



Determinants of Income Inequality in a Time Perspective in Indonesia

Arif Rahman^{1✉}, ²Ahmad Albar Tanjung, ³Ramli, ⁴Muhammad Arif

^{1,2,3}Universitas Sumatera Utara, Indonesia

⁴Universitas Muhammadiyah Surakarta, Indonesia

Article Information Abstract

History of Article

Received January 2023

Accepted March 2023

Published May 2023

Keywords:

indeks gini, angkatan kerja, populasi kota, pertanian, ECM

The development orientation which is more dominant on growth, has been impaled to widen the inequality gap. The purpose of this study is to analyze the short-term and long-term effects of several determinants of income in Indonesia during 1998-2021. Data sourced from the World Bank in a time series format. The study method uses descriptive quantitative analysis with the Error Correction Model approach. The Gini index is used as the dependent variable, while the independent variables include the ratio of the work force graduates above senior high school, urban population growth, the agricultural sector, haunting, and fisheries, and per capita GDP growth. The stationarity test results show that stationarity occurs in the first derivative data. Cointegration test results using the Engle-Granger method show that the model built has cointegration. The results of the long-term regression show that two variables have a significant effect on the Gini index, namely the ratio of the work force graduates above senior high school which has a positive effect, and the urban population growth rate which has a negative effect. In the short term, the ratio of the work force graduates above senior high school contributes significantly to the increase in the Gini index. Meanwhile, other predictor variables have no significant effect on the Gini index in Indonesia. The lack of support from the agricultural sector in pushing the Gini index down, and the positive role of the highly educated work force, reflects the ongoing development process which still seems exclusive.

INTRODUCTION

The world is focusing in succeeding the global purposes, in which one of them is to reduce the inequality income. This indicator belongs to the 10th purposes in SDGs document, in which nowadays 10 % of the richest people dominate the 40 % of global income while 10 % of the poorest are only gain 2-7% (Bappenas, 2022). The high world income inequality makes the world must rethink about the ongoing economic process which more alienates the life from universal prosperity.

Various development theories convey that there is *trade off* between economic growth and income even-distribution, especially in early development phase. Kuznets (1955) found a tendency that income inequality increased when the economy grew in the early development phases in developing countries. In many countries, the increased income is accompanied by a reduction in poverty but it is accompanied by conditions of increasing income inequality. Therefore, inclusive growth needs to be encouraged, namely labor-intensive growth that includes all of the citizens participation at all income levels, which includes non-discriminatory participation (Klasen, 2010).

Myrdal (1957) conveyed that there is an unfavorable impact in explaining the increasing inequality phenomenon between developing countries and developed countries. The spreading impact tends to be smaller than the backwash effect. This spreading effect occurs from the expansion in the economic activity center to relatively underdeveloped areas through increased demand for agricultural products. This is minimally happening in Indonesia because many agricultural and industrial products are still imported from outside, and there is a weak

relation between large and small businesses (Kuncoro, 2016).

Indonesia is an agricultural country and has various marine resources. The agriculture, forestry and fisheries sectors reflect to the added-value of natural resources utilization without further processing. Its proportion to GDP in 2021 is 13.28 %, the second highest after the industrial sector. The strong relation between the agricultural sector and the industrial sector is closely related in how much the agricultural sector capability can fulfill the demand standards which is specified by the industry. The standards of quality and quantity presented by the agricultural sector should ideally form a spread effect pattern that is able to absorb more labors, and support an increase in the income of workers in this sector. The expectation is to reduce the income gap among the communities. So that, the urban areas which often become a magnet for the job seekers in seeking their fortune can be muffled and the stock of productive age population in rural areas can be empowered to generate much more added value in the primary sector, it is expected that the per capita income will increase inclusively.

Good infrastructure to support the agricultural sector can reduce inequality. Hesda (2022) conducted a study regarding to that issue to clarify the unintended consequences of infrastructure development, which focuses on inequality and social capital. The results show that districts with high exposure to agricultural infrastructure integration are negatively associated with an inequality and positively correlated with a social capital. The effect of agricultural infrastructure on inequality performance and social capital is more possible to be mediated by an agricultural productivity.

So far, the agricultural sector is only as a proponent for the consequences of economic

competition which tend to defeat each other. The options in the development direction policies that are more oriented towards a growth are often awkward in deriving its distribution. One indication of economic progress that is mapped up to 2045 is the per capita income. This indicator until 2021 reaches USD 4291.8 thousand, or it is equivalent to 62.24 million rupiah per a year. However, when viewed from per capita GNI, the value is USD 4,140, higher than in 2020 of USD 3,870, but it is still classified as a lower middle-income country (World Bank, 2022). The weakness of this indicator is that the information provided is average, so it is unable to explain its distribution.

From the education side, the contribution of above high school graduates workforce in narrowing the income gap in the society can be an illustration in viewing how far the workforce has absorbed into the market at that level can contribute in income distribution in Indonesia.

