inferred that the set of independent variables Gross Regional Domestic Product (X1), Unemployment (X2), Dependency Ratio (X3), and

Education (X4) together or simultaneously affect the dependent variable, namely Income Disparity in Indonesia.

Coefficient of Determination Test (R^2)

Table 8. Coefficient of Determination Test Result

R-squared	0.750113
Adjusted R-squared	0.718877
S.E. of regression	0.019194

Source : Processed Data, 2025

The adjusted R-squared value obtained from the coefficient of determination test is 0.718877, meaning that 71.89% of the changes in income disparity (Y) across Indonesia can be accounted for by the independent variables, which include Gross Regional Domestic Product Per Capita (X1), Unemployment Rate (X2), Dependency Ratio (X3), and Education Level (X4). The remaining 28.11% is influenced by other variables not examined in this study.

DISCUSSION

The Influence of Gross Regional Domestic Product on Income Disparity

Based on the results of the Panel Data Regression test, it is known that the probability value for the Gross Regional Domestic Product variable is 0.0000 or less than 0.05 and the negative coefficient value (-) is - 0.00000107. So it can be inferred that Gross Regional Domestic Product (GRDP) had a significant inverse relationship with income inequality in Indonesia during the period 2012 to 2022. This means that an increase in GRDP tends to be followed by a reduction in income disparity, while a decline in GRDP is generally associated with a rise in inequality levels.

The findings of this study align with Kuznets' hypothesis, which suggests that during the course of economic development, income inequality initially tends to increase as a result of industrialization and shifts in economic structure. However, over time and the maturity of the economy and the expansion of productive sectors and the implementation of redistribution policies, income disparity will decrease. This theory is illustrated through an inverted U-curve which explains that at the initial stage of economic development, growth will increase disparity, but at a later stage, growth will actually reduce disparity.

Ravallion & Datt's (1996) study of India also showed similar findings, where despite per capita income increasing from the 1950s to the 1990s, the level of inequality actually decreased. However, these results are not entirely consistent across developing countries. Adams' (2004) study analyzing 60 developing countries actually found that GDP per capita had no effect on disparities. This shows that although Kuznets' theory is generally accepted, its impact is more pronounced in advanced industrial countries with high income levels, while in

developing countries the relationship between economic growth and income distribution is still variable and contextual.

In reality, in Indonesia itself there are dynamics that strengthen these findings. Regions with high GRDP such as DKI Jakarta tend to show lower levels of income disparity compared to regions with low GRDP, such as in Eastern Indonesia. This shows that strong and sustainable economic growth, especially if accompanied by job creation and equal access to economic resources, can contribute to reducing disparities.

The Impact of Unemployment on Income Disparity

The Panel Data Regression results indicate that the unemployment variable has a probability value of 0.5447, which exceeds the 0.05 significance threshold, along with a negative coefficient of -0.000993678879084. This implies that although unemployment is negatively associated with income disparity in Indonesia during the period 2012–2022, the relationship is statistically insignificant. This insignificant effect can be caused by several factors, such as the dominance of the informal sector which makes many residents still earn income even though they are not registered as formal workers. In addition, social assistance programs and government policies in income distribution also help reduce the impact of unemployment on income disparity. This shows that unemployment is not the only major factor in determining the level of income disparity in Indonesia.

This phenomenon can be associated with Lewis's (1954) theory of economic dualism, which explains that in the preliminary phase of a country's economic transformation, inequality increases due to the concentration of income in the more productive modern industrial sector, while traditional sectors such as agriculture still experience hidden unemployment and low income. However, as the transition of the workforce from the traditional sector to the modern sector increases, unemployment will decrease and income distribution will become more equal. In Indonesia, the insignificant effect of unemployment on inequality may indicate an ongoing structural transition process, where sector shifts have not been fully optimal in reducing income disparities.

