

INCOME INEQUALITY AND REGIONAL ECONOMIC INTEGRATION: A DECADE-LONG STUDY OF THE BARLINGMASCAKEB ECONOMIC ZONE (2012–2024)

Marlina Purwaningsih^{1*}, Diah Setyorini Gunawan², Arintoko³

¹⁻³ Faculty of Economics and Business, Universitas Jenderal Soedirman, Indonesia

*Email corresponding author: marlina.purwaningsih@mhs.unsoed.ac.id

Abstract

The Barlingmascakeb region, comprising five regencies and cities in Central Java, has significant potential for economic growth. However, this growth is not always accompanied by equitable income distribution. Ongoing income inequality can hinder sustainable development and exacerbate social inequality. This study aims to analyze the level of income inequality in the Barlingmascakeb region from 2012 to 2024 and identify the factors influencing it. The methodology employs a quantitative approach, utilizing the Williamson index to measure inter-regional inequality and panel data regression analysis to assess the effects of economic growth, the unemployment rate, and the district minimum wage on income inequality in Barlingmascakeb during the specified period. The results indicate that the level of inter-regional income inequality in the Barlingmascakeb region is categorized as high, although it has shown a decline in recent years. Furthermore, economic growth and the district minimum wage have a significant negative impact on income inequality in the region. Additionally, economic growth and the district minimum wage significantly reduce income inequality in the Barlingmascakeb Region. In contrast, the unemployment rate does not have a significant effect on income inequality, suggesting that other economic development issues play a more substantial role in shaping inequality in the region. These findings highlight the need for a more inclusive development policy that focuses on strengthening the economies of peripheral areas to sustainably reduce inequality.

Keywords: economic growth, income inequality, unemployment rate, wages, williamson index

INTRODUCTION

Income inequality in Central Java poses a significant challenge to achieving equitable development. Despite the province's substantial contribution to the national economy, a noticeable income disparity persists between regions, highlighted by a Gini ratio of 0.367 recorded in March 2024. This disparity exists between more developed urban areas, such as Semarang and Surakarta, and underdeveloped rural regions. Such inequality threatens to impede inclusive and equitable economic growth (Wahyuningsih & Mulyani, 2024).

The Regional Government of Central Java Province formulated the 2018-2023 Regional Medium-Term Development Plan (RPJMD) under Regional Regulation No. 23 of 2014. The goal of this RPJMD is to enhance community welfare by fostering a balanced economy and promoting harmonious inter-regional development (Ramadhan & Oktora, 2024). One of the strategies implemented is the establishment of eight strategic areas, including the Barlingmascakeb area, which is set to become the main economic growth center in the province. Figure 1 shows the GRDP per capita of strategic areas in Central Java.

