



## Entrepreneurship Bisnis Manajemen Akuntansi (E-BISMA)

Journal homepage: [ejournal.widyamataaram.ac.id/index.php/j-mae](http://ejournal.widyamataaram.ac.id/index.php/j-mae)



### Determinants of gini ratio: a case study of low gini ratio in Madura

<sup>1</sup>Imam Mahdi, <sup>2\*</sup>Setyo Wahyu Sulistyono

<sup>1,2</sup>Faculty of Economics and Business, University of Muhammadiyah Malang, Jl. Raya Tlogomas No. 246, Malang

\*Correspondence e-mail: [setyowahyu88@umm.ac.id](mailto:setyowahyu88@umm.ac.id)

Article Info	Abstract
<p><i>Keywords: Gini Ratio, Health, Education, Open Unemployment Rate, Poverty Rate</i></p>	<p><i>One of the regencies on Madura Island, namely Sumenep, will be the regency with the lowest gini ratio in East Java Province in 2022. This research was conducted to analyze: 1) the effects of health, education, open unemployment rate, and poverty rate partially on the Gini ratio; 2) the effects of health, education, open unemployment rate, and poverty rate simultaneously on the Gini ratio in Madura Island. The research method was carried out using panel data regression. The results obtained using the CEM: 1) health, education, and poverty levels have a negative and not significant effect; 2) the open unemployment rate influences positively and significantly; 3) all independent variables simultaneously have a significant positive effect. The government can issue policies to reduce income inequality in the form of providing free health services, education and compulsory education scholarships, periodic job fairs, skills training for workers, and distribution of social assistance that is right on target.</i></p>

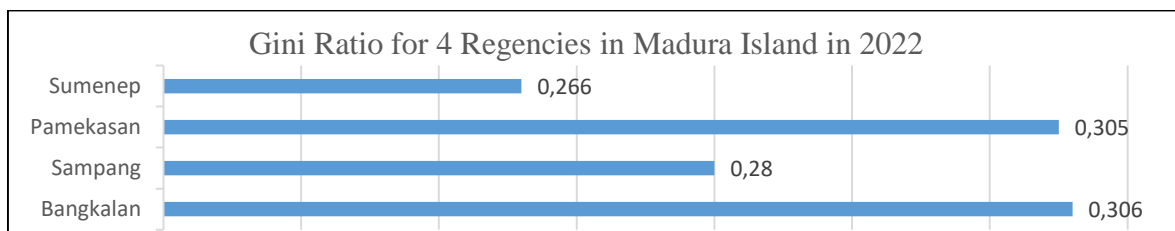
## 1. INTRODUCTION

Economic growth is a good way to gauge how prestigious a region's economic activities are. A rise in products and services is a sign of economic growth. Gross Regional Domestic Product (GRDP) fluctuations or changes in national income have historically been used to gauge economic growth. The level of income balance in a region cannot be explained by an increase in GRDP (Marantika et al., 2018). On the other hand, there are still a lot of ideas to take into account before using economic growth as a gauge for a region's degree of welfare. The degree of education, health, and general welfare of the populace are a few factors that the government and society must consider. The human development index says that in addition to commodities and services, the population's quality has to be raised. Since inequality is a fundamental issue in eradicating poverty, particularly in poor and developing countries, equitable gains of economic progress must also be experienced by the population, not only by a small number of individuals (Putro et al., 2018). One of the biggest issues confronting developed nations today is the increase in economic disparity. Income disparity has many different aspects and is not a natural result of unstoppable structural processes like globalization or technological advancement (Polacko, 2021).



A significant social, political, and economic concern is income inequality. Inequality may have an influence on stability in politics, racial & ethnic disputes in addition to economic development and growth. According to empirical study, a variety of factors, such as urbanization, degree of expansion, system of politics, government engagement, and geographical disparity, influence inequality (Abdullah et al., 2015). Comparing data on income disparity between economies or within the same region over time is a popular practice in economics. Such comparisons are occasionally made to assess the effectiveness or failure of initiatives meant to combat inequality (Cysne & Turchick, 2012). The level of economic development, the level of technological development, social and political unrest, political economy, the imperfection of the credit markets, the savings rate, institutions, fertility rate, and level of human development are some of the transmission mechanisms that have been identified in the theoretical literature as being related to the relationship between income inequality and economic growth (Mdingi & Ho, 2021).

Madura Island itself is an area separated from the mainland of East Java Province. Of course, there is a gap between Madura and other regions in East Java. This inequality can be reduced if the infrastructure between regions is good. Transportation infrastructure is critical to economic development (Berger & Enflo, 2017). One of the infrastructures that has a big impact on the economy of Madura is the Suramadu Bridge. Access to health care and education is made possible by roads. The location of infrastructure influences the spatial distribution of the economy as well. For example, roads and railroads foster regional economic growth quickly, & the advantages may last over the long term Even after the initial benefits the value of the investments or the infrastructure itself has dwindled (Marein, 2022).



