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"Entrepreneurship on Global Economics Development in the Era of Society 5.0"

Determinants of Development Inequality in Eastern Indonesia**Endang Setya Lukita¹, Muhammad Arif²**¹Muhammadiyah University of Surakarta

Jl. A. Yani Tromol No 157, Pabelan, Kartasura, Sukoharjo, Central Java

²Muhammadiyah University of Surakarta***Email:** b300190195@student.ums.ac.id**ABSTRACT**

The problem of inequality in regional development is a historical problem faced by every country. One of the efforts to reduce disparities is accelerating development in underdeveloped areas. This study aims to explain the condition of development inequality in eastern Indonesia by using five independent variables, namely the construction cost index, investment, average length of schooling, regional original income, and forest land cover area. This research method uses Williamson index analysis and panel data regression. The random Effect Model (REM) is the most appropriate approach to explain the influence of variables in this study. The results of the index study show that Williamson for eastern Indonesia has a value of 0.49 which means moderate inequality. The results of the REM analysis show that investment, local revenue, and forest land cover have a positive and significant effect on development inequality. The average length of schooling has a negative and significant effect on developmental inequality.

Keywords: Williamson index, investment, the average length of schooling, construction cost index, locally-generated revenue, forest land cover area.

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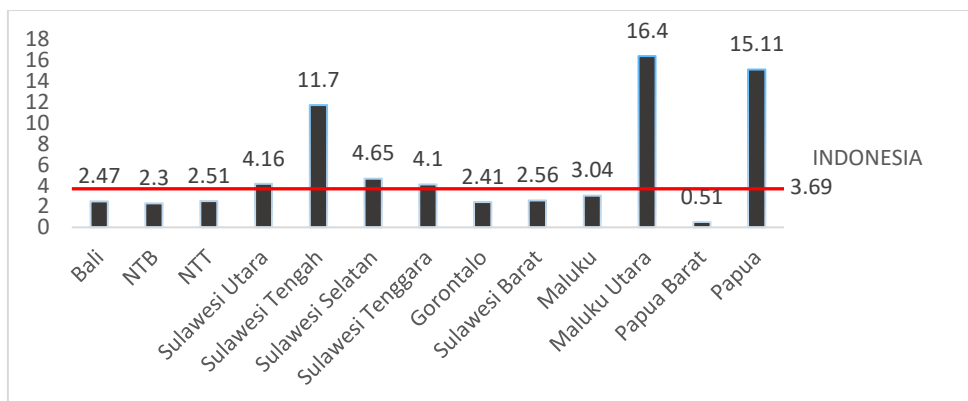
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INTRODUCTION

Inequality can cause problems within a country, threatening long-term sustainable growth (Farida, 2021). The problem of inequality in regional development is a historical problem faced by every nation, starting from the sub-districts, districts or cities, provinces, islands, and even globally. Evolution is not always evenly distributed. Inequality between regions has always been a severe problem in various areas (Arif & Wicaksani, 2017). The development inequality in Indonesia can be said to be still significant, and uneven development can be seen in each region. The government's attention to regional development inequality already exists. This issue has become part of the General Conditions of the Long-Term Development Plan (RPJP) 2005-2025. Empirical facts and several studies have shown that since mid-1995 until now the disparity in Indonesia between the eastern and western regions has become increasingly visible compared to the previous period, especially since 2005 (Firdaus, 2013, p. 1).

The eastern region of Indonesia consists of 13 provinces, namely Bali, NTB, NTT, North Sulawesi, Central Sulawesi, South Sulawesi, Southeast Sulawesi, Gorontalo, West Sulawesi, Maluku, North Maluku, West Papua, and Papua has always been the focus in national development planning. This can be seen from the uneven development of infrastructure, such as roads, bridges, ports, and airports, which are still minimal. Until now, economic growth, distribution of development results, and regional opportunities in eastern Indonesia are still being improved, and overall national development results are generally lagging compared to western Indonesia. Compared with the west of region, the eastern part is blessed with agriculture, forestry, plantations, oil, natural gas, and large-scale mining. However, due to a lack of infrastructure, human resources, administration, and capital funds, the potential of eastern Indonesia's help has not been utilized and managed properly (Soenandar, 2015).

One of the efforts to reduce inequality is by accelerating development in underdeveloped areas (Elia et al., 2020). However, economic growth in eastern Indonesia in 2021 will still experience significant inequality. This can be proven by the graph below.