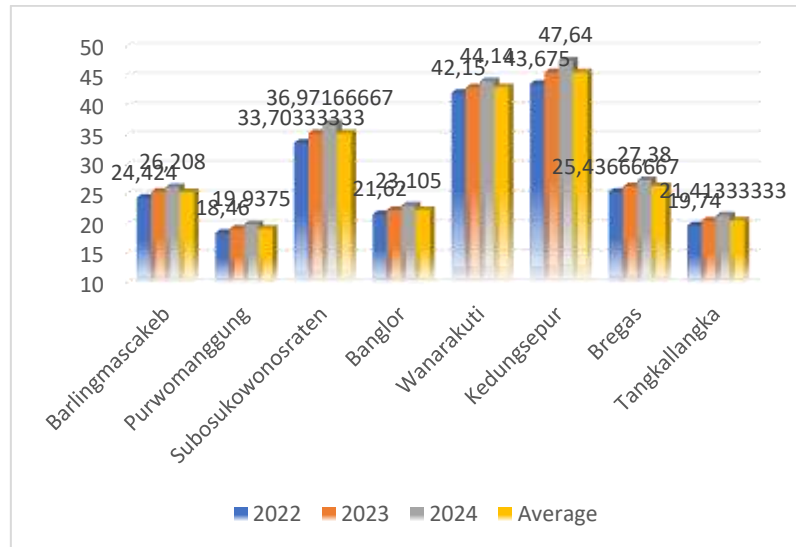


Figure 1. GRDP per capita of Strategic Economic Areas in Central Java

The GRDP per capita trend from 2022 to 2024 indicates a moderate increase in almost all regions, although growth is not always consistent each year. For instance, the Bregas region is projected to rise from around 25 million in 2022 to more than 27 million in 2024, while Barlingmascakeb and Banglor show relatively small but positive increases. The Barlingmascakeb region has one of the lowest growth rates, with an average annual GRDP below 25 million rupiah. This highlights the development and productivity gap between strategic areas. Although the Barlingmascakeb region appears to have stable average GRDP growth, there is a significant imbalance between Cilacap Regency and other regencies within the region. This disparity reflects differences in industrialization levels, infrastructure access, and investment attractiveness among regions in a strategic area. Variations in resource potential and utilization contribute to imbalances that can hinder overall economic integration in the region.

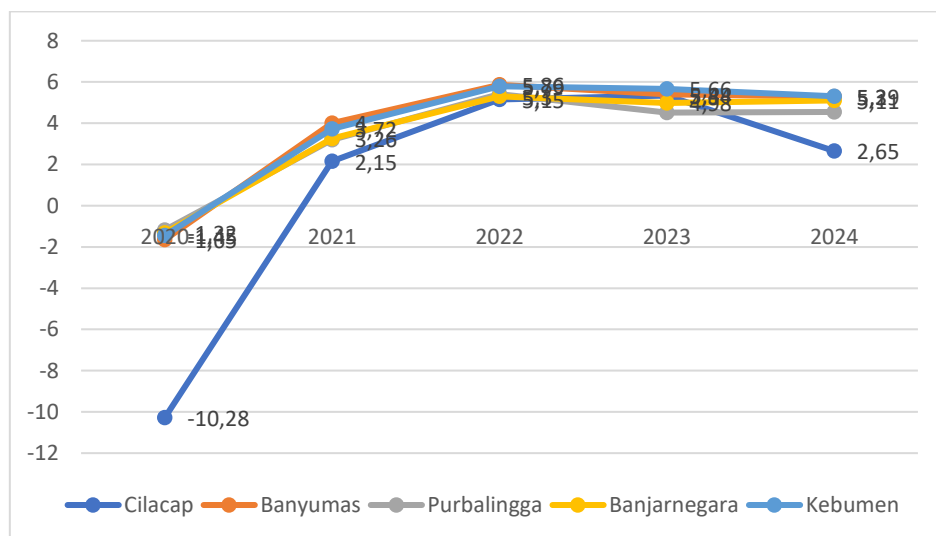


Figure 2. Economic Growth in the Barlingmascakeb Region

Economic growth in the Barlingmascakeb Region (Banjarnegara, Banyumas, Purbalingga, Cilacap, and Kebumen) is experiencing a strong recovery following a sharp contraction in 2020 due to the COVID-19 pandemic. All regencies have returned to positive growth rates above 4% in 2022 and 2023, with some even reaching the 5-6 percent range. However, despite these improvements in

growth rates, recent data and studies indicate that this growth has not resulted in equitable development across the region. This disparity is evident in the significant inequality in GRDP per capita among the districts. For instance, Cilacap has an economic value considerably higher than that of Banjarnegara and Kebumen, coupled with notable differences in access to infrastructure, the quality of human resources, and labor force participation rates.

This condition is worsened by the high level of open unemployment, which contributes to the elevated number of impoverished individuals, with an average poverty rate of approximately 16 percent higher than the average for Central Java Province (Corolina et al., 2021; Pamiati & Woyanti, 2021). The District/Municipal Minimum Wage (UMK) in the Barlingmascakeb region varies significantly, impacting income inequality in the area. For instance, Banjarnegara's Minimum Wage in 2025 was set at IDR 2,170,475.32, the lowest in Central Java, while Cilacap's Minimum Wage for the same year reached IDR 2,640,248.00, making it the fifth highest in the province (Milagsita, 2024; Wikanto, 2025). The difference in the size of MSEs between districts reflects economic inequality, which can widen the income gap in the Barlingmascakeb region.

