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Determinants of Income Inequality Among Districts/Cities in East Java Province for the Period 2019-2021

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ABSTRACT

This study aims to analyze the effect of economic growth, human development index, average years of schooling, and open unemployment rate on income inequality between districts / cities in East Java Province during the 2019-2021 period using panel data regression analysis. The results showed that the selected estimated model was the *Fixed Effects Model* (FEM). The results of the *cross section* validity test (*t* test) show that the variables of Economic Growth and Average Years of Schooling have a significant effect on income inequality. Meanwhile, the human development index and the open unemployment rate have no significant effect on income inequality in East Java during the 2019-2021 period. Based on the model existence test (*F* test), the estimated model exists, with a coefficient of determination (R^2) of 0.7297; which means that 72.98% of the variation in the income inequality variable can be explained by the variation in the variables of economic growth, human development index, average years of schooling, and open unemployment rate. While the remaining 27.02% is influenced by variations in other variables outside the model.

Keywords: Income Inequality, Determinants

INTRODUCTION

Economic development is a process that in the long run increases the real per capita income of a country's population while improving the institutional system. Economic development should be seen as an interrelated and mutually influencing process, and the factors that cause economic development should be viewed and analyzed both rationally and regionally. The relationship between income distribution disparities and economic performance has long been a subject of debate among economists and policymakers (Sari et al., 2018). Development is a continuous process that creates community conditions that are much better than previous achievements. Economic development aims to improve people's welfare. The problem of income disparity will hinder progress because it adversely affects the economic and political stability of a country (Suryani & Woyanti, 2018).

Income inequality is a problem that often occurs due to accelerated development, while regions with established economic strength and resources grow easily. Income inequality is an important issue in the development of a region. Income inequality refers to the income distribution of the population in a region. The larger the income gap, the greater the inequality of income distribution in the community. (Rahajuni et al., 2017).

Inequality in income distribution ultimately widens the *gap* between those with high economic status (rich) and those with low income (poor). A commonly used measure of inequality in income distribution is the Gini coefficient, which is usually represented by the Lorenz curve (Rozali et al., 2022).

Meanwhile, rapid economic growth does not necessarily result in successful development. It is rapid economic growth that affects inequality and income distribution, because real economic growth is not always followed by equity. There is a compromise in economic development between high economic growth and income equality. If economic development is more oriented towards income equality, it takes a relatively long time for economic growth to reach high growth rates. On the other hand, the possibility of income distribution inequality is greater when development is more oriented towards high growth rates. (Kim & Ha, 2022). Several implementations have been carried out by the government to overcome regional income inequality, one of which is to increase the regional economic growth rate (Triyono et al., 2021).

Rapid economic growth does not necessarily mean success in development. (Arif & Wicaksani, 2017). Economic development is certainly not always evenly distributed, and the income gap between regions is a very serious problem. The economic growth achieved cannot solve the problem of uneven development. Because some regions also have rapid economic growth, but some other regions have slow economic growth. So this does not experience the same development and progress, because it is caused by a lack of resources. (Kim & Ha, 2022). For this reason, the East Java Provincial Government together with the district/city governments should work together to find the main factors causing poverty in their respective regions.

The way a person thinks in dealing with problems is greatly influenced by the breadth of knowledge he has. The most important knowledge base is education. With higher education, people have more opportunities to live a more prosperous life. The role of education in reducing inequality and poverty, in a study conducted by (Harahap et al., 2020) education has a positive and substantial influence on educational inequality in

Indonesia, as well as a negative impact on educational inequality in Indonesia. Education in this study is represented by the average number of years of schooling (RLS).

Average Years of Schooling (AYS) is the average number of years completed by the population at all levels of formal education. This figure can also illustrate the quality of education of the population in the region. This number is calculated from three variables simultaneously, namely the school participation variable, the level/class currently/ever undertaken, and the last diploma owned. The population calculated according to the average years of schooling is the population aged 15 years and above (BPS East Java Province, 2019). The average years of schooling (RLS) in East Java in 2021 increased by 0.10 years from 7.78 years in 2020 to 7.88 years in 2021. This figure is lower than the previous years which only increased by an average of 0.12 years in the 2017-2019 period.