Graph 1. Comparison of Indonesia's Economic Growth with Eastern Indonesia in 2021, Source: BPS (data processed)

Based on graph 1, it can be explained that most of the eastern regions of Indonesia have low economic growth. Compared to Indonesia's economic growth in 2021, which has a value of 3.69 percent, several provinces east of Indonesia are still below Indonesia. In 2021 there are six out of thirteen sections in the eastern region that have economic growth exceeding Indonesia's, namely North Sulawesi with a value of 4.16 percent, Central Sulawesi

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with a value of 11.7 percent, South Sulawesi with a value of 4.65 percent, Southeast Sulawesi with a value of 4.1 percent, North Maluku with a value of 16.4 percent, and Papua with a value of 15.11 percent. Based on the explanation above, it shows that economic interaction between provinces in the eastern region is still limited (Pribadi et al., 2015). In addition, the uneven economic growth in eastern Indonesia is also caused by natural resources, especially oil and gas, and the development of trading industries and other industrial centers, which are only concentrated in a few areas (Tadjoeddin, 2014).

The majority of underdeveloped areas are in eastern Indonesia. This is caused by development constraints such as the lack of availability of basic economic infrastructure and facilities, limited quality and quantity of human resources, and geographical conditions that are relatively isolated, making eastern Indonesia lag behind other regions. The availability and quality of services in the east of Indonesia also need to be improved for transportation, telecommunication, and electricity networks. For example, Papua Province. Compared to other regions, Papua is still far behind in terms of the economy, infrastructure, and people's welfare. The condition of regional development in Papua is still challenging due to the uneven geographical conditions. Most of Papua's territory is still forest and hills, making it difficult for the government to develop these areas.

The human component in sustainable development has a vital role because it can increase economic growth, which in turn can reduce inequality (Sianipar et al., 2022). But the fact is that in 2021 from the Central Statistics Agency, only four provinces in Eastern Indonesia had a high human development index, namely, Bali, South Sulawesi, Southeast Sulawesi, and North Sulawesi. Considering that eastern Indonesia is vast and has abundant natural resources, it is ironic to face delays in development and a low level of social welfare compared to western Indonesia. The neoclassical school predicts that the disparity in development between regions will gradually disappear. This prediction departs from the assumption that less developed areas have a lower ratio of capital to labor, so the marginal productivity of investment per capital unit is higher in less developed regions. As a result, there will be a catch-up process from less developed areas to developed areas. Jhingan (2012) said that development inequality stems from the capitalist system's profit motive so that economic activity is concentrated in areas with high-profit expectations so that other regions are neglected. These central areas of economic activity attract investment and absorb active young workers from less developed areas, thereby increasing the backwash effect.

A study by (Firdaus & Yusop, 2009) regarding the case of how the eastern region can catch up with the economic progress of the western region, found that during economic development after the start of industrialization, a catch-up process occurred, but at a very slow rate of only 0.29 percent. This means that it will take about 200 years for the eastern regions of Indonesia to catch up with the advances of the western regions if left naturally. Previous research related to development inequality was also carried out by (Soebagyo et al., 2019) showing that inequality between regions in Central Java is affected by GRDP. The issues raised in this study are how much influence investment, average length of schooling, local own-source income, construction cost index, and area of forest land cover have on development inequality in eastern Indonesia.

METHOD

This research uses quantitative methods with secondary data from the Central Bureau of Statistics. The objects that are the scope of this research include development inequality as measured by the Williamson Index in 13 provinces in eastern Indonesia in 2015-2021.

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The independent variables to be analyzed are an investment, average length of schooling, local revenue, construction cost index, and forest cover area. To see the inequality between regions, the Williamson Index calculation is used as follows:

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

Information:

IW = Williamson Index

Y = GRDP per capita on average for all regions

Y_i = GRDP per capita area

n = Total population of the entire region

f_i = Total population of the area

Based on the formula above, the criterion is determined that if IW is close to 1 (one), it means unequal. If IW is close to 0 (zero), then it implies development equity (Iek & Blesia, 2019). The criteria in the Williamson Index (IW) are explained in detail as follows:

- a) $0 < IW \leq 0.4$ is included in the category of low inequality.
- b) $0.4 < IW \leq 0.5$ falls into the category of medium inequality.
- c) $0.5 < IW \leq 1$ falls into the category of high inequality.