Based on this background, the study aims to analyze the magnitude of income inequality in the Barlingmascakeb Region from 2012 to 2024, as well as the impact of economic growth, unemployment, and the District Minimum Wage on income inequality during this period. Unlike previous studies, this research uses the Williamson index as a proxy for income inequality, providing a more comprehensive analysis through integrated calculations.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Regional Economic Development

Regional development involves managing resources through collaboration between the government, the community, and the private sector to create jobs and stimulate economic growth. Economists define economic development as an increase in per capita income within society. Additionally, economic development encompasses changes in the overall economic structure of the community (Isnowati, 2014).

According to Arsyad, (2014) Before the 1960s, economic development was defined as the ability of a national economy, initially relatively static over a long period, to increase and maintain its GNP growth rate at 5 to 7 percent or more per year. This definition is primarily economic in nature. However, the understanding of economic development has evolved. The experiences of the 1950s and 1960s demonstrated that focusing solely on GNP (Gross National Product) growth could not fundamentally address development issues. This is evident in the fact that the standard and quality of life for most people did not improve, even when annual GNP growth targets were met. In other words, there are clear signs of a significant misinterpretation of the term "economic development" when it is viewed too narrowly. Therefore, Todaro & Smith, (2011) states that the success of a country's economic development is indicated by three main values: (1) the community's ability to meet its basic needs (sustenance), (2) an increased sense of self-esteem among community members, and (3) the growing ability of the community to make choices (freedom from servitude), which is a fundamental human right.

Inequality Theory

Income distribution inequality refers to the disparity in economic prosperity between the rich and the poor, as evidenced by differences in income. This inequality often arises from strong reverse effects and weak dispersion effects in developing countries (Jhingan, 2010). Inequality between regions is a common occurrence in economic activities. This arises from differences in the availability of natural resources and varying demographic conditions in each region. Such disparities affect a region's capacity to drive the development process. As a result, regions are often categorized as developed or underdeveloped (Sjafrizal, 2012).

Based on research conducted by Khuluk et al., (2021) inequality refers to the varying standards of living across society, primarily due to differences in factors of production and available resources between regions. These disparities lead to variations in development levels and income distribution, resulting in a welfare gap among different areas.

Kuznets, (1955) states that in the early stages of economic growth, income distribution tends to worsen. However, in the later stages, income distribution improves along with income equalization. This observation is known as the “inverted U” Kuznets curve, reflecting the longitudinal (time-series) changes in income distribution.

The effect of economic growth on income inequality in the Barlingmascakeb Region

Economic growth is the process of increasing the production of goods and services in a country or region over time (Zulfa, 2016). Positive economic growth rates do not always align with income equality across different regions. Kuznets, (1955) assumes that the relationship between growth and inequality resembles an inverted U-shape. In the short run, there is a positive correlation, but in the long run, the relationship becomes negative. This means that in the early stages of development, inequality will increase to a certain point before it begins to decrease. This is in line with research conducted by Yasa, (2015) that economic growth has a significant negative effect on income inequality. Other research conducted by Wu & Li, (2017) found an inverse correlation between economic growth and inequality: as economic growth increases, income inequality decreases (Amri & Nazamuddin, 2018) also explains that efforts toward equitable development must be supported by economic growth in various regions to ensure a balanced increase in income across all areas. Therefore, the research hypothesis can be proposed as follows:

H₁: Economic growth has a negative effect on income inequality.