The Gini *Ratio* is a commonly used measure of the degree of inequality in the income distribution of a region's population. The Gini coefficient ranges from 0 to 1, with 0 indicating perfect equity and 1 indicating perfect inequality. Income inequality between regions is a serious problem, as well as in East Java province. East Java province consists of 27 regencies and 9 municipalities. Inequality in East Java province is due to the fact that most of the regions in this province are categorized as relatively underdeveloped regions. However, regional differences in the availability of natural resources, differences in the quality of human resources, and unequal distribution of facilities and infrastructure result in regional underdevelopment that causes unequal income distribution.

The determinants used in this study use several variables used by several previous researchers, with some of the determinants used proving to have a significant effect on the problem of income inequality. The author will use determinants in the form of economic growth variables (PE), human development index (HDI), average years of schooling (RLS), and open unemployment rate (TPT).

METHOD

The research method used is quantitative method and the data source used is secondary data. The data taken from this research is data sourced from the Central Bureau of Statistics of East Java Province and the literature relevant to this research. This study will analyze Economic Growth, Human Development Index, Average Years of Schooling, and Open Unemployment Rate as independent variables on Income Inequality as the dependent variable in 38 Regency / City in East Java Province in 2019-2021. This analysis uses panel data OLS (Ordinary Least Square) regression analysis tools including the f test hypothesis test, t test, and $R2$ test, while for selecting the best model using the chow test and hausman test, and the test uses the Eviews 10 application. The form of the model equation in this study is as follows:

$$logIG_{it} = \beta_0 + \beta_1 PE_{it} + \beta_2 IPM_{it} + \beta_3 logRLS_{it} + \beta_4 TPT_{it} + \varepsilon_{it}$$

where:

IGit = Gini Index (Index)
PEit = Economic Growth (%)
IPMit = Human Development Index (%)
RLSit = Average Years of Schooling (Years)
TPTit = Open Unemployment Rate (%)

log = Natural Logarithm
β_0 = Constant
β_1 ... β_4= Independent variable regression coefficient 1-4
ε = *Error term* (error factor)
i = observation i
t = year *t*

RESULT AND DISCUSSION

Panel data regression estimation results on econometric models with the approach. *Pooled Least Squares* (PLS), *Fixed Effect Model* (FEM), and *Random Effect Model* (REM) are shown in Table 1.

Table 1. Panel Data Regression Results

Variabel	Koefisien Regresi		
	CEM	FEM	REM
C	-1.489815	-7.719244	-1.461247
PE	-0.000225	0.128212	6.32E-05
IPM	-0.001370	-0.002392	-0.000861
LOG(RLS)	0.191498	-1.285644	0.151424
TPT	0.000602	0.005414	0.007046
R^2	0.158603	0.729753	0.112008
Adj. R^2	0.127726	0.575863	0.079421
F-statistik	5.136613	4.742030	3.437200
Prob. F-statistik	0.000789	0.000000	0.010961

Source: Olah data, eviews 10

To determine the best estimation model from the *Pooled Ordinary Least Square (PLS), Fixed Effect Model (FEM),* and *Random Effect Model (REM) estimation* results, the Chow test and Hausman test are used. If the Chow test selects *PLS* and the Hausman test selects *REM*, the *Langrange Multiplier* (*LM*) test must be performed to determine the best estimation model between the *PLS* and *REM estimation* results.

The Chow test is a statistical test used to choose between the PLS or FEM estimated models. The Chow Test results can be seen in table 2.

Table 2. Chow Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	42.950575	(33,132)	**0.0000**

Source: Data processed

Based on table 2, the probability value of F is 0.000 (<0.05), so H_0 is rejected. Then the selected model is FEM.

The Hausman test is a statistical test to select a *Fixed Effect Model* or *Random Effect Model*. The hypothesis formulation is H_0 : *Random Effect* Model while H_A : *Fixed Effect* Model. H_0 is accepted if p-value > α and H_0 is rejected if p-value ≤ α. The results of the Hausman Test can be seen in table 3.

Table 3. Hausman Test Results

TEST SUMMARY	CHI-SQ. STATISTIC	CHI-SQ D F	PROB.
Cross-section Random	12.734864	4	0.**0126**

Source: Data processed

Table 3 shows that the probability value is 0.0126. The hypothesis formulation is as follows, H0: Random Effect Model (REM) is selected. Medium HA: The selected model is Fixed Effect Model (FEM). Determining the criteria if the probability value is lower than the alpha value, then H0 is accepted. From the above results it is known that H0 is rejected because the probability value is 0.0126 <0.05. So the best model to use is the Fixed Effect Model (FEM).