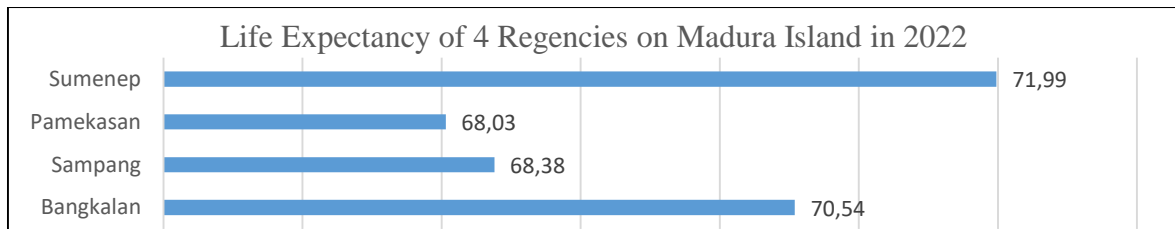
**Figure 1.** Gini Ratio Figures for 4 Regencies in Madura in 2022

Source: Badan Pusat Statistik East Java Province

Based on Figure 1, which was obtained from Badan Pusat Statistik (BPS) East Java Province, one of the districts in Madura, Sumenep Regency, is the region with the lowest Gini ratio rate in East Java Province in 2022. Gini index data for 4 districts in Madura as follows: Sumenep Regency 0.266 (lowest first order), Sampang Regency 0.280 (fourth lowest order), Pamekasan Regency 0.305 (lowest tenth order), and Bangkalan Regency 0.306 (eleventh lowest order). Of the 4 regencies, 3 regencies are included in the top 10 regencies/cities with the lowest Gini Ratio in East Java Province in 2022.

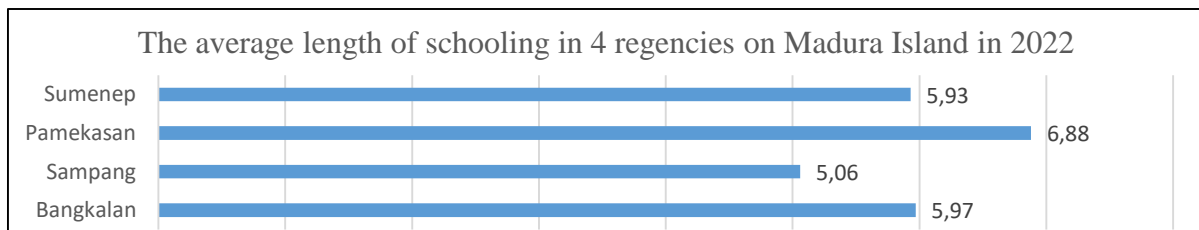
As a district with the lowest gini ratio in East Java Province. The Sumenep Regency Government has several superior policies which are efforts to reduce inequality in Sumenep Regency. Sumenep Regent Achmad Fauzi said that at least 5 superior policy programs were being carried out, namely: first, the universal health coverage/UHC policy. Second, the distribution of scholarships to students encourages the improvement of the quality of human

resources through the Human Development Index (HDI). Third, holding job fairs up to 3 times a year to reduce the unemployment rate. Fourth, creating mass entrepreneurs such as the Santri entrepreneur program. Finally, ensuring the distribution of social assistance is right on target (Zubaidi, 2022). Based on the policy of the Sumenep Regency Government in suppressing this inequality. There are at least 4 main focuses, namely improving public health, public education, reducing the unemployment rate, and reducing the poverty rate.



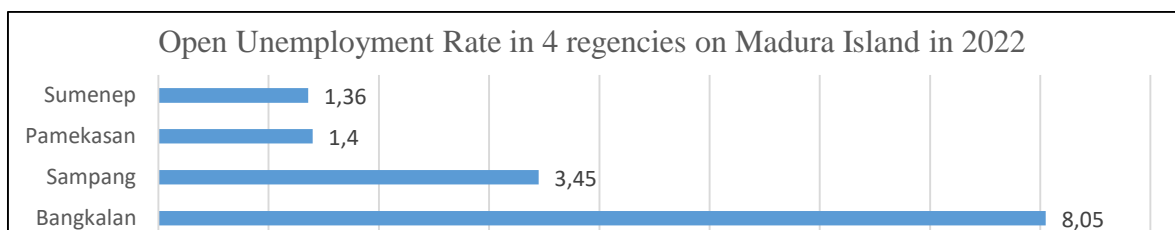
**Figure 2.** Life Expectancy of 4 Regencies on Madura Island in 2022 (year)  
Source: Badan Pusat Statistik East Java Province

According to the data in Figure 2 provided by BPS East Java Province, Sumenep has the highest life expectancy on Madura Island at 71.99 years. This figure surpasses the life expectancy of the entire East Java Province, which stands at 70.74 years. Bangkalan comes in second with a life expectancy of 70.54 years, followed by Sampang at 68.38 years and Pamekasan at 68.03 years.



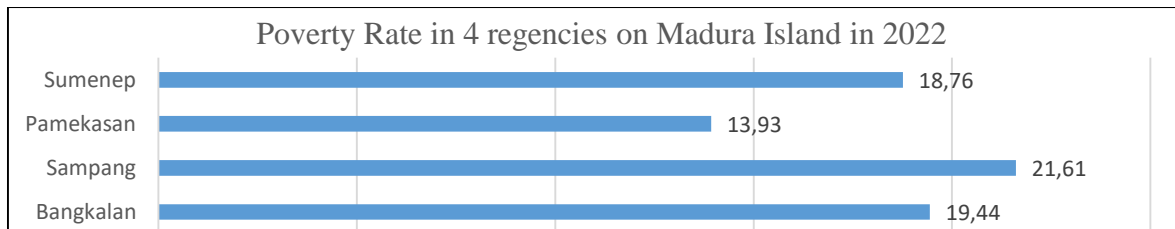
**Figure 3.** The average length of schooling in 4 regencies on Madura Island in 2022 (year)  
Source: Badan Pusat Statistik East Java Province

According to Figure 3 from BPS East Java Province, Pamekasan has the highest average length of schooling on Madura Island at 6.88 years. Bangkalan comes in second with an average length of schooling of 5.97 years, followed by Sumenep with 5.93 years and Sampang with 5.06 years. Unfortunately, these figures are lower than the average length of schooling in East Java Province, which is 8.03 years.