The effect of unemployment on income inequality in the Barlingmascakeb Region

Unemployment rates can impact income inequality across different regions. A high unemployment rate can limit employment opportunities for specific individuals or groups. (Yusica, 2018). If a significant portion of the population is unemployed, they may struggle to earn adequate income or have no income at all. Higher unemployment rates lead to greater income inequality (Misdawita & Sari, 2013). This research is also in line with what was done Bouincha & Karim, (2018) the increase in the number of unemployed people in developing countries tends to be uneven, which impacts regional income disparities. A high unemployment rate can widen the gap in income inequality across different regions. Therefore, the research hypothesis can be proposed as follows:

H₂: Unemployment rate has a positive effect on income inequality

The effect of district minimum wage on income inequality

In theory, neoclassical economic theory posits that minimum wages will increase income inequality rather than reduce it. The establishment of a minimum wage creates a non-market mechanism that raises the price of labor (Ansori & Priyono, 2018). As labor costs rise, an increase in the minimum wage leads to a reduction in labor demand, resulting in some workers becoming unemployed. This wage increase is anticipated to impact regional income inequality; the greater the wage increase in a region, the higher the level of inequality (Sungkar et al., 2015). Other research conducted by Amri & Nazamuddin, (2018) also explains that wage increases have a positive correlation with regional income inequality. Therefore, the research hypothesis can be proposed as follows:

H₃: District Minimum Wage has a positive effect on income inequality

RESEARCH METHODS

This research employs a quantitative approach, focusing on testing theories by measuring research variables numerically and analyzing data using statistical procedures (Sugiyono, 2017). This

study utilizes secondary data, specifically data on the per capita income, ADHK GRDP growth rate, unemployment rate, and District Minimum Wage (UMK) of the Barlingmascakeb Region from 2012 to 2024.

The Williamson Index measures the level of income inequality between regions, specifically assessing the gross regional income inequality within a region (Kuncoro, 2013). The Williamson Index formula incorporates GDP per capita and total population, yielding a value between zero and one ($0 < W < 1$). A smaller Williamson Index value indicates lower inequality, while a larger value signifies higher inequality. Below is the calculation of the Williamson Index.

$$IW = \sqrt{\frac{\sum(Y_i - Y)^2 f_i / n}{Y}}$$

Information:

IW : Williamson Index
 Y_i : Per capita income in study area i
 Y : Average per capita income of the reference region
 f_i : Total population in study area i
 n : Total population in the reference area

The Williamson Index calculation has the following criteria for the results used (Sjafrizal, 2012):

$IW (0,7 - 1)$: High Inequality
 $IW (0,4 - 0,69)$: Moderate Inequality
 $IW (<0,39)$: Low Inequality

Panel data combines time series data from 2012 to 2024 with cross-sectional data covering five regencies: Banjarnegara, Purbalingga, Banyumas, Cilacap, and Kebumen. This study employs panel data analysis to examine the effects of economic growth, the unemployment rate, and micro and small enterprises (MSE) on income inequality in the Barlingmascakeb region during the period from 2012 to 2024. The panel data regression equation for this study is:

$$ID = \alpha + \beta_1 EG_{1it} + \beta_2 Unp_{2it} + \beta_3 Wage_{3it} + \varepsilon$$

Information:

ID : Income inequality
 α : Constant (intercept)
 $\beta_1 \dots \beta_4$: Regression Coefficient (slope)
 EG : Economic growth
 Unp : Unemployment rate
 $Wage$: District Minimum Wage
 ϵ : Error term
 it : The i -th object and the t -th time

RESULTS AND DISCUSSION

Williamson Index Economic Cooperation Area

The Williamson Index measures the level of GRDP inequality. It ranges from zero to one, with a positive value. A higher Williamson Index value, closer to one, indicates greater income inequality between regions. Conversely, a lower value, closer to zero, signifies reduced income inequality among the regions.

Table 1. Income Inequality in the Barlingmascakeb Region, 2012 - 2024

No	Year	Inequality Rate	Inequality Category
1.	2012	0.736	High Inequality
2.	2013	0.711	High Inequality
3.	2014	0.693	High Inequality
4.	2015	0.696	High Inequality
5.	2016	0.696	High Inequality
6.	2017	0.663	High Inequality

No	Year	Inequality Rate	Inequality Category
7.	2018	0.631	High Inequality
8.	2019	0.621	High Inequality
9.	2020	0.581	Moderate Inequality
10.	2021	0.571	Moderate Inequality
11.	2022	0.568	Moderate Inequality
12.	2023	0.573	Moderate Inequality
13.	2024	0.559	Moderate Inequality
Average		0.638	High Inequality

