

Determinant Factors of Income Inequality in Central Java Province

By

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Abstract: The purpose of this study is to analyze the effect of GRDP per capita, Investment, Human Development Index, Open Unemployment Rate on inter-regional income inequality in Central Java Province. This study uses secondary data in the form of panel data consisting of cross-time period 2010-2021 and cross-site 35 regencies / cities in Central Java Province. The approach method used to estimate this regression model is the FEM (Fixed Effect Model) approach method. The results of this study indicate that the variables of GRDP per capita and the Open Unemployment Rate (TPT) have a positive and significant effect on inter-regional income inequality and the Human Development Index (HDI) variable has a negative and significant effect on inter-regional income inequality. Meanwhile, the Investment variable has no effect on inter-regional income inequality in Central Java province in 2010-2021. The most influential variable is the Human Development Index (HDI).

Keywords: Williamson Index; GRDP per capita; Investment; Human Development Index; Open employment Rate

Abstract: Tujuan penelitian ini adalah untuk menganalisis pengaruh PDRB per capita, Investasi, Indeks Pembangunan Manusia, Tingkat Pengangguran Terbuka terhadap ketimpangan pendapatan antardaerah di Provinsi Jawa Tengah. Penelitian ini menggunakan data sekunder berupa data panel yang terdiri dari silang waktu periode 2010-2021 dan silang tempat 35 Kabupaten/Kota di Provinsi Jawa Tengah. Metode pendekatan yang digunakan untuk mengestimasi model regresi ini adalah metode pendekatan FEM (Fixed Effect Model). Hasil penelitian ini menunjukkan bahwa variabel PDRB per kapita dan Tingkat Pengangguran Terbuka (TPT) berpengaruh positif dan signifikan terhadap ketimpangan pendapatan antardaerah dan untuk variabel Indeks Pembangunan Manusia (IPM) berpengaruh negatif dan signifikan terhadap ketimpangan pendapatan antardaerah. Sedangkan, untuk variabel Investasi tidak berpengaruh terhadap ketimpangan pendapatan antardaerah di provinsi Jawa Tengah tahun 2010-2021. Variabel yang paling berpengaruh adalah Indeks Pembangunan Manusia (IPM)

Kata Kunci: Indeks Williamson; PDRB per kapita; Investasi; Indeks Pembangunan Manusia; Tingkat Pengangguran Terbuka

INTRODUCTION

Economic development is characterized by conditions that demonstrate increased economic growth in a particular area, which is followed by an increase in other economic aspects (Sukirno, 2012: 445). A region's economic development can be considered successful if economic growth is accompanied by a decrease in income inequality. Since the 1970s, the issue of unequal income distribution in developing countries has been a key factor in determining development policies. This is based on previous research conducted by Williamson (1965) that shows that development policies that prioritize economic growth often lead to an increase in income-sharing inequality across multiple countries in an early stage of development.

One sign of how well an area has developed economically is economic growth. Economic growth demonstrates the degree to which economic activity will result in more money being made available to the community over time. If all real rewards for the use of production elements in a given year are higher than real income, then the economy is said to be growing.

The problem in this study is that Central Java Province has a stable increased Economic Growth rate, with industries sector plays a significant role in boosting economic in Central Java Province year 2021, Investment that continues increasing from year to year, with HDI value in Upper middle classification which averaging in 71.48 value from 2017-2021 (BPS, 2022) and Open Unemployment Rate averaging in 5,18 from 2017-2021 and 3 lowest out of 7 provinces in Java Island (BPS, 2022) but Central Java Province has a high inequality indicated by Williamson index value greater than 0.50 (Tambunan 2001), which is 0.65 in 2021 (BPS Central Java, 2020).

Table 1. Williamson Index for Central Java 2010-2011

Year	Williamson Index
2010	0.69
2011	0.69
2012	0.68
2013	0.67
2014	0.67
2015	0.66
2016	0.65
2017	0.64
2018	0.64
2019	0.63
2020	0.66
2021	0.65

Source: BPS Central Java, data processed

Table 1. Indicating that economic growth in the Central Java is not enjoyed equally by all people or inequality happened across its districts / cities in Central Java. Inequality between regions that occurs can be caused by several factors such as demographic conditions, geographical location, the potential of each district/city. In line with Kuznets' hypothesis regarding the Inverse U-curve, where in the early stages of growth the income distribution tends to worsen, but in the later stages it will improve.