**Figure 4.** Open Unemployment Rate in 4 regencies on Madura Island in 2022 (percent)  
Source: Badan Pusat Statistik East Java Province

According to Figure 4 from BPS East Java Province, Sumenep has the lowest open unemployment rate on Madura Island at 1.36 percent. Pamekasan comes in second with an open unemployment rate of 1.4 percent and Sampang Regency follows closely with a rate of 3.45 percent. These rates are lower than the open unemployment rate for East Java Province, which is 5.49 percent. However, Bangkalan Regency has a higher open unemployment rate of 8.05 percent, surpassing the provincial average.



**Figure 5.** Poverty Rate in 4 regencies on Madura Island in 2022 (percent)  
Source: Badan Pusat Statistik East Java Province

According to data in Figure 5 from BPS East Java Province, Pamekasan district has the lowest poverty rate on Madura Island, at 13.93 percent. The second lowest district is Sumenep, with a poverty rate of 18.76 percent. Bangkalan Regency has a poverty rate of 19.44 percent, while Sampang Regency has the highest poverty rate on Madura Island at 21.61 percent. Unfortunately, the poverty rate in Sampang Regency is even worse than the poverty rate in the Province of East Java, which is currently at 10.49 percent.

Based on this background, the researcher intends to analyze whether public health, education, the open unemployment rate, and the poverty rate affect the gini ratio on Madura Island. This research was conducted to analyze the factors that make regencies in Madura the region with the lowest Gini Ratio in East Java Province, which has a novelty from previous studies, namely the use of health and education variables that have not previously been studied by other researchers, especially in Indonesia. This research uses annual data from 2013 to 2022. The researcher hopes that this research can provide an overview of what influences the Gini ratio on Madura Island so that it becomes the lowest in East Java Province in 2022. Therefore, it is hoped that this research can be considered in determining the direction of policy to reduce income inequality in the region.

## 2. LITERATURE REVIEW

### Gini Ratio

One technique to gauge how much disparity regional among proponents of economic expansion is felt by the general populace is the Gini Ratio which Corrado Gini developed. The Gini index, which has become iconic due to its geometric interpretation in terms of the Lorenz curve, is also intriguing due to its extensive mathematical features and other formulations (Inoua, 2021). Economic activity must incorporate certain instruments. A greater Gini ratio value indicates increased regional inequality, as well as uneven income distribution between high- and low-income earners (Berman et al., 2016). This indicator is

well known and good for measuring differences in income distribution spacial. Although it was originally designed to study income disparity, it may now be used to assess any general distribution of probability, such as life expectancy, rates of literacy, educational achievement, wellness indices, and a variety of quantities relevant to the field of social science ([Chan, 2022](#)).

### **Health**

The inaugural Human Development Report (HDR), which established the human development index (HDI) concept, was based on Nobel winner Amartya Sen's work on "human capabilities". Since then, the United Nations Development Programme (UNDP) has released yearly HDRs that include a rating of nations according to the Human Development Index (HDI). This index is distinguished by its 3 dimensions, which are fundamental to HDI. These dimensions include life expectancy at birth as an indicator of health, The literacy rate among adults used to measure education, and the usual logarithmic value of per-capita gross national income at a parity of purchasing power used to measure living standards. Although the UNDP has updated its approach throughout the years, this framework has remained the foundation for analyzing the performance of nations worldwide ([Mangaraj & Aparajita, 2020](#)). A more productive workforce is a result of having access to quality education and healthcare, which might ultimately boost national economic growth. By lowering infirmity, debility, and the number of sick days missed, better health boosts employee productivity and pay. Poor health, on the other hand, results in fewer hours worked, which reduces productivity, income, and workers' physical and mental abilities ([Ogundari & Awokuse, 2018](#)). A workforce that is highly educated and in excellent health is inclined to grow and accept innovative technology to boost economic growth ([Ogundari & Abdulai, 2014](#)). High productivity as a result of good health will increase the income earned.

We must take into account how economic inequality affects both average health and inequalities in health to comprehend its implications on individual health. Therefore, we know that income redistribution improves the average population's health ([Ferreira et al., 2022](#)). By carefully examining the research on life expectancy gaps, average life expectancy, and economic inequality in developed countries. We find little evidence that the average life expectancy is often shorter in countries (or subnational regions) with larger wealth disparity. In many developed nations, rising income inequality has been associated with expanding educational & and economic gaps in life expectancy, but these differences started to grow before income inequality rose. This timing implies that other factors, like the allocation of public goods, risks to the environment, & and the unequal dissemination of health discoveries, have increased the importance of individual income for good health ([Truesdale & Jencks, 2016](#)).

### **Education**

The full impact of education will be determined by a range of factors, and the mechanism by which it influences inequality is complex. We can imply that extending and improving education can reduce economic inequalities, particularly in emerging nations ([Iliman, 2023](#)). As the number of educated persons grows, unskilled workers transition into

the skilled worker cohort, affecting the labor force composition. Although this approach may initially increase income disparity, it is expected to reduce income inequality over time as the wage premium for talented persons falls as the supply of educated people increases (Abdullah et al., 2015).

One of the largest successes in economics is the human capital theory, both in terms of prediction and the influence it has on policy. Over the recent period, the world's economy boomed, notably in nations with higher education spending (Lee & Lee, 2016). According to the basic theory of human capital, education may lead to greater earnings; hence, increasing education or expanding public spending on education can reduce economic disparities and increase mobility between generations. Since Becker (1962), economic researchers have discovered again and time again that disparities in the quantity and quality of education are remarkably effective predictors of wage/income inequalities between persons (Deming, 2023). However, given that higher education has a significantly greater rate of return than compulsory education, empirical data indicates that educational expansion widens economic inequality. Furthermore, as more individuals obtain higher education, the rate of return on higher education stays very high. In other words, educational expansion does not lower income disparity. As a result, numerous researchers have utilized various data & and ways to explain why higher education funding or lower tuition costs are beneficial (i.e., more equal educational opportunities) will not significantly boost economic equality (Yang & Qiu, 2016).

