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# The Effect of Economic Sector and Education on Income Inequality In Indonesia

**Irma Novianti[1*], Fithriyah[2]**

[1,2]Airlangga University

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***A B S T R A C T***

*This study aims to determine the impact of economic sector relations (agriculture, industrial, finance), education (literacy), provincial minimum wages and infrastructure (electricity, clean water and sanitation) on income inequality in Indonesia. The data used in this study are secondary data for 2010-2018 period from Central Bureau of Statistics and The Indonesia Database for Policy and Economic Research which is processed using panel data regression method and instrumental variables. Based on the estimation result, it shows that the variables of the agricultural sector, industrial sector, literacy and sanitation infrastructure are able to reduce income inequality in Indonesia in contrast to the result of the financial sector variables that have not been able to reduce income inequality. Meanwhile, the provincial minimum wage, electricity and clean water infrastructure variables have no effect on income inequality in Indonesia.*

***Keywords:*** *Income Inequality, Panel Data Regression, Instrumental Variables*
***JEL Classification Code****: C23, C01, D63*

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*Author correspondence:*
E-mail: Irmanovianti35@gmail.com

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## INTRODUCTION

Inequality of income distribution is a condition where the distribution of income received by the community is not evenly distributed. Kuznets (1955) was an early researcher who examined inequality in various countries cross-sectionally and found an "inverted-U" pattern. The inverted-U Kuznets curve depicts the income inequality index with the rate of economic growth. Kuznets concluded that the average income per capita at the beginning of the country's development was still low, which was followed by a low level of inequality. Furthermore, when the average income increases, income inequality will also increase. Income inequality in Indonesia is a serious problem and needs to be addressed. As shown in figure 1.1, the Gini ratio has shown a downward trend over the last few years but its value is still in the category of moderate inequality. A report from the World Bank (2015), states that the level of inequality in Indonesia (from 2000 to 2014) is increasing faster than in most of its neighbors in East Asia. This shows that high growth so far has not been pro-poor, because economic growth does not flow to the lower classes and in fact, most of the rich groups can enjoy this growth (Yusuf, 2015).

The Gini ratio (a proxy for income inequality) in Indonesia fluctuated from 2010-to 2018. This increase in the Gini ratio was caused by a decrease in the number of poor people, which means that low-income residents experienced an increase in welfare, which was marked by an increase in population consumption. This increase in welfare is not only experienced by low-income residents but also by upper-middle-income residents. Despite the increase in consumption of the population as a whole, the consumption growth of the low-income population is still smaller than the consumption of the middle-upper population. This has led to an increase in income inequality. Meanwhile, in 2016 to 2018 the trend decreased from the previous year. This decrease was due to an increase in monthly per capita expenditure in the 40 percent and under group which was faster than the middle 40 percent and 20 percent and above (BPS, 2017). When compared with the main economic growth from 2015 to 2018, it shows the fact from the theory that developing countries face a trade-off between economic growth and income inequality. Then 2010 to 2014 showed a phenomenon where economic growth which had a downward trend was accompanied by relatively stagnant income inequality. According to Nangrumba (2015), this shows that Indonesia is experiencing a condition where people's welfare becomes stagnant when economic growth weakens.

Therefore, income inequality in Indonesia is quite high, causing a slowdown in economic growth in recent years. Given the magnitude of the impact caused by income inequality, a strategy is needed to reduce income inequality in Indonesia. There are several factors that play an important role in influencing income inequality. First, the economic sector has a relationship with one another. This is because an increase in labor growth and income in one sector will increase the consumption of goods and services from other sectors. Cohen and Zysman's research in Nangarumba (2015) proves that the economic sector also has an important role in income inequality, especially in developing countries. In this study, the sectors used are the agricultural sector, the industrial sector, and the financial sector. This is due to changes in the economic structure. The initial growth stage will be concentrated in the modern sector. Second, education has an effect on income inequality. The higher the education of the community, the higher the income earned by the community. Research on education by Nurjanah (2016) suggests that the literacy rate has an influence on income inequality. Third, the

minimum wage plays a role in determining wages in the labor market which increases the price of labor, thereby increasing the price of labor, resulting in a reduction in the demand for labor (Sungkar et al, 2015). Fourth, infrastructure development will increase people's income, due to increasing economic activity as a result of higher mobility of production factors and trade activities. Several empirical facts regarding the role of infrastructure development on income inequality between regions in Indonesia. The study of Muljono, Antamemg, Sinaga & Daryanto (2010) examines the impact of road construction on production factor income, both for intra and inter-regional west-eastern Indonesia. This study found that the impact of road construction can increase the income of factors of production, but the impact differs between regions. This shows that urban areas benefit from income from factors of production that are greater than rural areas.