According to Kuncoro (2003) Kuznets argues that in the early stages of development, developed regions accumulate more wealth than underdeveloped regions, resulting in unequal income distribution. Kuznets points out that development involves a population shift from traditional to modern. However, Kuznets also states that when the level of aggregate income has reached a certain level, the level of income inequality goes off and finally decreases during the last stage of development. The relationship between income distribution and the degree of development forms an inverted U-shaped curve.

Based on the identification of the description above, it can be explained that although there is Economic development as seen from Economic growth, Investment, HDI, TPT, but the value of the

Williamson index shows that there is a fairly striking inter-regional income inequality between districts / cities in Central Java Province.

METHODS

This type of research is quantitative research. The subjects of this research are 35 regencies / cities in the Region of Central Java Province. In this study, the objects of research are GRDP per capita, Investment, Human Development Index, Open Unemployment Rate, and Income Inequality between regions from 2010-2021. The data used in this research is data obtained from secondary data from Central Java BPS and related agencies. The secondary data used is panel data from cross sections of 35 regencies/cities in Central Java Province and time series data from 2010-2021. This study uses a panel data regression model with 420 observations. The panel data regression model is a regression model by stacking time series data observations with cross section data. Data processed using Eviews 7 software

The Panel Data regression equation model in this study is as follows:

$$IW = \beta_0 + \beta_1GRDP_{it} + \beta_2 INV_{it} + \beta_3 HDI_{it} + \beta_4 OUR_{it} + \epsilon_{it}$$

Description:

- IW = Williamson index
- α = Constant
- $\beta_1, \beta_2, \beta_3, \beta_4$ = Regression Coefficient
- GDRP = Gross Regional Domestic Product per capita
- INV = Investment
- HDI = Human Development Index
- OUR = Open Unemployment Rate
- i = Cross Section (regency/city Central Java)
- t = Time Series (year 2010-2021)
- ϵ_{it} = Error term

The data used in this study is panel data, therefore a model must be determined. In determining Testing the model estimation is done in two ways, namely with the model, the Likelihood Ratio Test, and the Hausman Test. must be carried out to choose the best model between the fixed effect model (FEM) or the random effect model (REM).

RESULTS AND DISCUSSIONS

Model Determination

Chow Test

Table 2. Likelihood Ratio Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	154,352525	(34,381)	0,0000
Cross-section Chi-square	1131,011782	34	0,0000

Source: Data processed, 2023

Table 2. shows the results of the Likelihood Ratio Test where the probability number of the Cross-section F is 0.0000 or smaller than the significance level used $\alpha = 5\%$ or 0.05 so that H_0 is rejected and H_a is accepted, meaning that the Common Effect Model (CEM) is better used than the Fixed Effect Model (FEM).

Table 3. Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	67,166633	4	0,0000

Source: Data processed, 2023

Based on Table 3. shows the results of the Hausman Test by obtaining a Chi-square number of 0.0000 or smaller than the significance level used $\alpha = 5\%$ or 0.05 so that H_0 is rejected and H_a is accepted, meaning that the Fixed Effect Model (FEM) is better used than the Random Effect Model (REM). Based on the results of the panel data model estimation above, the best and appropriate model used in this study is the Fixed Effect Model (FEM).