This study's panel data regression analysis demonstrates that the unemployment variable has a negative relationship with income inequality in Indonesia throughout the 2012–2022 period, although the effect is not statistically significant. These findings, while consistent in some respects with previous research, also reveal notable differences. For example, a study by Ersad et al. (2022) identified a significant negative influence of unemployment on income disparities across regions in Southern Sumatra, indicating that increased unemployment levels were associated with reduced inequality. On the other hand, Yusica (2018) reported contrasting evidence, showing that unemployment positively correlates with income inequality suggesting that as unemployment rises, so does the gap in income distribution.

These differing outcomes indicate that unemployment's effect on income disparity likely varies depending on the surrounding context, depending on regional characteristics, local economic structure, and the role of the informal

sector. At a national level such as in Indonesia, the effect of unemployment on disparities may be weakened by the compensatory role of social programs and the contribution of the informal sector, while at a regional level such as in Southern Sumatra, the effect becomes more pronounced due to dependence on certain sectors and lack of economic diversification that increase inequality when unemployment increases.

The Influence of Dependency Ratio on Income Disparity

The findings from the panel data regression indicate that the dependency ratio variable has a probability value of 0.0000, which falls below the 5% threshold, alongside a positive coefficient of 0.00397794832622. This suggests a meaningful and statistically significant positive association between the dependency ratio and income inequality in Indonesia during the period from 2012 to 2022. In essence, a higher dependency ratio – reflecting a greater share of non-working individuals in the population – is linked to an increase in income disparity across the country.

The outcome supports the assumptions of population growth theory as articulated by Thomas Robert Malthus (1798) which states that population growth, especially that which is not balanced by proportional resource growth, will create economic imbalance. This inequality creates pressure on economic resources, especially when most of the population is in the non-productive age group that does not contribute directly to economic output, but still needs to fulfill basic needs. This condition causes a greater economic burden for the productive age group, especially for low-income households, which ultimately narrows the fiscal space for productive consumption, investment, and savings.

Empirical findings showing that the dependency ratio reflects a positive and notable association significant effect on income disparity in Indonesia during the 2012–2022 period are in line with the results of a study (Priyo Marmujiono, 2014) which revealed that there is a positive and significant relationship between the dependency ratio and the level of poverty and income inequality.

Observations in the Indonesian context reinforce the idea that the dependency ratio is connected to income inequality, as supported by existing theoretical and empirical literature. Data shows that areas with high dependency ratios, such as several provinces in Eastern Indonesia (for example, East Nusa Tenggara), generally also experience high levels of income inequality. A high dependency load on the economically active group tends to intensify welfare inequality within the population.

However, on the other hand, there are areas such as DKI Jakarta which have a relatively high dependency ratio but actually record a more moderate level of inequality. This shows the effectiveness of social policies such as direct cash assistance programs, national health insurance (JKN), Smart Indonesia Card, and various other social interventions in reducing the negative impact of the dependency ratio.

The Impact of Education on Income Disparity

According to the results of the panel data regression, the education variable yields a p-value of 0.8504 – above the standard threshold of 0.05 – and a positive coefficient of 0.000000370839495521. These findings suggest that education exerts a positive but negligible and statistically insignificant impact on income disparity in Indonesia between 2012 and 2022.

These findings are consistent with the Human Capital Theory introduced by Gary Becker in the 1960s. According to Becker, investment in education and skills development can increase individual productivity which ultimately has an impact on increasing income. Those with advanced education typically access better-paying jobs, while individuals with minimal education are disproportionately represented in lower-wage employment.

The panel data regression analysis in this study reveals that education has a positive yet statistically insignificant impact on income inequality in Indonesia between 2012 and 2022. Although this outcome aligns with broader discussions in the literature, it contrasts with findings from other empirical works. For instance, a study by Nadya and Syafri (2019) reported a significant positive association between education and income inequality in Indonesia. Their findings suggest that individuals with access to quality education tend to secure better-paying jobs, thereby increasing the income gap with less-educated groups. Conversely, research by Nuraini (2017) found a significant negative relationship between education and income disparity in the Gerbangkertosusila region, indicating that when educational access is more evenly distributed and aligned with labor market demands, education can serve as a tool to reduce inequality.