Several previous studies have studied income inequality. Gardin (2015) researched income inequality in Spain and found that high inequality in Spain is due to lower levels of employment and lower education. Rabiul et al (2017) examined income inequality in Malaysia and found that economic growth had a significant contribution to reducing income inequality. Garbinti et al (2018) researching income inequality in France from 1900-to 2014 found that changes in the inequality of income distribution have a large impact on welfare comparisons across countries, for example, income before tax is on average 50%. The smallest income in France is 20%. This indicates that income in France is smaller than income in other countries. Rofiuddin and Firmansyah (2018) find that economic growth and population do not affect income inequality, while the provincial minimum wage has a negative effect on income inequality in Indonesia.

Abdullah (2013) conducted research on the factors that influence income inequality in Central Java. This study aims to determine the determinants of income inequality in Central Java Province from the period 2002-to 2011. The method used is panel data regression. The results showed that the share of output had a significant effect on income inequality. Meanwhile, the dependent variable and the dependent ratio are not significant in income inequality. Fadilah et al (2017) conducted research on the influence of industry, industrial labor, and GRDP of the industrial sector on income disparities between East Java regions. This study aims to determine the effect of industry, industrial workforce, and GRDP of the industrial sector on income disparities between regions in East Java in 2012-2015. The method used is multiple linear analysis. The results of the study indicate that the GRDP of the industrial sector has a significant effect on dispirits. So it can be concluded that industrialization in East Java Province has not been able to resolve the income disparity between regions in East Java Province.

The difference with previous studies lies in the method used and the research location. The method used in the previous study used panel data regression and multiple linear analysis. This study uses ordinary panel data regression and instrumental variable panel. The research locations are also different. The previous study was more micro in scope, namely provinces, while this study was more macro, namely Indonesia. The results of the research are also different, the two journals only look at wages, labor, and GRDP in the economic sector, so it becomes a renewal in this study to look at the economic sector, education (literacy rate), provincial drinking wages and infrastructure on income inequality. This study will also use the latest data and analyze the effect of income inequality in Indonesia from 2010-to 2018. Therefore, analyzing the effect of income inequality in Indonesia using the latest data will be very useful because conditions

have changed a lot.

Based on the background that has been stated above, it can be formulated the problem in this research is how the relationship between economic sectors (agriculture, industry, finance), education (literacy), minimum wages, and infrastructure (electricity, clean water, and sanitation) affects income inequality in Indonesia. Indonesia ?. This study aims to determine the effect of the relationship between economic sectors (agriculture, industry, finance), education (literacy), provincial minimum wages, and infrastructure (electricity, clean water, and sanitation) on income inequality in Indonesia.

## METHODOLOGY

The type of data used in this study is secondary data in the form of panel data consisting of 33 provinces of Indonesia over a period of 9 years, from 2010 to 2018. The data collected in this study include the Gini ratio, Gross Regional Domestic Product (GDP) of the agricultural sector, GRDP of the industrial sector, GRDP of the financial sector, literacy, provincial minimum wage, ratio of electricity infrastructure, ratio of clean water infrastructure and ratio of sanitation infrastructure with data sourced from the Central Statistics Agency and The Indonesia Database for Policy and Economic Research. This study has a hypothesis that the variables of the economic sector, education, provincial minimum wages and infrastructure have an effect on income inequality in Indonesia. So it can be written in the equation of the panel data regression model in this study as follows:

$$lnGI_{it} = \alpha_0 + \alpha_1 lnPertanian_{it} + \alpha_2 lnIndustri_{it} + \alpha_3 lnKeuangan_{it} + \alpha_4 lnLiterasi_{it} + \alpha_5 lnUMP_{it} + \alpha_6 lnListrik_{it} + \alpha_7 lnAir_{it} + \alpha_8 lnSanitasi_{it} + \varepsilon_{it}$$

$$lnLiteracy_{it} = \alpha_0 + \alpha_1 lnListrik_{it} + \alpha_2 lnAir_{it} + \alpha_3 lnSanitasi_{it} + \varepsilon_{it}$$

where GI is the Gini Ratio of 33 provinces, Agriculture is the GRDP of the agricultural sector 33 provinces, Industry is the GRDP of the industrial sector of 33 provinces, Financial is the GRDP of the financial sector of 33 provinces, Literacy is literacy (read-write) 33 provinces, lnUMP is the minimum wage of 33 provinces, Electric is the electricity infrastructure of 33 provinces, Air is the clean water infrastructure of 33 provinces, Sanitation is the sanitation infrastructure of 33 provinces, α is the intercept parameter, ε is the error component at the i-th observation unit and the t-time.