Increases in the average level of education will undoubtedly lead to wider income gaps if the return to an extra year of study is the same across educational levels. Likewise, if the benefits of an additional year of study are larger at higher levels of education (Colclough et al., 2010), then increasing the mean level of education will result in greater income disparity. But if benefits to greater levels of education are lower, the growth in income disparity will be mitigated. If significantly negative, this might lead to a rise in average schooling and a net reduction in inequality of income (Coady & Dizioli, 2018).

### **Open Unemployment Rate**

Keynesian or disequilibrium unemployment develops when the nominal wage lacks the inclination to empty the labor market (Schoder, 2020). A mismatch between the market's supply and demand for labor can lead to unemployment. Therefore, issues like a lack of qualified workers, a mismatch in skill sets, or an uneven geographic distribution of occupations can lead to income inequality. The majority of observers believe that inequality and unemployment are strongly connected. However, the recent economic crisis has demonstrated that high unemployment worsens inequality, with fewer employment options for the least qualified workers and broader income distribution (OECD, 2015). Contrarily, it appears that economic development is no longer correlated with more equality since robust growth may coexist with the ongoing underutilization of labor and escalating inequality (Monfort et al., 2018).

### Poverty Rate

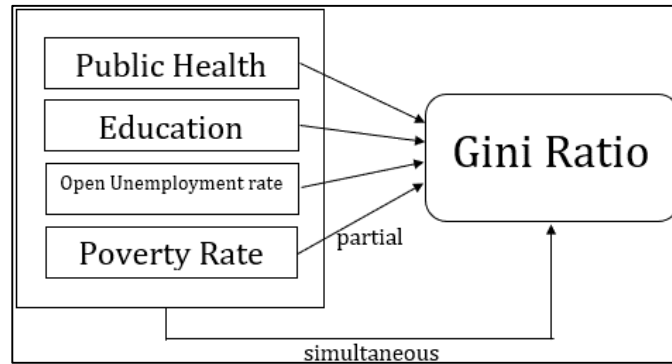
According to Ragnar Nurkse's poverty theory, a lack of productivity or poor human resource quality will result in low income or poverty (Shamim, 2022). Poverty and income disparity are unbreakably connected, & and regularly announces of one frequently indicates the presence of the other. By having a more equitable income distribution, those from the lowest income group can increase their income and get out of poverty (Ogbeide & Agu, 2015). Income disparity, however, has a variety of effects on society's socioeconomic classes (Grottera et al., 2017). Due to their acute vulnerability, the most adverse effects of an unequal distribution of wealth are felt primarily by the most vulnerable people in society (Baloch et al., 2020).

Productivity encourages economic growth by fostering commerce. The favorable impact of unrestricted trade on GDP growth increases as productivity grows. This conclusion results from the interaction between trade openness and productivity development; technologies acquired through global commerce are better used by fostering domestic productivity level development, which supports the nation's economic growth (Duong et al., 2023; Ramzan et al., 2019). High productivity will increase everyone's income level so an increase in income levels will result in changes in income inequality within a country or province.

### 3. METHOD

In this research, the research method used is descriptive quantitative methods. Finding the axioms of numerous phenomena and the relationships between variables are its objectives. Quantitative research's basic point is data. The quality of the data is crucial because quantitative research is based on the idea that no research approach is legitimate without trustworthy data (Yue & Xu, 2019). The data used in this study is secondary data obtained from the Badan Pusat Statistik (BPS) of East Java Province. The data used is annual data from 2013 to 2022 consisting of life expectancy (public health variable), average length of schooling (education variable), open unemployment rate, and poverty rate as independent variable data, and the gini ratio as the dependent variable. The subjects in this research were 4 regencies on Madura Island, consisting of Sumenep, Pamekasan, Sampang, and Bangkalan.

To collect reliable data for this study using the documentation method or documentation study. Research that is carried out methodically on records or archives that are used as data sources is called documentation. Collecting and analyzing official papers with guaranteed validity and legitimacy, policy and regulatory documents, research findings, and other materials is the goal of content or document analysis (Amruddin et al., 2022).



**Figure 6.** Analytical framework

To model the gini ratio on Madura by applying panel data regression, the analysis tool used is the StataMP 17 application, following steps are done: 1) build the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) for the data set, 2) from the aforementioned models, pick the best selection, 3) Performing classical assumption tests (normality and multicollinearity test), 4) interpret the final model according to the analysis framework in Figure 6 (Lasdiyanti et al., 2019).

#### 4. RESULTS AND DISCUSSION

##### Results for Panel Data Models

In conducting panel data regression, what must be done first is to carry out a regression of the 3 models to be selected consisting of the CEM, FEM, and REM.