Source: Secondary Data processed, 2025

The income inequality in the Barlingmascakeb region—comprising Banjarnegara, Purbalingga, Banyumas, Cilacap, and Kebumen—from 2012 to 2024, as measured by the Williamson Index, reveals a fluctuating trend with moderate levels of disparity. During the early period from 2012 to 2015, the index experienced a gradual decline, indicating an improvement in income distribution across the region. This suggests that development efforts during this time may have been relatively balanced, allowing less-developed areas to catch up economically. However, from 2016 to 2018, the index showed an upward trend, reflecting growing disparities likely caused by the concentration of economic growth in more urbanized and industrialized districts such as Cilacap and Banyumas. This uneven development may have left peripheral or rural districts trailing behind.

A notable improvement in income equality occurred between 2019 and 2021, when the index dropped significantly. This can be attributed to the effects of the COVID-19 pandemic, which disrupted economic activities uniformly across regions, followed by government interventions such as stimulus packages and social assistance that reached broader segments of the population. These measures temporarily narrowed the income gap among districts. However, this positive trend was not sustained. From 2022 to 2024, the index began to rise again, indicating that the post-pandemic economic recovery has been uneven. More developed districts with better infrastructure and economic resilience rebounded faster, while others struggled to recover at the same pace, leading to renewed disparities.

The effect of per capita income, unemployment and district minimum wage (UMK) on income inequality in the Barlingmascakeb Region

Panel Data Regression is employed to analyze the effects of economic growth, unemployment rate, and district minimum wage on income inequality in the Barlingmascakeb Economic Cooperation Area. The data comprises a combination of cross-sectional data from five regencies: Cilacap, Banyumas, Purbalingga, Banjarnegara, and Kebumen, while the time series data spans from 2012 to 2024.

The first step involved determining the appropriate panel data regression model. Tests, including the Chow test, Hausman test, and Lagrange multiplier test, were conducted to identify the suitable model for this panel data regression.

Table 2. Chow test

Redundant Fixed Effects Tests
 Equation: Untitled
 Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	168.163624	(4,57)	0.0000
Cross-section Chi-square	165.718791	4	0.0000

Source: Eviews processing, 2025

Based on the Chow test results presented in Table 2, the significance level for the cross-section F statistic is 0.000, and the Chi-Square value is also 0.000. Since the significance level is less than 0.05 ($\alpha = 5$ percent), we reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1). This indicates that the selected model is the Fixed Effect Model. Additionally, a Hausman test is conducted to determine whether the appropriate model is the Fixed Effect Model or the Random Effect Model.

Table 3. Hausman test

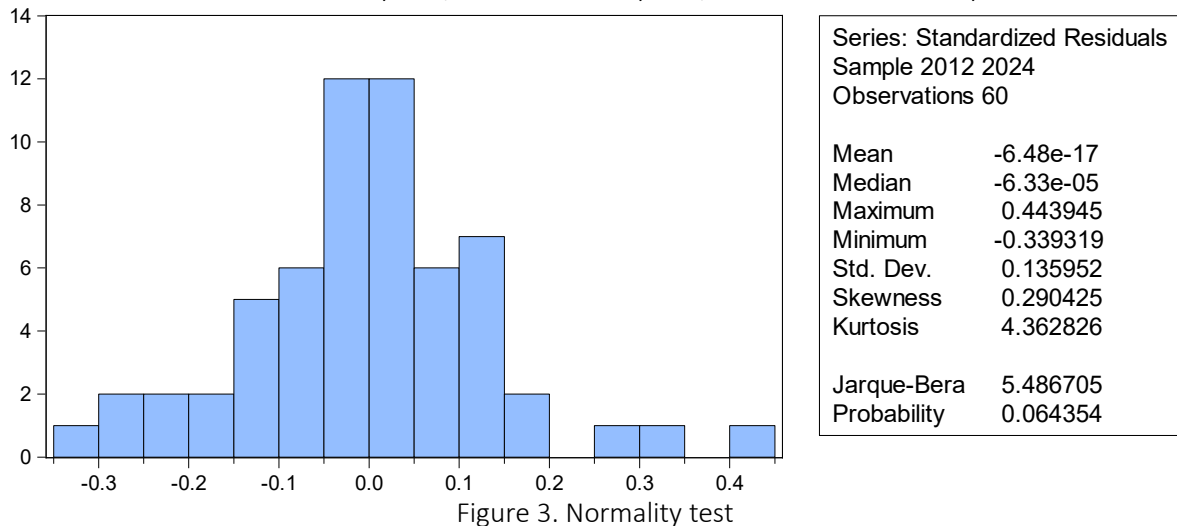
Correlated Random Effects - Hausman Test
 Equation: Untitled
 Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	35.190573	3	0.0000