Thus, it can be concluded that education is not yet effective enough as a tool to reduce income disparity in Indonesia if it is not accompanied by equal access, improved quality of education, and a close relationship between the educational sector and labor market demands. Therefore, education development policies in Indonesia must be directed not only at quantitative improvements (such as length of schooling), but also at improving the quality and suitability of skills.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Based on the results of data analysis obtained through the panel data regression method, the following conclusions can be drawn:

1. The panel data regression analysis indicates that the Gross Regional Domestic Product (GRDP) variable has a statistically significant negative impact on income inequality in Indonesia during the 2012–2022 period. This suggests that higher GRDP in a region is generally associated with lower levels of income disparity. Therefore, it can be inferred that economic growth reflected through rising GRDP has the potential to narrow regional income gaps and support more equitable income distribution across the country. This effect is particularly evident when growth is driven by increased employment opportunities, broader access to economic resources, and the implementation of inclusive development policies that ensure balanced progress among different regions.

2. The findings from the panel data regression analysis suggest that both unemployment and poverty variables exhibit negative but statistically insignificant effects on income inequality in Indonesia over the 2012–2022 period. While a decline in unemployment or poverty may coincide with reduced income disparity, the strength of these relationships is not sufficient to draw firm statistical conclusions. The lack of significance implies that poverty alone does not serve as a dominant determinant of income inequality. Consequently, addressing inequality requires broader strategies that extend beyond poverty alleviation such as improving labor productivity and enhancing the effectiveness of income redistribution policies to ensure a more equitable economic structure in Indonesia.
3. The panel data regression results indicate that the dependency ratio variable has a positive and statistically significant influence on income inequality in Indonesia during the 2012–2022 period. This suggests that as the proportion of the non-productive population (such as children and the elderly) increases relative to the working-age population, income disparities tend to widen. In essence, the rising dependency ratio contributes to greater economic strain on the productive segment of the population, potentially diminishing the efficiency of income distribution and limiting opportunities for productive investment. This demographic pressure may intensify the income gap between higher-income and lower-income groups, reinforcing structural inequality across society.
4. The panel data regression analysis reveals that the education variable exhibits a positive yet statistically insignificant relationship with income inequality in Indonesia over the 2012–2022 period. This indicates that, despite improvements in educational attainment or access, such progress has not translated into a meaningful reduction in income disparities across regions or social groups. The lack of statistical significance may reflect persistent gaps in educational quality, a misalignment between graduates' skills and labor market demands, as well as uneven employment opportunities. Therefore, for education to effectively serve as a mechanism for narrowing inequality, strategic reforms are necessary focusing on enhancing educational quality, ensuring equitable access, and aligning educational outcomes with economic and labor market requirements.

Recommendations

Considering the empirical evidence presented, the researcher proposes that government authorities prioritize inclusive and equitable economic growth to reduce income disparities, including through infrastructure development, empowerment of MSMEs, and increasing regional competitiveness. Although the negative impact is weakening but not significant, increasing the quality and quantity of jobs, workforce training, and evaluating employment policies are still needed to support income equality. In response to the proven impact of the dependency ratio on inequality, the government is encouraged to broaden the scope of support for economically inactive individuals and intensify efforts in population management strategies. Meanwhile, to increase the contribution of education in reducing inequality, it is necessary to equalize access to quality

education, adjust competency-based curriculum, and increase collaboration between education and industry.

ADVANCED RESEARCH

The outcomes of this study may provide a foundational basis for subsequent academic inquiries focusing on income inequality, both within the context of Indonesia and in broader geographical settings, regardless of the variable framework employed. Additionally, this research enriches existing economic literature and encourages deeper exploration into other determinants of income disparity across various levels.

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