Its absorption is still limited, coupled with the divergence of wage structures between levels of education, which has the opportunity to create a widening inequality gap. Previously, a study on the relationship between educational aspects and inequality had been carried out by (Istiqomah et al., 2020). It is through by using a proxy for the average length of schooling, in which the results show a significant negative effect on inequality.

The development of income inequality in Indonesia based on the Gini index shows an increase. During the observation period, the Gini index in 1998 was 32.2, increasing to 37.9 in 2021. The index number reached 29.5 in 2000, but in the following year until 2014 it consistently increased to 40.8. Inequality started return to decline in 2015 to 2019, but it was return to increase in 2020 to 2021, one of which is due to the co-19 pandemic which rocked the national economy.

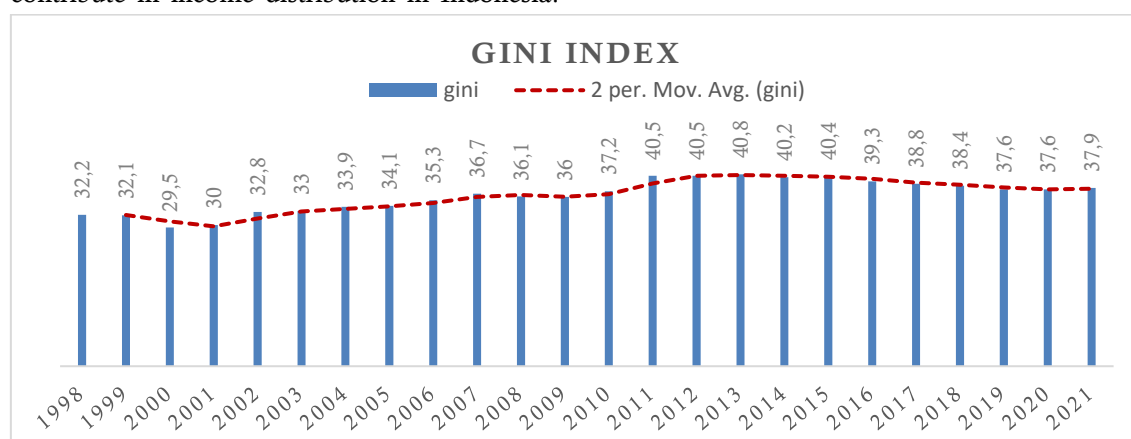


Figure 1. Index Gini Development in Indonesia in 1998-2021

Source: World Bank, 2022 (Processed)

Various studies have analyzed the relationship of income inequality from various parameters. Among others, what was done by Gu & Wang (2022), from the perspective of income inequality with global political polarization. The findings show that there is a positive and significant cross-country relationship between the level of income inequality and political polarization. Elsewhere, Uzar & Eyuboglu (2022) investigated the effect of income inequality on the ecological footprint by considering its components in the 1965-2017

period in the United States. The results show that income inequality, economic growth, energy consumption, ecological footprint, and their components are cointegrated. In addition, it is found that income inequality has a positive effect on the ecological footprint and agricultural land.

The problem of income inequality is also closely related to the application of state ideology and politics. As well as a study conducted by Novokmet & Piketty (2017) which traced income inequality and poverty in Russia during 1905-2016. The study found that the dramatic failure

of soviet communism and its egalitarian ideology, in the form adopted in Russia, has led to a high degree of tolerance for large inequality and concentration of private property in Russia, partly deriving from the direct plunder of the country's natural resources and foreign exchange reserves. The research also found that inequality has increased much more than in China and other former communist countries in Eastern Europe. The estimation result is that the wealth held by wealthy Russians abroad is three times greater than net foreign exchange reserves, and the quantity is comparable to the total households financial assets owned in Russia.

Income inequality is closely related to the SDGs mission achievement in extreme poverty elimination by 2030. The study by Lakner et al. (2022), built a model by using GDP growth to pass it on to growth based on observations in household surveys. When inequality is considered constant, and allowing GDP per capita to grow according to World Bank estimates and historical observations, the simulation studies show that the number of very poor people (<USD 1.90/day) will remain above 600 million in 2030, and will give a consequence in global poverty reaching 7.4 %. If the Gini index for each country gets off 1 % per year, the global poverty rate could decrease to around 6.3 % by 2030. Reducing each country's Gini index by 1 % per year would have a greater impact on reducing global poverty than increasing its annual growth of each country by 1 %.

this research aims to analyze several factors that becomes income inequality determinants in Indonesia, such as the added value of the primary sector, per capita income, quality of the workforce, and the rate of population growth in urban areas. The lack of information regarding to the total effect of the several variables such as the effect of the growth rate of the agricultural sector, the quality of the labor force, per capita GDP growth, and urban population growth on income inequality has prompted us to conduct further studies on some of these aspects. We divide it into short term and long term. The application of the Error

Correction Model method can help to answer the level of effect in two different period.s.