This study uses independent variables, namely:

1. The construction cost index, as a proxy for measuring the level of geographical difficulty of an area, the more complex the geographic location of a place, the higher the price level in that area. The construction cost index data was obtained from the Central Bureau of Statistics.
2. Investment, used as a placement of funds in the hope of increasing profits. Investment data was obtained from the Central Bureau of Statistics.
3. Average length of schooling, the average number of years spent by those aged 15 years and over to pursue all types of education undertaken. Data on the average length of instruction in annual form is obtained from the Central Bureau of Statistics.
4. Regional Own Revenue, derived from regional revenue sources obtained from provincial taxes, regional levies, products of Regional Owned Enterprises, and other legitimate regional original revenues. Local Own Revenue Data received from the Central Bureau of Statistics.
5. Area of forest land cover, defined as how much forest area is closed to be converted into specific development goals. Data on forest land cover was obtained from the Central Bureau of Statistics.

Then the estimation stage used in this study includes parameter estimation of econometric models using the Pooled Least Square (PLS) approach, Fixed Effect Model (FEM), and Random Effect Model (REM). Selection of the best-estimated model by Chow test and Hausman test, and Lagrange Multiplier test if necessary. Test the goodness of the model on the selected estimated model, and test the validity of the effect of the independent variables on the selected estimated model. The type of data used in this research is panel data, a combination of time series and cross-section data. The econometric model used is as follows:

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$$IW_{it} = \beta_0 + \beta_1 IKK_{it} + \beta_2 LOG(INV)_{it} + \beta_3 LOG(RLS)_{it} + \beta_4 LOG(PAD)_{it} + \beta_5 LOG(LPLH)_{it} + \epsilon_{it}$$

Where :

- IW = Development Inequality (index)
- IKK = Construction Cost Index (per cent)
- INV = Investment (billion of rupiah)
- RLS = Average Length of Study (years)
- PAD = Local Own Revenue (billions of rupiah)
- LPLH = Forest Land Cover Area (hectares)
- Log = Logarithmic Operations
- ϵ = Error Term
- β_0 = Constant
- $\beta_1 \dots \beta_5$ = Regression Coefficient
- i = Cross Section
- t = Time Series

RESULT AND DISCUSSION

Below is an explanation of development inequality in eastern Indonesia based on calculations from the Williamson Index and results from panel data regression to determine what variables affect development inequality in east Indonesia.

Conditions of Inequality in the Eastern Region of Indonesia

Calculation of regional development inequality in eastern Indonesia using the Williamson Index is summarized in the following table:

Table 1. Willamson Index by Province in Eastern Indonesia 2015-2021

Province	Williamson Index							Average
	2015	2016	2017	2018	2019	2020	2021	
Bali	0.22	0.31	0.32	0.32	0.31	0.38	0.35	0.32
NTB	0.83	0.82	0.74	0.57	0.54	0.70	0.69	0.70
NTT	0.61	0.62	0.62	0.62	0.61	0.59	0.57	0.61
North Sulawesi	0.50	0.50	0.49	0.50	0.51	0.48	0.49	0.50
Central Sulawesi	0.46	0.48	0.51	0.55	0.59	0.37	0.46	0.49
South Sulawesi	0.62	0.61	0.61	0.62	0.64	0.70	0.69	0.64
Southeast Sulawesi	0.58	0.57	0.60	0.60	0.60	0.59	0.49	0.58
Gorontalo	0.14	0.14	0.13	0.13	0.12	0.17	0.18	0.14
Weat Sulawesi	0.37	0.36	0.36	0.35	0.34	0.34	0.39	0.36
Maluku	0.26	0.25	0.24	0.23	0.22	0.39	0.40	0.28
North Maluku	0.28	0.28	0.27	0.27	0.27	0.36	0.66	0.34
West Papua	0.64	0.59	0.58	0.58	0.57	0.57	0.58	0.59
Papua	0.81	0.81	0.82	0.82	0.83	0.78	0.79	0.81
Eastern Indonesian Average								0.49

Source: BPS (data processed)

Based on table 1, it can be seen that the difference in the average value of regional inequality during 2015-2021 has quite a big difference. Six provinces in eastern Indonesia have a Williamson Index score of between $0.5 \leq$ and 1, which means that these regions fall into the category of high inequality, including NTB, NTT, South Sulawesi, Southeast

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Sulawesi, West Papua and Papua. The highest value of inequality during the study period was in Papua Province, with a value of 0.81, while the value of low inequality was in Gorontalo Province, with 0.14. However, the average Williamson Index value during the study period shows that eastern Indonesia is in moderate inequality with a value of 0.49. This is happening because, in 2021, North Maluku will have a growth rate of 16.4 per cent originating from export activities abroad and metal ore mining, especially nickel, gold and silver ores, so that it can boost the economy.