Table 4. Fixed Efect Model (FEM) Estimation Results

LOG(IG)it=-7.719244 + 0.128212 UMKMtPEit- 0.002392 IPMit- 1.285644 LOG(RLS)it+ 0.005414 UMKMtTPTit
(0.0284) ** (0.3111) (0.0842)*** (0.4920)
R^2 =0.729753; DW =2.516431; *F* statistic=4.742030; Prob. *F* = 0.000000
Description: *Significant at α =0.01 **Significant at α =0.05 ***Significant at α =0.10 The number in parentheses is the probability value of the t-statistic

A. Model Fit Test

1. Model Existence Test (F Test)

The model exists if all independent variables simultaneously have an influence on the dependent variable. In this study, the model existence test hypothesis formulation is H0: β1 = β2 = β3 = β4 = 0, which means that all regression coefficients are zero, so that economic growth, human development index, average years of schooling, and open unemployment rate together have no effect on the Gini index. Meanwhile, Ha: β1 ≠ 0 | β2 ≠ 0 | β3 ≠ 0 | β4 ≠ 0, which means that at least one regression coefficient is not zero, so that together economic growth, human development index, average years of schooling, and open unemployment rate have an effect on the Gini index.

H0 is not rejected if the probability of F > α and H0 is rejected if the probability of F < α. Based on Table 1-1, it can be seen that the probability value of the F statistic in the model estimation is 0.0000, which means that it is less than α 0.05; then H0 is rejected, so together economic growth, human development index, average years of schooling, and open unemployment rate affect the Gini index.

2. Interpretation of the Coefficient of Determination (R^2)

The coefficient of determination (R2) shows the predictive power or goodness of the estimated model. It can be seen that R2 In the econometric model, the Fixed Effect Model (FEM) has a value of 0.729753. This means that 72.98 percent of the variation in Income Inequality (IG) in East Java Province is explained by variations in economic growth, human development index, average years of schooling, and open unemployment rate. The remaining 27.02 percent is explained by variations in other variables not included in the model.

B. Validity Test of Influence

The effect validity test (t test) aims to test whether each independent variable has a real effect on the dependent variable. H0 of the t test states i=0, which means that the i-th independent variable has no effect on the dependent variable; while Ha states i>0, which means that the i-th independent variable has a positive effect on the dependent variable. H0 is not rejected if the probability of t statistics > α; and H0 is rejected if the probability value of t statistics ≤ α. The results of the effect validity test can be seen in Table 5

Table 5. Validity Test Results of the Influence of Independent Variables

Variables	Coefficient	Prob	Criteria	Description
PE	β1 (0.128212)	0.0284	≤ 0,05	Significant at α = 0.05
HDI	β2 (- 0.002392)	0.3111	> 0,10	Not Significant
Log(RLS)	β3 (- 1.285644)	0.0842	≤ 0,10	Significant at α = 0.10
TPT	β4 (0.005414)	0.4920	> 0,10	Not Significant

As shown in Table 2-1, the Economic Growth (PE) variable is shown to have a positive effect, and the Average Years of Schooling (Log(RLS)) variable is shown to have a negative effect on the Gini Index (IG), while HDI and TPT have no effect. Thus, the coefficients of PE (δβ1) and Log(RLS) (δβ3) variables can be interpreted. Meanwhile, the coefficients of HDI (δβ2) and TPT (δβ4) do not need to be interpreted because they are not significant.

C. Interpretation of the Coefficient of the Influential Independent Variable

The effect of economic growth on the gini ratio

The coefficient of the economic growth variable (PE) is 0.128212 with the relationship pattern between the Economic Growth variable (PE) and Income Inequality is linear. So, if Economic Growth (PE) increases by 1%, it will increase Income Inequality by 0.128212.

Effect of average years of schooling variable on gini ratio

The coefficient of the variable average years of schooling (RLS) is -1.285644 with the pattern of the relationship between the variable average years of schooling (RLS) and Income Inequality is linear-logarithmic. Therefore, if the average years of schooling increases by 1 year, it will decrease Income Inequality by 1.285644.