This study uses panel data regression analysis techniques. Panel data is a combination of time series data and cross section data. There are 3 approaches in panel data, namely Pool Least Square (PLS), Fixed Effect Model (FEM) and Random Effect Model (REM). The selection of the estimation model in panel data regression has two main steps, namely using the restricted F-Test or Chow Test, while the Hausman Test is used to determine the choice of method between FEM and REM

## RESULT AND DISCUSSION

This study uses the Random Effect (RE) model to represent the data. Table 1 shows the results of panel data estimation using RE (Model 1) and RE with instrument variables (Model 2). There are two reasons why this study uses the Random Effect Model compared to the Fixed Effect Model (FE). First, RE overcomes the decreasing number of degrees of freedom, as happened under the FE model (Greene, 2008). Second, Batalgi (2008) revealed that the RE model is preferred to estimate panel data with a larger amount of data compared to the time period because the RE estimation results are not conditional on

**Table 1.**
**Panel Regression Results**

| Variable | Model 1 | Model 2 |
|---|---|---|
| | REM | REM IV |
| Konstanta | -0,9905*** | -0,7748*** |
| | (0,2703) | (0,2586) |
| Sektor Pertanian | -0,2209 | -0,0313** |
| | (0,0143) | (0,0139) |
| Sektor Industri | -0,0447 | -0,0053*** |
| | (0,0041) | (0,0015) |
| Sektor Keuangan | 0,0446*** | 0,0417*** |
| | (0,0106) | (0,0102) |
| Literasi | -0,0714 | -0,5790*** |
| | (0,2395) | (0,1911) |
| Upah Minimum Provinsi | -0,0029 | -0,0144 |
| | (0,0174) | (0,0180) |
| Infrastruktur Listrik | -0,0666 | |
| | (0,0968) | |
| Infrastruktur Air | 0,0453 | |
| | (0,0558) | |
| Infrastruktur Sanitasi | -0,1615** | |
| | (0,0698) | |
| *Hausman Test* | Chi-square = 18.57<br>Prob Chi-square = 0.0173 | *Random Effect* |
| *Lagrangian Multiplier Test* | Chibar-square = 342.22<br>Prob > chibar = 0.0000 | *Random Effect* |
| *Chow Test* | Prob > F = 0.0000 | *Fixed Effect* |

***,****,* significant at 1%, 5%, 10%, the number in brackets is the standard error
Source: Author's Calculation

the amount of data – cross-section. Table 1 shows the estimation results in terms of the economic sector, the agricultural sector has a negative and significant coefficient, which indicates a negative relationship between the agricultural sector and income inequality. Based on the estimation results in table 1, the coefficient value of the agricultural sector of -0.0313 indicates that an increase in the contribution of the agricultural sector to GRDP by 1% is able to reduce income inequality by 0.0313. These results are in line with the research of Nangrumba (2015); Gordon and Resosudarmo (2016); Afandi et al. (2017), who argues that the agricultural sector still dominates in Indonesia and is able to absorb a large workforce. The increase in productivity and the contribution of the agricultural sector to GRDP is expected to increase the income of workers which leads to a decrease in income inequality.

The coefficient of the manufacturing industry sector is negative and significant which indicates that the increasing contribution of the industrial sector to GRDP is able to reduce income inequality. Based on the regression results, the industrial sector coefficient is -0.0053 with a significance level of 1%, which indicates that every 1% increase in the industrial sector's contribution to GRDP will reduce income inequality by -0.0053. This study supports the results of Zulkifli (2016); Ferry and Wildan (2018) which state that the industrial sector is able to absorb a large number of workers so that it has an impact on increasing the economy and leads to economic equality.

The financial sector has a positive relationship with income inequality. The

coefficient of the financial sector is 0.0417 with a significance level of 1%, which indicates that the increasing contribution of the financial sector to GRDP is followed by an increase in income inequality. This research is in line with Dünhaupt (2012), finding that there are two possible financial mechanisms that can increase income and reduce labor income. First, is the shift in the sectoral composition of the economy. Where the financial sector claims a higher share of national income than the non-financial sector. Second, the economy can lead to a lower share of the overall income of the workforce if their share is in different occupations.