**Table 1.** The estimates of the Common Effect Model (CEM)

Number of observation	= 40					
F (4,35)	= 7,59					
Probability > F	= 0,0002					
R-squared	= 0,4644					
Adj R-squared	= 0,4032					
Root MSE	= 0,025					
Gini Ratio	Coefficient	Std. err.	T	P> t	[95% conf. interval	
Health	-0,0028496	0,0028939	-0,98	0,332	-0,0087247	0,0030254
Education	-0,00576	0,0147608	-0,39	0,699	-0,0357261	0,024206
Open Unemployment Rate	0,0090399	0,0027544	3,28	0,002	0,0034481	0,0146316
Poverty Rate	-0,0067443	0,0040637	-1,66	0,106	-0,0149941	0,0015055
_cons	0,622478	0,182449	3,41	0,002	0,250869	0,992869

Source: Own Calculation with StataMP 17 (2023)

**Table 2.** The estimates of the Fixed Effect Model (FEM)

Number of obs	= 40					
Number of groups	= 4					
F (4,32)	= 1,27					
Prob > F	= 0,3019					
R-squared:						
Within	= 0,1371					
Between	= 0,0074					
Overall	= 0,0020					
Corr(u_i, Xb)	= -0,7621					
Gini Ratio	Coefficient	Std. err.	T	P> t	[95% conf. interval	
Health	0,016765	0,020398	0,82	0,417	-0,0247843	0,0583143
Education	-0,024081	0,02407	-1,00	0,325	-0,0731099	0,024948
Open Unemployment Rate	0,0088452	0,0048672	1,82	0,079	-0,0010689	0,0187593
Poverty Rate	-0,0065787	0,0045489	-1,45	0,158	-0,0158445	0,0026871
_cons	-0,6358459	1,300555	-0,49	0,628	-3,28499	2,013299

Source: Own Calculation with StataMP 17 (2023)

**Table 3.** The estimates of the Random Effect Model (REM)

Number of obs	= 40					
Number of groups	= 4					
Wald chi2(4)	= 30,34					
Prob > chi2	= 0,0000					
R-squared:						
Within	= 0,1130					
Between	= 1,0000					
Overall	= 0,4644					
Corr(u_i, X)	= 0					
Gini Ratio	Coefficient	Std. err.	Z	P> z	[95% conf. interval	
Health	-0,0028496	0,0028939	-0,98	0,325	-0,0085217	0,0028224
Education	-0,00576	0,0147608	-0,39	0,696	-0,0346907	0,0231706
Open Unemployment Rate	0,0090399	0,0027544	3,28	0,001	0,0036413	0,0144384
Poverty Rate	-0,0067443	0,0040637	-1,66	0,097	-0,014709	0,0012204
_cons	0,622478	0,182449	3,41	0,001	0,2648846	0,9800713

Source: Own Calculation with StataMP 17 (2023)

### The best model selection test results

The Chow, Hausman, and Lagrange multiplier tests are three different test models. Lagrange multiplier test to pick common effect or random effect; Chow test to choose the CEM or FEM; Hausman test to choose the REM or FEM. When the results of the Chow and Hausman tests do not agree, the final test is employed. A model test hypothesis is provided below:

- A Chow test with ho: CEM and ha: FEM makes up the first model.
- A test with ho: REM and ha: FEM makes up the second model.
- A Lagrange multiplier test with ho: CEM and ha: REM makes up the third model.
- Reject ho if P 0,05 and accept it if P > 0,05 (Effendi, 2019).

**Table 4.** The best model selection test results

Test	Probability
Chow Test	0,7723
Hausman Test	0,8913
Breusch and pagan LM Test	1,0000

Source: Own Calculation with StataMP 17 (2023)

From Table 4 above, it can be seen that in the Chow test, the probability value is 0.7723. It means greater than 0.05. So accept  $H_0$  and choose the common effect model. Furthermore, in the Hausman test, the probability value is 0.8913. means greater than 0.05. So it was decided to choose the Random Effect Model. Finally, the Breusch and Pagan LM test obtained a probability value of 1.0. This means that it is greater than 0.05, so that in model selection it was decided to choose the CEM.

#### Classical Assumption test (normality and multicollinearity test)

The results of selecting the most efficient model parameters are determined using the Common Effect Model (CEM) technique. To determine whether the model deviates from conventional assumptions or not, it is necessary to test the results, the test consists of:

#### Normality test

Since parametric testing assumes that the data are normal as a basic premise, many statistical tests need the determination of the data's normality. There are two main criteria for defining normality: graphics, and numbers/statistical analysis (Mishra et al., 2019). Errors and residuals must be normally distributed, which is one of the basic premises of the classical linear regression model. The Shapiro-Wilk W test can be used to test the normality of the residues.

$H_0$  = The normal distribution of residues

$H_a$  = Residues are not normally distribution

If the probability is less than 0.05 then the hypothesis  $H_0$  is rejected, which indicates that the residuals are not normally distributed. Therefore, a normality handler is needed when the data is declared to be not normally distributed. check outlier and outlier data (data values that deviate from the norm). If the Outliner Value is greater than 1, normality is managed by selecting normal data and deleting data affected by the Outliner.

**Table 5.** The result of the Normality test (Shapiro Wilk W Test)

Variable	Observation	W	V	z	Probability>z
E	40	0,95973	1,592	0,978	0,16398

Source: Own Calculation with StataMP 17 (2023)

Based on the results of the Shapiro-Wilk W test, which are listed in Table 5. The probability value is 0.16398. This means that this value is greater than 0.05, so it accepts  $H_0$ . The residues in this research were normally distributed.

### Multicollinearity Test (variance inflation factor)

A diagnosis of multicollinearity should always be confirmed while analyzing a data set to avoid the detrimental effects of multicollinearity and its possible weakness in regression models (Ullah et al., 2019). Whether or not the independent variables are connected in this regression is the focus of the multicollinearity test. Multicollinearity occurs when there is a correlation. Examining the computer output of the correlation coefficient is one technique for determining model multicollinearity. The research model has a multicollinearity problem, which can be determined by looking at the mean-variance inflation factor value > 10. Conversely, if the value is less than 10, the multicollinearity problem can be solved with this research model.

**Table 6.** The result of the Multicollinearity test (Variance Inflation Factor)

Variable	VIF	1/VIF
Poverty rate	10,63	0,094105
Education	10,42	0,095991
Open Unemployment Rate	1,73	0,576771
Health	1,33	0,751949
Mean VIF	6,03	

Source: Own Calculation with StataMP 17 (2023)

Based on the results of the Variance Inflation factor test listed in Table 6. The Mean VIF value is 6.03. This means that this value is less than 10, so it is stated that there is no multicollinearity in this research.