Data Panel Linear Regression Analysis

Based on the results of the Likelihood Ratio Test, the Hausman test obtained the best choice model is the Fixed Effect Model. The results of the panel data regression equation that will be used to determine how far the variables of GRDP per capita, investment, and human development index on income inequality between regions in this study are as follows:

$$IW = \beta_0 + \beta_1 \text{GDRP}_{it} + \beta_2 \text{INV}_{it} + \beta_3 \text{HDI}_{it} + \beta_4 \text{OUR}_{it} + \varepsilon_{it}$$

$$IW = 0,2223 + 0,0013\text{GDRP} + 3,60\text{E-}10\text{INV} - 0,0027\text{HDI} + 0,0011\text{OUR}$$

Table 4. below shows the estimation results of the regression Fixed Effect Model regression as follows:

Table 4. Data Panel Linear Regression Analysis Results (FEM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0,222341	0,023968	9,276754	0,0000
GDRP	0,001353	0,000268	5,054855	0,0000
INV	3,60E-10	3,56E-10	1,012468	0,3120
HDI	-0,002674	0,000394	-6,781441	0,0000
OUR	0,001143	0,000372	3,074567	0,0023
<i>R-squared</i>	0,985804	<i>Mean dependent var</i>		0,077760
<i>Adjusted R-squared</i>	0,984389	<i>S.D. dependent var</i>		0,080423
<i>S.E. of regression</i>	0,010048	<i>Akaike info criterion</i>		-6,274535
<i>Sum squared resid</i>	0,038470	<i>Schwarz criterion</i>		-5,899369
<i>Log likelihood</i>	1356,652	<i>Hannan-Quinn criter.</i>		-6,126252
<i>F-statistic</i>	696,2712	<i>Durbin-Watson stat</i>		0,269853
<i>Prob(F-statistic)</i>	0,000000			

Source: Data processed, 2023

Classical Assumption Test

The model chosen in this study is the Fixed Effect Model (FEM) which uses the Ordinary Least Square (OLS) estimator in its calculations. According to (Gujarati, 2009: 338) OLS estimators are Best Linear Unbiased Estimators (BLUE) regardless of whether individual units are normally distributed or not. So in this study, the use of normality test is not carried out for this reason.

The autocorrelation test is used to evaluate whether there is a relationship between one nuisance variable and another nuisance variable in time series data, (Gujarati, 2009: 442). Meanwhile, this study uses panel data which is a combination of cross-section and time series data. With 35 districts / cities in Central Java Province as cross-section units and data analyzed only within a 12-year time span from 2010-2021. According to Gujarati (2009: 455), even if there is autocorrelation in the OLS estimator, the estimate is still considered a Linear Unbiased Estimator (BLUE), which is considered consistent and has a normal distribution. Under some conditions, the OLS method can still be used. Therefore, in this study, the autocorrelation test was not conducted based on the reasons explained earlier.

Based on the explanation above, this study will only conduct 2 classical assumption tests, namely, multicollinearity and heteroscedasticity tests. The following are the results of these 2 tests:

Multicollinearity Test

Table 5. Multicollinearity Test

Variable	GDRP	INV	HDI	OUR
GDRP	1,000000	0,597434	0,691743	0,167138
INV	0,597434	1,000000	0,474165	0,134598
HDI	0,691743	0,474165	1,000000	-0,035282
OUR	0,167138	0,134598	-0,035282	1,000000

Source: Data processed, 2023

The multicollinearity test results in Table 5. show that the correlation coefficient between independent variables is below the correlation coefficient, namely < 0.9 , which means that there is no multicollinearity in each independent variable in the regression model.

Heteroscedasticity Test

Table 6. Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0,957583	1,122270	-0,853256	0,3941
GDRP	-0,004910	0,012530	-0,391861	0,6954
INV	1,21E-08	1,66E-08	0,727130	0,4676
HDI	0,023094	0,018464	1,250752	0,2118
OUR	0,030914	0,017411	1,775536	0,0766

Source: Data processed, 2023

The results of the heteroscedasticity test based on Table 6. show that the GRDP per capita variable has a p-value of 0.6954, the Investment variable has a p-value of 0.4676, the Human Development Index variable has a p-value of 0.2118 and the Open Unemployment Rate variable (has a p-value of 0.0766. This indicates that the p-value of each variable is greater than the significance level of 0.05. Then the regression model used, namely the Fixed Effect Model (FEM), does not violate the rules of the heteroscedasticity assumption or in other words the assumption of homogeneity of variance is fulfilled.

Determination Coefficient (R^2)

Referring to Table 4, shows the value of adjusted R Square of 0.984389 or 98.44%. This means that the variables of GRDP per capita, Investment, Human Development Index, Open Unemployment Rate can explain the inter-regional Income Inequality variable by 98.44%, the remaining 1.56% is explained by other variables that are not included in the model in this study.