This study also wants to see the effect of education on income inequality. This study measures the education variable by using a proxy for the literacy rate of the population. The literacy variable is considered an endogenous variable, where in addition to influencing the level of income inequality, literacy can also be influenced by the level of income inequality. The regression results in Model 1 and Model 2 show that literacy is negative, which indicates that better literacy skills in society can have an impact on reducing the level of income inequality. This study supports the results of Messias (2003) who states that income inequality and literacy have a negative and significant relationship in Brazil. Regarding literacy, BPS (2010-2018) notes that the literacy rate has increased every year. In 2010 the literacy rate was 93.91%, while in 2018 it was 95.66%, meaning that literacy is important for the population in Indonesia, as seen from year to year there has been an increase in literacy. will contribute significantly to inequality and prosperity characterized by high per capita income.

The UMP coefficient is negative and not significant. This explains that the minimum wage has no effect on income inequality because the territory of Indonesia has a very large agricultural land and the population works in the agricultural sector. The location of the industrial sector is only in certain areas so any increase in wages can only be felt by people who work in the industrial sector in certain areas. On the other hand, an increase in the minimum wage does not affect the income of the population working in the agricultural sector. An increase in the minimum wage should reduce income inequality, but in reality in Indonesia, it does not increase the income of the population working in the agricultural sector. This research is in line with the results of the study (Hariani, 2019).

Furthermore, the variable that has no effect on income inequality is the coefficient of electricity and clean water infrastructure. The results of the electricity infrastructure regression, it shows that the coefficient value of the electricity infrastructure variable is -0.066 and shows a negative and insignificant relationship. This can be seen with a probability of 0.492 so that the electricity infrastructure has no effect on income inequality. While the results of the regression of clean water infrastructure show that the coefficient value is 0.0453 and shows a positive and insignificant relationship. This can be seen with a probability of 0.417 so that clean water infrastructure has no effect on income inequality. This is because the development of electricity and clean water infrastructure is deemed insufficient to achieve equity because when viewed in big cities in Indonesia with good infrastructure quality, there are still many economic gaps that are quite clearly visible. Economic equity will be realized if infrastructure development can be enjoyed and utilized by all groups of people. This research is in line with the study conducted by Lestari and Suhadak (2019) regarding the absence of influence of electricity and clean water infrastructure on income inequality.

Meanwhile, the coefficient of sanitation infrastructure has a negative and significant relationship to income inequal-

ity. The regression results show that the coefficient of sanitation infrastructure is -0.1615 with a probability of 0.021, meaning that sanitation infrastructure is able to reduce income inequality. This is because the existence of proper sanitation facilities will be able to reduce the prevalence of disease and increase the productivity of the community which in turn can improve the welfare of the community. The results of this study are in line with research conducted by (Mungkasa 2004).

## CONCLUSIONS

Based on the results of panel data regression, it can be concluded that the agricultural sector and the industrial sector can reduce income inequality in Indonesia. The agricultural and industrial sectors are considered capable of absorbing a large number of workers. This is different from the results of the financial sector regression which is still unable to reduce income inequality in Indonesia, this is due to a shift in the sectoral composition of the economy. Where the financial sector claims a higher share of national income than the non-financial sector.

The literacy variable can be influenced by the level of income inequality. The regression results in Model 1 and Model 2 show that literacy is negative, which indicates that better literacy skills in society can have an impact on reducing the level of income inequality. This is because the increasing literacy will contribute significantly to inequality and welfare which is characterized by high per capita income. The Provincial Minimum Wage does not affect income inequality in Indonesia because the territory of Indonesia is an area that has a very large agricultural land, with many of the population working in the agricultural sector. The industrial sector is only found in certain areas so the increase in wages can only be felt by people who work in the industrial sector in certain areas. On the other hand, an increase in the minimum wage does not affect the income of the population working in the agricultural sector. Electricity and clean water infrastructure do not affect income inequality in Indonesia, this is due to the fact that the development of electricity and clean water infrastructure is deemed insufficient to achieve equity because if we look at big cities in Indonesia with good infrastructure quality, there are still many significant economic disparities. clearly visible. Economic equity will be realized if infrastructure development can be enjoyed and utilized by all groups of people. This result is different from sanitation infrastructure which can reduce income inequality.

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