### Result of the Best model test (Common Effect Model)

#### T-test (partial)

Analyze if the independent variable's impact on x and y is close to the test hypothesis (Maulud & Abdulazeez, 2020). The test is used to determine and measure which variable has the highest or strongest influence and which has the lowest or weakest influence on the dependent variable to test the hypothesis partially.  $H_0$  is accepted if t-count < t-table or has no effect. If the value is negative, the effect is in the opposite direction, while a positive value indicates a unidirectional effect. The T-table value in this research is 2.03011.

Based on the results of the Common Effect Model test in Table 1, the t-count value of the health variable is -0.98. This means that the value is smaller than the t-table value. So it is stated that health does not significantly influence the Gini ratio. And the value is negative which means the effect is in the opposite direction. The most noticeable impact is on one's ability to work physically and mentally. Wages and productivity may be impacted by health. People with bad health make significantly less income than people with good health. Health problems frequently result in lower earning potential and productivity in the job market. So their income level also fell and caused the Gini ratio to increase (O'Donnell et al., 2015). These results differ from research conducted by Wijaya and Rindayati (2020) which states that life expectancy (health) has a positive and significant influence on income inequality in Indonesia.

Then the t-count value of the education variable is -0.39. it means that this value is smaller than the t-table. So it is stated that education has no significant effect on the Gini ratio. And the value is negative which means the effect is in the opposite direction. The cause of the influence of education in the opposite direction to the Gini ratio is when the level of public education has decreased. Then the skill level, as well as work productivity will decrease. This is also followed by a decrease in income levels which will lead to an increase in income inequality. This result is also in line with research conducted by [Abdullah \(2015\)](#) which states that education has no significant effect on average income inequality.

The next variable is the open unemployment rate, the t-count value of this variable is 3.28. It means that this value is greater than the t-table. So it is stated that the open unemployment rate has a significant effect on the Gini ratio. And the value is positive which means the effect is unidirectional. This happens because when the open unemployment rate increases, more and more people have no income or low income. So there is an increasing difference in income between the lower class and the upper class. This will increase income inequality or the Gini ratio. These results are in line with the results of research conducted by previous researcher, which states that the unemployment rate has a positive (unidirectional) and significant influence on the gini ratio or income inequality ([Salim et al., 2020](#)).

The last variable is the poverty rate which has a t-value of -1.66. This means that this value is smaller than the t-table value. So it is stated that the poverty level does not have a significant effect on the Gini ratio. A negative value means that the effect is in the opposite direction. This occurs because the more wealthy groups often capture a bigger proportion of the gains when economic growth occurs but are not dispersed equally throughout society. As a result, even as overall poverty declines, income inequality may rise as a result of the widening income gap between the affluent and the poor. This is different from the research conducted by previous research which states that the combination impact of high poverty but high financial inclusion is substantially connected with larger inequality of income ([Park & Mercado, 2018](#)).

### **F test (simultaneous)**

The result of Test F is a panel data regression test that is conducted concurrently. The F Value illustrates the magnitude of the significant influence of the predictor variable on the respondent variable. Before use, this F value must be compared with the F table ([Zulfikar, 2018](#)). The test used to assess the degree of interaction between variable X and variable Y is the correlation coefficient and the coefficient of determination. to ascertain whether the independent variables have an impact on the independent variables simultaneously or together.

In the F test, the test results are carried out by comparing the F-table with the F-count. The F-table in this research is 2,64146. From Table 1, we can see that the calculated F-value is 7,59, meaning that this > F-table. So it is stated that health, education, open unemployment rate, and poverty rate together significantly influence the gini ratio on Madura Island.

### Determination Coefficient Test

The proportion of variance associated with variable Y that can be "explained" by variable X is quantified by the "coefficient of determination", commonly known as the square of the correlation coefficient ( $r^2$ ) (Armstrong, 2019). A brief evaluation of how well the sample regression fits the data is the coefficient of determination-square-number represents the strength of the influence of the independent variables on the dependent variable. The range of  $r^2$  values is between ( $0 \leq r^2 \leq 1$ ). With rising  $r^2$ , more variation in the dependent variable may be explained by a change in the independent variable. Conversely, the lower the squared value, the lesser the amount of the dependence variable's fluctuation that can be accounted for by the independence variable's variance.

From Table 1 the value obtained for R-Square is 0.4644. This means that the independent variables namely health, education, open unemployment rate, and poverty rate contribute to influencing the dependent variable Gini ratio of 46.44%, while 53.66% is influenced by other variables.

## 5. CONCLUSION

The results of this research are: 1) Health, education, and poverty levels have insignificant and opposite effects on the gini ratio on Madura Island. 2) The open unemployment rate has a significant positive effect on the Gini ratio on Madura Island. 3) Simultaneously health, education, open unemployment rate, and poverty rate affect the gini ratio significantly and have a positive effect. 4) The independent variables in this study contributed to influencing the Gini ratio of 46.44 percent.

Therefore, it is hoped that policymakers will be able to determine policy innovations to encourage an increase in the level of public health and education to increase the level of people's income so that income inequality can be optimally suppressed. Then it is hoped that there will be new policies that can reduce the unemployment rate and poverty rate. To reduce income inequality.

These policies can be in the form of providing free health services, educational scholarships and compulsory education, regular job fairs, skills training for the workforce, and distribution of social assistance that is right on target. For future researchers, it is hoped that they can further expand the variables that have the potential to reduce the Gini ratio, such as the use of technology and economic digitalization.