Source: Eviews processing, 2025

Based on Table 3, the cross-sectional random significance level is 0.0000. Since this significance level is less than 0.05 ($\alpha = 5$ percent), we reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1). This indicates that the Fixed Effect Model is appropriate for this analysis. Additionally, the Chow and Hausman tests confirm that the selected model is indeed the Fixed Effect Model.

Equally important is the classical assumption test. This test ensures that the panel data regression model is valid and can be reliably used for research results. The classical assumption tests conducted include the normality test, multicollinearity test, and heteroscedasticity test.



Based on Figure 3, the Jarque-Bera value is 5.487, with a probability of 0.0064. This probability is less than 0.05 ($\alpha = 5$ percent), indicating that the data is not normally distributed and does not pass the normality test.

Table 4. Multicollinearity test

Variable	Economic Growth	Unemployment Rate	District Minimum Wage
Economic Growth	1.000	-0.450	-0.278
Unemployment Rate	-0.450	1.000	0.515
District Minimum Wage	-0.278	0.515	1.000

Source: Secondary Data Processed, 2025

The multicollinearity test results show that the correlation value between the independent variables economic growth, unemployment rate, and District Minimum Wage is less than 0.8. This indicates that the regression model does not exhibit symptoms of multicollinearity.

Table 5. Heteroscedasticity test

Dependent Variable: RES_ABS

Method: Panel Least Squares

Date: 05/13/25 Time: 15:20

Sample: 2012 2024

Periods included: 12

Cross-sections included: 5

Total panel (balanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.209437	0.173207	-1.209171	0.2321
EG	0.080923	0.048650	1.663380	0.1023
UNP	0.003991	0.062428	0.063936	0.9493
WAGE	9.85E-05	6.12E-05	1.610768	0.1133
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.324737	Mean dependent var		0.098482
Adjusted R-squared	0.233836	S.D. dependent var		0.092843
S.E. of regression	0.081266	Akaike info criterion		-2.058613
Sum squared resid	0.343416	Schwarz criterion		-1.779367
Log likelihood	69.75839	Hannan-Quinn criter.		-1.949385
F-statistic	3.572427	Durbin-Watson stat		1.152605
Prob(F-statistic)	0.003280			

Source: EvIEWS Processing, 2025

Based on the heteroscedasticity test conducted, the p-value for each variable economic growth, unemployment rate, and district minimum wage is greater than 0.05. This indicates that the regression model is not affected by symptoms of heteroscedasticity.

Table 6. Fixed Effect Model

Dependent Variable: ID

Method: Panel Least Squares

Date: 05/13/25 Time: 14:49

Sample: 2012 2024

Periods included: 13

Cross-sections included: 5

Total panel (balanced) observations: 65

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.329743	0.038031	8.670324	0.0000
EG	-0.006296	0.002334	-2.697247	0.0092
UNP	-0.003956	0.006937	-0.570233	0.5708
WAGE	-4.16E-08	1.37E-08	-3.033067	0.0036
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.957666	Mean dependent var		0.215195

Adjusted R-squared	0.952467	S.D. dependent var	0.199803
S.E. of regression	0.043561	Akaike info criterion	-3.314473
Sum squared resid	0.108163	Schwarz criterion	-3.046856
Log likelihood	115.7204	Hannan-Quinn criter.	-3.208881
F-statistic	184.2038	Durbin-Watson stat	1.819426
Prob(F-statistic)	0.000000		