DISCUSSION

Effect of Economic Growth (PE) on Income Inequality

This result shows that PE has a positive and significant effect on income inequality among districts/cities in East Java. The coefficient of the PE variable is 0.128212 with a prob of 0.0284, which means that a 1% increase in TPT will not affect the increase in inequality by 0.128212 percent. So the results of this study are in line with research (Alamanda, 2021) with the title "The Effect of Economic Growth on Income Inequality: Panel Data Analysis From Fifty Countries". In Alamanda's research, it is suggested that PE has a positive effect on income inequality. Empirical data shows that a one-point increase in GDP growth will result in an average increase in the Gini Index of 0.082 to 0.085 points. In addition, the article reveals that the impact of economic growth on income inequality appears to be greater in lower-middle-income countries than in high-income countries. This research is also in line with (Kurniasih, 2017) which states that *Economic Growth has a* positive and significant impact on income inequality in Indonesian provinces. (Rubin & Segal, 2015) stated that economic growth has a positive effect on income in the US.

However, this research contradicts research conducted by (Niyimbanira, 2017), showing that economic expansion reduces poverty but does not reduce income inequality. The findings of this study have implications for policy development to reduce income inequality in South Africa by policy makers. In conclusion, this study suggests socio-economic strategies that, in a knowledge-based economy, can promote economic growth and improve human development. This is similar to research conducted by (Shen & Zhao, 2022) (Shen & Zhao, 2022), which states that the expansion of *economic growth has* no impact on income inequality.

Effect of Human Development Index (HDI) on Income Inequality

These results show that HDI has no significant effect on income inequality between districts/municipalities in East Java at the α level up to 10%. The results of this study are similar to the results of research (Handoyo et al., 2020) which states that HDI has no effect on regional income inequality. This research is in accordance with the theory of Todaro and Smith in (Triandewo, Maris, 2020). (Triandewo, Maris Agung, 2019): Large increases in income may play a relatively small role in human development. Inequality in the region affects the welfare of the people in the region itself. The unevenness of the Human Development Index in various regions means that there are regions that are more advanced because the quality of the population is better, and there are regions that are not advanced because the quality of the population is poor.

However, this research contradicts that conducted by (Ghifara et al., 2022) where HDI has a positive effect on income inequality in Indonesian Metropolitan cities. (Arkum & Amar, 2022) also stated that this study revealed that human development is the main variable affecting income distribution disparity in Bangka Belitung Islands Province.

Effect of Average Years of Schooling (AOLS) on Income Inequality

These results show that RLS has a significant effect on income inequality between districts/cities in East Java. The coefficient of the RLS variable is -1.285644 with a prob of 0.0842, meaning that a 1% increase in RLS will not affect the increase in inequality by 1.285644 percent. This study is in line with previous research by (Shahabadi et al., 2018) which states that RLS has a considerable negative effect on income differences. Thus, RLS can reduce economic inequality. Similarly, the Kuznets inverted-U hypothesis is supported by the calculated income coefficient which is positive and statistically significant and its squared value which is negative and statistically significant. (Rahman et al., 2021) stated that RLS has a negative and significant effect on income disparity in North Sumatra. However, this research contradicts the research conducted by (Putri & Arham, 2022) (Putri & Arham, 2022) stated that RLS is not significant, which means that any increase in the average years of schooling can increase income distribution inequality.

The Effect of Open Unemployment Rate on Income Inequality

These results indicate that TPT has no significant effect on income inequality between districts/cities in East Java at the α level up to 10%. This research is in line with that conducted by (Hariani, 2019) where the unemployment rate has no effect on income distribution inequality in Indonesia for the period 2009-2013. The open unemployment rate does not have a significant effect because the status of TPT in 38 administrative districts / cities in East Java is included in the category of provinces with relatively low levels of TPT so that it does not affect income inequality. However, this study contradicts research conducted by (Putri Syauqiah et al., 2022) which states that the unemployment rate has a

positive but negligible effect on income disparity in West Java Province. This is the same as (Maipita, 2017) the findings of this study, the Unemployment rate has a positive but negligible effect on income disparity in West Java Province.

IMPLICATIONS

This research can provide knowledge and suggestions for achieving welfare and reducing income inequality by improving human resources.

CONCLUSION

This study aims to analyze the effect of economic growth, human development index, average years of schooling, and open unemployment rate on income inequality between districts / cities in East Java Province during the 2019-2021 period using panel data regression analysis. The results showed that the selected estimated model was the *Fixed Effects Model* (FEM). The results of the *cross section* validity test (*t* test) show that the variables of Economic Growth and Average Years of Schooling have a significant effect on income inequality. Meanwhile, the human development index and the open unemployment rate have no significant effect on income inequality in East Java during the 2019-2021 period.

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