Goodness of Fit (F test)

The results of the f-test calculation show that the probability value ($F_{\text{statistic}}$) is $0.000 < \alpha (0.05)$ and the $F_{\text{statistic}}$ is 696.28 with an F_{table} of 2.62 at the 95% confidence level. This shows that the $F_{\text{statistic}}$ value is greater than the F_{table} value, so the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted. Thus, it can be concluded that the variables of GRDP per capita, investment, HDI, and TPT together have a significant influence on interregional income inequality in the regencies/city of Central Java Province.

Partial Test (t Test)

Based on the regression results with levels $\alpha = 0.05$, the t_{table} value is 1.665. Based on these results, the effect of each independent variable on the dependent variable is as follows:

(1) GRDP per capita

The GRDP per capita variable has a $t_{Statistic}$ value of 5.055 with a significance level < 0.05 , namely 0.0000 and a t_{table} value of 1.966. Based on this, the $t_{Statistic} > t_{table}$ value means that H_0 is rejected and H_a is accepted. So that the independent variable GRDP per capita has a significant and partial positive effect on the dependent variable, namely Income Inequality between regions in Central Java Province in 2010-2021. In other words, the initial research hypothesis is accepted.

(2) Investment

The Investment Variable has a $t_{Statistic}$ value of 1.012 with a significance level ≥ 0.05 , namely 0.312 and a t_{table} value of 1.966. Based on this, with a p-value that is above the significance level and a $t_{Statistic}$ value $< t_{table}$, which means H_a is rejected and H_0 is accepted. So that the independent variable investment has no effect on the dependent variable, namely Income Inequality between regions in Central Java Province in 2010-2021. In other words, the initial research hypothesis is rejected

(3) Human Development Index

The Human Development Index variable has a $t_{Statistic}$ value of -6.781 with a significance level < 0.05 , namely 0.0000 and a t_{table} value of -1.966. Based on this, the $t_{Statistic}$ value $< t_{table}$, which means H_0 is rejected and H_a is accepted. So that the independent variable Human Development Index has a significant and partial negative effect on the dependent variable, namely Income Inequality between regions in Central Java Province in 2010-2021. In other words, the initial research hypothesis is accepted.

(4) Open Unemployment Rate

The Open Unemployment Rate variable has a $t_{Statistic}$ value of 3.074 with a significance level < 0.05 , namely 0.0000 and a t_{table} value of 1.966. Based on this, the $t_{Statistic}$ value $> t_{table}$, which means H_0 is rejected and H_a is accepted. So that the independent variable Open Unemployment Rate has a significant and partial positive effect on the dependent variable, namely Income Inequality between regions in Central Java Province in 2010-2021. In other words, the initial research hypothesis is accepted.

Discussion

The Effect of GRDP per capita on Interregional Income Inequality in Central Java Province, 2010 – 2021

The coefficient value of the GRDP per capita variable is 0.001353 with a probability of 0.0000 smaller than $\alpha = 5\%$, which means that every 1% increase in GRDP per capita will be followed by an increase in interregional income inequality in Central Java Province by 0.001353%, This shows that the Kuznets Hypothesis is still valid in Central Java Province, which explains that in a country, economic development in the early stages can trigger an economic gap between its population that is shaped like an inverted U. Where not all regions benefit from the benefits. Where not all regions benefit equally from economic growth. The economic gap that occurs in the early stages can lead to social inequality and other problems such as poverty and injustice between regions in Central Java Province. However, if economic development continues and is accompanied by improvements in income distribution, then economic inequality between regions can be reduced or even eliminated as per capita income increases.

The findings are in line with the initial research hypothesis and are also strengthened by previous research which states that GDRP per capita has a positive and significant effect on inter-regional income inequality (Sholikhah, 2016; Kiak, 2020; Hartini 2015; Isnowati, 2007; Rauf et al. 2021).