## 6. REFERENCES

- Abdullah, A., Doucouliagos, H., & Manning, E. (2015). DOES EDUCATION REDUCE INCOME INEQUALITY? A META-REGRESSION ANALYSIS. *Journal of Economic Surveys*, 29(2), 301–316. <https://doi.org/10.1111/joes.12056>
- Amruddin, Muskananfol, I. L., Febriyanti, E., Badi'ah, A., Pandie, F. R., Goa, M. Y., & Martinin, Y. (2022). *Metodologi Penelitian Kuantitatif dan Kualitatif (Sumber Elektronik)*. CV Media Sains Indonesia.
- Armstrong, R. A. (2019). Should Pearson's correlation coefficient be avoided? *Ophthalmic and Physiological Optics*, 39(5), 316–327. <https://doi.org/10.1111/opo.12636>

- Baloch, M. A., Danish, Khan, S. U.-D., Ulucak, Z. Ş., & Ahmad, A. (2020). Analyzing the relationship between poverty, income inequality, and CO2 emission in Sub-Saharan African countries. *Science of The Total Environment*, 740, 139867. <https://doi.org/10.1016/j.scitotenv.2020.139867>
- Berger, T., & Enflo, K. (2017). Locomotives of local growth: The short- and long-term impact of railroads in Sweden. *Journal of Urban Economics*, 98, 124–138. <https://doi.org/10.1016/j.jue.2015.09.001>
- Berman, Y., Ben-Jacob, E., & Shapira, Y. (2016). The Dynamics of Wealth Inequality and the Effect of Income Distribution. *PLOS ONE*, 11(4), e0154196. <https://doi.org/10.1371/journal.pone.0154196>
- Chan, T. (2022). On a new class of continuous indices of inequality. *Mathematical Social Sciences*, 120, 8–23. <https://doi.org/10.1016/j.mathsocsci.2022.08.003>
- Coady, D., & Dizioli, A. (2018). Income inequality and education revisited: persistence, endogeneity, and heterogeneity. *Applied Economics*, 50(25), 2747–2761. <https://doi.org/10.1080/00036846.2017.1406659>
- Colclough, C., Kingdon, G., & Patrinos, H. (2010). The Changing Pattern of Wage Returns to Education and its Implications. *Development Policy Review*, 28(6), 733–747. <https://doi.org/10.1111/j.1467-7679.2010.00507.x>
- Cysne, R. P., & Turchick, D. (2012). Equilibrium unemployment-inequality correlation. *Journal of Macroeconomics*, 34(2), 454–469. <https://doi.org/10.1016/j.jmacro.2011.12.009>
- Deming, D. (2023). *Multidimensional Human Capital and the Wage Structure*. <https://doi.org/10.3386/w31001>
- Duong, K. D., Nguyen, S. D., Phan, T. T.-P., & Luong, L. (2023). How Foreign Direct Investment, Trade Openness, and Productivity Affect Economic Growth: Evidence From 90 Middle-income Countries. *Scientific Papers of the University of Pardubice, Series D: Faculty of Economics and Administration*, 30(3). <https://doi.org/10.46585/sp30031615>
- Effendi, K. A. (2019). Oil Prices and Macroeconomic on the Islamic Banking Performance in OPEC Member Countries. *International Journal of Energy Economics and Policy*, 9(1), 200–204. <https://doi.org/10.32479/ijeep.7098>
- Ferreira, I. A., Gisselquist, R. M., & Tarp, F. (2022). On the Impact of Inequality on Growth, Human Development, and Governance. *International Studies Review*, 24(1). <https://doi.org/10.1093/isr/viab058>
- Grottera, C., Pereira, A. O., & La Rovere, E. L. (2017). Impacts of carbon pricing on income inequality in Brazil. *Climate and Development*, 9(1), 80–93. <https://doi.org/10.1080/17565529.2015.1067183>
- İLİMAN PÜSKÜLLÜOĞLU, E. (2023). Investigation of Human Capital Index Value and Income Distribution in European and Central Asian Countries: The Case of Turkey. *Research in Educational Administration and Leadership*, 8(2), 421–463. <https://doi.org/10.30828/real.1184741>
- Inoua, S. (2021). Beware the Gini Index! A New Inequality Measure. *ESI Working Paper 21-18*. <https://doi.org/https://doi.org/10.48550/arXiv.2110.01741>
- Lasdiyanti, M., Kencana, E. N., & Suciptawati, P. (2019). Modeling Human Development Index of Bali with Spatial Panel Data Regression. *European Journal of Engineering and Technology Research*, 4(5), 132–137. <https://doi.org/10.24018/ejeng.2019.4.5.1312>
- Lee, J.-W., & Lee, H. (2016). Human capital in the long run. *Journal of Development Economics*, 122, 147–169. <https://doi.org/10.1016/j.jdeveco.2016.05.006>