Panel Data Regression Results

The estimation results of the econometric model using the Pooled Least Square (PLS) approach, Fixed Effect Model (FEM), and Random Effect Model (REM), along with the results of the model selection test, are summarized in table 2.

Table 2. Estimation of Panel Data Regression Econometric Model - Cross section

Variable	Regression Coefficient		
	CEM	FEM	REM
<i>C</i>	0,504018	0,747077	0,659025
<i>IKK</i>	-0,000939	-0,001251	0,000430
<i>LogINV</i>	0,032509	0,015113	0,017250
<i>LogRLS</i>	-0,695879	0,040251	-0,486894
<i>LogPAD</i>	0,113546	-0,053108	0,075940
<i>LogLPLH</i>	0,079550	0,010351	0,023902
<i>R²</i>	0,682315	0,950620	0,197133
<i>Adjusted. R²</i>	0,660253	0,936629	0,141378
Statistik <i>F</i>	30,92789	67,94478	3,535718
Prob. Statistik <i>F</i>	0,000000	0,000000	0,006484
Uji Pemilihan Model			
A. Chow			
Cross- Section $F(12,60) = 27,167250$; Prob. $F(12,60) = 0,0000$			
B. Hausman			
Cross-Section random $\chi^2(5) = 10,481692$; Prob. $\chi^2 = 0,0627$			

Source: Eviews 10

The Chow test and Hausman test show that (REM) was chosen as the best-estimated model, as seen from the probability or significance in the Chow test having a prob value of 0.0000 < 0.05 and the Hausman test having a prob value of 0.0627 > 0.05. The complete estimation results from the REM model are shown in Table 3.

Table 3. Model Estimasi Random Effect Model (REM)

$IW_{it} = 0,659025 + 0,000430 IKK_{it} + 0,017250 \log INV_{it} - 0,486894 \log RLS_{it} +$ <div style="display: flex; justify-content: space-around; width: 100%;"> (0,6051) (0,0265)** (0,0090)** </div> $0,075940 \log PAD_{it} + 0,023902 \log LPLH_{it}$ <div style="display: flex; justify-content: space-around; width: 100%;"> (0,0209)** (0,0162)** </div>
$R^2 = 0,197133$; $DW = 1,224078$; $F = 3,535718$; Prob. $F = 0,00648$

Source: Eviews 10.

Description: *Significant at $\alpha = 0.01$; **Significant at $\alpha = 0.05$; ***Significant at $\alpha = 0.10$; The number in brackets is the probability of the t statistic.

From table 2, it can be seen that the estimated REM model exists with a probability or empirical statistical significance F value of 0.00648 (< 0.05), with a coefficient of determination (R²) of 0.197133. This means that 19.71 per cent of the Williamson Index variable is influenced by the Variable Construction Expensive Index, Investment, Average

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Length of School, Local Original Income, and Area of Forest Land Cover. The remaining 80.3 per cent is influenced by other variables that are not included in econometric models. Separately from the other variables, four independent variables have a significant influence, namely the variable Investment, Average Length of School, Regional Original Income, and Area of Forest Land Cover, with a probability or empirical statistical significance t of 0.0265 (< 0.05); 0.0090 (< 0.05); 0.0209 (< 0.05); and 0.0162 (< 0.05).

The investment variable has a regression coefficient of 0.017250 with a linear-linear relationship pattern. If the Williamson Index increases by 1 per cent, the investment will increase by 0.017250 per cent. Preferably, if the Williamson Index decreases by 1 per cent, the investment will reduce by 0.017250 per cent.

The Average Length variable of School has a regression coefficient value of -0.486894 with a linear-logarithmic relationship pattern. This means that if the Williamson Index increases by 1 per cent, the average length of school will decrease by $-0.486894/100 = -0.00486894$ per cent. Conversely, if the IW decreases by 1 per cent, then the RLS will decrease by $-0.486894/100 = -0.00486894$ per cent.

The local Original Income variable has a regression coefficient of 0.075940 with a linear logarithmic relationship pattern. This means that if the Williamson Index increases by 1 per cent, the Local Revenue will increase by $0.075940/100 = 0.0007594$ per cent. Preferably, if IW decreases by 1 per cent, PAD will reduce by $0.075940/100 = 0.0007594$ per cent.

The Area of Forest Land Cover variable has a regression coefficient value of 0.023902 with a linear-logarithmic relationship pattern. This means that if the Williamson Index increases by 1 per cent, then the area of forest land cover will increase by $0.023902/100 = 0.00023902$ per cent. Preferably, if the Williamson Index decreases by 1 per cent, then the area of forest land cover will reduce by $0.023902/100 = 0.00023902$ per cent.