The Effect of Investment on Interregional Income Inequality in Central Java Province, 2010 – 2021

The coefficient value of the Investment variable is 3.60E-10 or equal to 0.00000000036 with a probability of 0.3120 greater than $\alpha = 5\%$, which means that the investment variable has no significant

effect on the level of income inequality between regions in Central Java Province for the 2010-2021 period. The insignificance of the Investment variable on inter-regional income inequality in Central Java Province in this study is due to the uneven distribution of investment among regions in Central Java Province. This is also reinforced by previous research conducted by (Pinilih, 2021) in his research in Central Java Province which revealed that the unevenness of investment distribution data made the investment variable insignificant. So, although overall investment is increasing, its impact may be limited to areas that already have higher income levels, while areas with low incomes remain behind.

Albeit not significant, the Investment variable has a positive effect on inter-regional income inequality in accordance with the initial hypothesis of the study. As explained by Harrod-Domar theory, investment is an important factor in determining economic growth. However, as explained in the Kuznets Hypothesis earlier, economic growth is positively correlated with inter-regional income inequality in the early stages of development. This is supported by research conducted by Putri, et.al (2015) which found that investment has a significant positive effect on inter-regional income inequality in Indonesia.(Sholikhah, 2016; Wilantari, et al. 2022; Hakim, 2022)

The Effect of Human Development Index on Interregional Income Inequality in Central Java Province, 2010 – 2021

The coefficient value of the Human Development Index (HDI) variable is -0.002674 with a probability of 0.0000 smaller than $\alpha = 5\%$, which means that every 1% increase in HDI will be followed by a decrease in interregional income inequality in Central Java Province by -0.002674%. The negative effect of HDI and the positive effect of GDRP per capita and investment can be explained by the concentration of HDI indicators that cover a wide range of indicators, including life expectancy, education, and income. With an HDI focus on improving well-being and providing opportunities for individuals to reach their potential, there is a strong effort within a region to improve quality of life and provide more equitable access to basic services such as education and health. As a result, it can reduce income inequality between regions due to government efforts to equalize access to resources and opportunities for the entire population or in other words, inclusiveness.

This result is in line with the initial research hypothesis and Human Capital theory which states that education has a negative effect on economic growth and can reduce income inequality. As well as previous research which states that HDI has a negative effect on inter-regional income inequality (Hartini, 2015; Syamsir, et.al, 2018)

The Effect of Open Unemployment Rate on Income Inequality among Regions in Central Java Province, 2010 – 2021

The coefficient value of variable X4, namely the Open Unemployment Rate (TPT), is 0.001143 with a probability of 0.0023 smaller than $\alpha = 5\%$, which means that every 1% increase in the TPT will be followed by an increase in interregional income inequality in Central Java Province by 0.001143%. This can be explained because a high unemployment rate indicates that a large proportion of the labor force in a region faces difficulties in finding a job that matches their skills and expertise. When more people are looking for work than can be employed, competition in the labor market increases. This can affect wage levels. Low wages reduce the purchasing power of individuals, which can hamper consumer demand and overall economic growth. In the long run, this can hamper the ability of regions to create economic inclusiveness, increase productivity, competitiveness, and sustainable economic growth, in other words, income inequality between regions occurs.

The results of this study are in line with the research hypothesis and are also reinforced by previously conducted research which states that the Open Unemployment Rate (TPT) has a positive effect on inter-regional income inequality (Syamsir, et.al, 2018; Zusanti, et.al, 2018)

CONCLUSIONS

Based on the regression results and discussion of the influence of GDRP per capita, Investment, HDI, TPT, it can be concluded that simultaneously, the variables of GDRP per capita, Investment, HDI,

and TPT have a significant effect on inter-regional income inequality in the Regency / City of Central Java Province, 2010-2021.

The GDRP per capita variable partially has a positive and significant effect on income inequality between regions in Central Java Province, 2010-2021. The investment variable partially has a positive but insignificant effect on inter-regional income inequality in Central Java Province, 2010-2021. The Human Development Index (HDI) variable partially has a negative and significant effect on income inequality between regions in Central Java Province, 2010-2021. The Open Unemployment Rate (TPT) variable partially has a positive and significant effect on income inequality between regions in Central Java Province, 2010-2021

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