Source: Eviews Processing, 2025

Based on Table 6, the panel data regression model used is the Fixed Effects Model. The equation for the panel data regression is as follows:

$$ID = 0.329743 - 0.006296EG - 0.003956Unp - 0.0000000416Wage$$

- The constant has a coefficient value of 0.320743, indicating a positive effect. This means that if all variables, such as economic growth, the unemployment rate, and the district minimum wage (UMK), are held at 0 or remain constant, income inequality will increase by 0.320743 per unit.
- Economic growth has a coefficient value of -0.006296, indicating that a 1 percent increase in economic growth will reduce income inequality by 0.006296 per unit.
- The unemployment rate has a coefficient value of -0.003956, meaning that a 1 percent increase in the unemployment rate will reduce income inequality by 0.003956 per unit.
- The district minimum wage (UMK) has a coefficient value of -0.0000000416, suggesting that a 1 rupiah increase in the district minimum wage will reduce income inequality by 0.0000000416 per unit.

In addition, a partial t-test was conducted to assess the effect of each independent variable on the dependent variable. Based on Table 6, economic growth has a t-value of -2.70 with a probability of 0.009. The calculated t-value exceeds the critical value from the t-table (-2.70 > -2.00), and the probability is less than 0.05 (0.009 < 0.05). This indicates that economic growth has a significant negative effect on income inequality in the Barlingmascakeb Region.

The unemployment rate has a t-value of -0.57 with a probability of 0.57. The t-value is lower than the critical value from the t-table (-0.57 < 2.00), and the probability is greater than 0.05 (0.57 > 0.05). This indicates that the unemployment rate does not have a significant influence on income inequality in the Barlingmascakeb Region. The District Minimum Wage has a t-value of -3.03 with a probability of 0.004. The t-value exceeds the critical value from the t-table (-3.03 > -2.00), and the probability is less than 0.05 (0.004 < 0.05). This indicates that the District Minimum Wage (UMK) has a significant negative effect on income inequality in the Barlingmascakeb Region.

The Simultaneous Test (F Test) is used to determine whether all independent variables have the same influence on the dependent variable. This test is conducted using the F distribution by comparing the F table value with the statistical F value found in the ANOVA table. If the statistical F value is greater than the F table value or if the F probability (F prob) is smaller than 0.05, it indicates that all independent variables together affect the dependent variable. Conversely, if the statistical F value is smaller than the F table value or if F prob is greater than 0.05, it suggests that the independent variables do not collectively affect the dependent variable. In this model, the F-statistic is 184.2038 with a Prob (F-statistic) of 0.000. The F-statistic value exceeds the F table value (184.2038 > 2.758), and the F prob is less than 0.05 (0.000 < 0.05). This indicates that the variables of economic growth, unemployment rate, and district minimum wage together influence income inequality in the Barlingmascakeb Region.

The coefficient of determination test (Adjusted R-Squared) measures how well a statistical model predicts an analysis result. It also indicates the proportion of variation in the dependent variable explained by the independent variable. Table 6 shows an Adjusted R-Squared value of 0.9525, or 95.25 percent. This means that 95.25 percent of the impact of economic growth variables, the unemployment rate, and the District Minimum Wage can explain their influence on income inequality in the Barlingmascakeb Region. The remaining 4.75 percent is attributed to other variables outside the model.

CONCLUSION

Income inequality in the Barlingmascakeb Region from 2012 to 2024 is classified as high. Economic growth and the District Minimum Wage (UMK) have a significant negative effect on income inequality in the region. In contrast, the Open Unemployment Rate and industrial labor do not significantly impact income inequality. To address this issue, the government in the Barlingmascakeb Region must implement comprehensive measures to reduce inequality and promote equitable economic development. Reducing development inequality in the Barlingmascakeb Region can be achieved alongside increased economic growth in each area. Therefore, government policies are necessary to stimulate economic growth, such as targeted investment in the industrial sector. These efforts can enhance economic growth and help reduce development inequality, alongside programs aimed at improving economic equity in the region.

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