DISCUSSION**The Effect of Investment on Development Inequality**

The selected estimation model explains that the investment variable has a positive effect, meaning that the Williamson index will increase when investment increases. Or it could be said that the Williamson Index will also increase with the influence of increased investment. According to theory (Adisasmita, 2005), investment is a means for processes that have good luck and lead to areas that are not faring well. An increase in demand will encourage income to increase investment, and so on. This study's results align with research (Irantó & Solehati, 2020) which states that investment positively affects regional inequality in eastern Indonesia. Analysis by (Nogués & González-González, 2022) also says that investment has a positive effect on inequality in Spain.

The Effect of Average Years of School on Development Inequality

The selected estimation model explains that the average length of school variable has a negative effect, meaning that the Williamson Index will decrease when the average length of school increases. The results of this study are in line with research conducted by (Checchi, 2001) which states that the average length of schooling negatively affects inequality in Washington City. Research by (Wan et al., 2006) also says that the size of education hurts regional disparities in China. According to (Garcia & Soelistianingsih, 1998) education is needed to reduce inequality and optimize all the potential of the community so that it can make a positive contribution to regional growth.

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The Effect of Regional Original Income on Development Inequality

The selected estimation model explains that the regional original income variable has a positive effect, meaning that the Williamson Index will increase when local revenue increases. The results of this study are in line with research conducted by (Sukmaadi & Marhaeni, 2021) which states that original regional income positively influences inequality in the Province of Bali.

The Effect of Area of Forest Land Cover on Development Inequality

The selected estimation model explains that the forest land cover area variable positively influences the Williamson Index, meaning that when the forest land cover area increases, the Williamson Index will increase. However, the results of this study are not in line with research conducted by (Bou Dib et al., 2018) which states that changes in land use do not affect inequality in rural areas of Indonesia.

The Effect of the Construction Cost Index on Development Inequality

The selected estimation model explains that the construction cost index variable does not affect the Williamson Index. This means that the size of the construction cost index does not affect the level of development inequality in eastern Indonesia. This happened because the construction cost index could not be used to measure an area to reduce development inequality. Based on (Bappeda & Litbang Tana Tidung, 2020) the construction cost index aims to describe price comparisons between different regions in a specific period. Another study used the construction cost index to compare general allocation funds (GAF).

IMPLICATIONS

The research results show that investment encourages increased development inequality in eastern Indonesia. The government needs to get investors interested in investing in areas still rare in demand so that investment in east Indonesia is evenly distributed. Each region has the same opportunity to develop the potential of their respective areas so that inequality can be reduced.

A good and quality education program from the government will help the community obtain a more proper education. In addition, the free education program can also help the community get a more comprehensive education at a higher level, so that later they can produce quality human resources.

The increase in original regional income must be used to develop regions in eastern Indonesia. With more funds from the government, it can be used for equitable development. Then little by little, the development gap will be overcome. The government also needs to make policies that make it easier for people to carry out economic activities, especially in leading sectors in eastern Indonesia.

The study results show that the area covered by forest land has increased development inequality in Eastern Indonesia. The location of forest land cover, or land conversion, is an essential issue in inequality. Forest land is usually converted into housing, malls, or other buildings. However, these changes were not accompanied by changes in skills, so the development process could not absorb farmers.

CONCLUSION

Measurement of regional inequality using the Williamson Index shows that inequality in Eastern Indonesia is classified as moderate inequality in the 2015-2021 period with a value of 0.49. Furthermore, inequality between provinces in Eastern Indonesia is still relatively high. There is a Williamson Index value between $0.5 \leq$ and 1, including NTB, NTT, South

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Sulawesi, Southeast Sulawesi, West Papua and Papua. Based on the results of panel data testing, the best estimation model selected in this study is the Random Effect Model (REM).

Based on the validity test of the effect on the significance (α) of 0.05, the value of the investment variable, regional original income, and the area of forest land cover has a positive effect—the variable average length of school with a negative influence. Meanwhile, the construction cost index variable had no significant impact on regional inequality in Eastern Indonesia in 2015-2021.

The authors provide several suggestions for reducing development inequality in eastern Indonesia based on the results above. First, the infrastructure development policy aimed at reducing regional disparities in east Indonesia is focused on increasing electric power distribution. Such development will increase inequality at an early stage and minimise inequality when development occurs on an ongoing basis. Second, the government needs to implement policies encouraging investment in less developed areas in eastern Indonesia so that the economy can develop more and inequality between regions will be reduced.

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