- Luh Miyuki Mani, P. T. W., & Rindayati, W. (2020). Pengaruh Pendidikan dan Kesehatan terhadap Ketimpangan Pendapatan di Indonesia. *IPB University*. <http://repository.ipb.ac.id/handle/123456789/109878>
- Mangaraj, B. K., & Aparajita, U. (2020). Constructing a generalized model of the human development index. *Socio-Economic Planning Sciences*, 70, 100778. <https://doi.org/10.1016/j.seps.2019.100778>
- Marantika, D., Hadi P, T., & Viphindrartin, S. (2018). DISPARITAS REGIONAL ANTAR PROVINSI DI INDONESIA 2011 – 2015 (MODEL REGRESI SPASIAL). *Media Trend*, 13(1), 31. <https://doi.org/10.21107/mediatrend.v13i1.3171>
- Marein, B. (2022). Colonial Roads and Regional Inequality. *Journal of Urban Economics*, 131, 103492. <https://doi.org/10.1016/j.jue.2022.103492>
- Maulud, D., & Abdulazeez, A. M. (2020). A Review on Linear Regression Comprehensive in Machine Learning. *Journal of Applied Science and Technology Trends*, 1(4), 140–147. <https://doi.org/10.38094/jastt1457>
- Mdingi, K., & Ho, S.-Y. (2021). Literature review on income inequality and economic growth. *MethodsX*, 8, 101402. <https://doi.org/10.1016/j.mex.2021.101402>
- Mishra, P., Pandey, C., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anaesthesia*, 22(1), 67. [https://doi.org/10.4103/aca.ACA\\_157\\_18](https://doi.org/10.4103/aca.ACA_157_18)
- Monfort, M., Ordóñez, J., & Sala, H. (2018). Inequality and Unemployment Patterns in Europe: Does Integration Lead to (Real) Convergence? *Open Economies Review*, 29(4), 703–724. <https://doi.org/10.1007/s11079-018-9488-x>
- O'Donnell, O., Van Doorslaer, E., & Van Ourti, T. (2015). Health and Inequality. *Handbook of Income Distribution*, 2, 1419–1533. <https://doi.org/10.1016/B978-0-444-59429-7.00018-2>
- OECD. (2015). *In It Together: Why Less Inequality Benefits All*. OECD Publishing. <https://doi.org/10.1787/9789264235120-en>
- Ogbeide, E. N. O., & Agu, D. O. (2015). Poverty and Income Inequality in Nigeria: Any Causality? *Asian Economic and Financial Review*, 5(3), 439–452. <https://doi.org/10.18488/journal.aefr/2015.5.3/102.3.439.452>
- Ogundari, K., & Abdulai, A. (2014). Determinants of Household's Education and Healthcare Spending in Nigeria: Evidence from Survey Data. *African Development Review*, 26(1), 1–14. <https://doi.org/10.1111/1467-8268.12060>
- Ogundari, K., & Awokuse, T. (2018). Human capital contribution to economic growth in Sub-Saharan Africa: Does health status matter more than education? *Economic Analysis and Policy*, 58, 131–140. <https://doi.org/10.1016/j.eap.2018.02.001>
- PARK, C.-Y., & MERCADO, R. (2018). FINANCIAL INCLUSION, POVERTY, AND INCOME INEQUALITY. *The Singapore Economic Review*, 63(01), 185–206. <https://doi.org/10.1142/S0217590818410059>
- Polacko, M. (2021). Causes and Consequences of Income Inequality – An Overview. *Statistics, Politics and Policy*, 12(2), 341–357. <https://doi.org/10.1515/spp-2021-0017>
- Putro, P. B. W., Mintarti, S., & Wijaya, A. (2018). Analisis determinasi pertumbuhan ekonomi dan kemiskinan. *INOVASI*, 13(2), 135. <https://doi.org/10.29264/jinv.v13i2.2459>
- Ramzan, M., Sheng, B., Shahbaz, M., Song, J., & Jiao, Z. (2019). Impact of trade openness on GDP growth: Does TFP matter? *The Journal of International Trade & Economic Development*, 28(8), 960–995. <https://doi.org/10.1080/09638199.2019.1616805>
- SALIM, A., RUSTAM, A., HAERUDDIN, H., ASRIATI, A., & PUTRA, A. H. P. K. (2020). Economic Strategy: Correlation between Macro and Microeconomics on

- Income Inequality in Indonesia. *The Journal of Asian Finance, Economics and Business*, 7(8), 681–693. <https://doi.org/10.13106/jafeb.2020.vol7.no8.681>
- Schoder, C. (2020). A Keynesian Dynamic Stochastic Disequilibrium model for business cycle analysis. *Economic Modelling*, 86, 117–132. <https://doi.org/10.1016/j.econmod.2019.06.006>
- Shamim, T. (2022). Nurkse's model of vicious circle of poverty theory: Is it applicable for dental profession in India. *Journal of Family Medicine and Primary Care*, 11(3), 1221. [https://doi.org/10.4103/jfmpe.jfmpe\\_660\\_21](https://doi.org/10.4103/jfmpe.jfmpe_660_21)
- Truesdale, B. C., & Jencks, C. (2016). The Health Effects of Income Inequality: Averages and Disparities. *Annual Review of Public Health*, 37(1), 413–430. <https://doi.org/10.1146/annurev-publhealth-032315-021606>
- Ullah, M. I., Aslam, M., Altaf, S., & Ahmed, M. (2019). Some New Diagnostics of Multicollinearity in Linear Regression Model. *Sains Malaysiana*, 48(9), 2051–2060. <https://doi.org/10.17576/jsm-2019-4809-26>
- Yang, J., & Qiu, M. (2016). The impact of education on income inequality and intergenerational mobility. *China Economic Review*, 37, 110–125. <https://doi.org/10.1016/j.chieco.2015.12.009>
- Yue, C., & Xu, X. (2019). Review of Quantitative Methods Used in Chinese Educational Research, 1978–2018. *ECNU Review of Education*, 2(4), 515–543. <https://doi.org/10.1177/2096531119886692>
- Zubaidi, Z. (2022, December 28). *Angka Gini Ratio di Sumenep Terendah se-Jatim, Ini Rahasiannya*. *Jatimnow.Com*. <https://jatimnow.com/baca-54028-angka-gini-ratio-di-sumenep-terendah-sejatim-ini-rahasiannya>
- Zulfikar, R. (2018). Estimation Model And Selection Method Of Panel Data Regression : An Overview Of Common Effect, Fixed Effect, And Random Effect Model. *INA-Rxiv*. <https://doi.org/10.31227/osf.io/9qe2b>