This study is expected to contribute to several things. First, to provide information on the relationship between predictor variables for inequality from the long-term and short-term perspectives. Second, fill in more specific information regarding education, especially the effect of a highly educated work force on inequality. Third, it can complement the findings from Mardiansjah & Rahayu (2019), regarding the relationship between urban population growth and inequality, along with the expansion of the urbanization process and the rapid emergence of new cities outside Java since 2000. Fourth, the model that was built wants to reconfirm what stated by Kuznets (1955), (Klasen, 2010), and Kuncoro (2016) especially with regard to the effect of predictor variables on inequality in Indonesia. Fifth, the results of the study can complement information regarding the anomaly of the industrial sector's influence on poverty and the phenomenon of premature deindustrialization (Rahman et al., 2022). Particularly in the context of income inequality, the results of the study can provide an overview of the growth process that is inclusive or even seems exclusive. The purpose of this study is to analyze the determinants of inequality in a time perspective (short term and long term) in Indonesia in 1998-2021. The absence of specific studies regarding the role of higher education, and the effect of the growth rate of urban population as new cities emerge on the process of income inequality in Indonesia through the ECM method is a research gap that is expected to complement previous findings.

The hypothesis of the model built is that, in the long run, the growth of the agricultural, shooting, and fishing sectors has a negative effect, per capita GDP has a negative effect, the ratio of the labor force graduates above senior high school to the working age population above senior high school has a negative effect, and urban population growth has a negative effect to income inequality. Meanwhile, in the short term, the added value of the agricultural, forestry and fisheries sectors has a negative effect, and per

capita GDP has a positive effect on income inequality, while the ratio of the work force of graduates above senior high school and urban population growth has no significant effect.

RESEARCH METHODS

Several factors that are strongly suspected of having an effect on income inequality are proxied in data indicators such as the growth rate of the agriculture, forestry and fisheries sectors, per capita GDP growth, the ratio of the workforce graduates above senior high school to the working age population graduating above senior high school, as well as urban population growth. Meanwhile, the Gini index is used to describe developments in income inequality. The data source is from the World Bank, with an observation period from 1998 to 2021 located in Indonesia. The study focuses on analyzing the income inequality in Indonesia.

The characteristic of the study analysis is descriptive quantitative. The study uses the Error Correction Model (ECM) method assistance to obtain information regarding whether there is a balance in the long term for each variable studied or not. In addition, the ECM also informs the value of the error correction term to indicate how long the short term error will be corrected by the model, and regain its balance in the long term. In theory, the built model requires time adjustments to reach balance. Income inequality, as a focus study, is closely related to time characteristics. Changes in inequality patterns move in long phases according to the conditions of each country.

As Kuznets (1955) states, inequality widens in general in the early phases of growth when it transitions from pre-industrial to industrial, stabilizes for a time, and stops in later phases. Widening income inequality is associated with the shift from agriculture and the countryside to industry and cities, and after the initial phase of turbulent industrialization and urbanization has passed, various forces are converging to support the economic position of the low-cost group in urban areas.

Before being interpreted, the regression model was firstly tested for OLS assumptions. The tests in question include the normality test, multicollinearity test, autocorrelation test, and heteroscedasticity test. These tests are carried out to obtain Gauss Markov conditions which can be written as follows:

$$\mu_i \sim N(0, \sigma^2 I_N) \text{ atau } \mu_i \sim Nd(0, \sigma^2) \dots\dots\dots (1)$$

In which an μ_i has a normal distribution, with a zero mean vector and a covariance matrix $\sigma^2 I_N$. If these conditions can be met, then the estimator has the minimum (best or efficient) variance and the estimator (b_2) is on average equal to β_2 for repeated samples (Firdaus, 2010).

The step in using ECM begins with testing the stationarity of the data. If the observed data in the unit root test turns out to be stationary, then only ordinary OLS regression is performed. However, if it is unstationary, then the next step is to test the degree of integration. If the results of the Augmented Dickey-Fuller test are $< 5\%$, the data is unstationary, if $> 5\%$, then the data is stationary. The equivalent form is:

$$\Delta Y_t = \beta Y_{t-1} + \mu_t \dots\dots\dots (2)$$

If the results of the unit root test do not contain the unit roots, then the data is integrated of order zero or $I(0)$. If the stationary data is in the first derivative data, then the data is integrated of order one or $I(1)$. If the results of the unit root test on the regressor and predictor variables are known that both are integrated in the same order, for example $I(1)$, while the regression results contain trend stochastics, then the regression results of these two variables will produce spurious regression. To avoid this, then all variables are estimated in first derivative format.

Cointegration testing is carried out to continue the analysis of non-stationary time series data. The stationary linear combinations (cointegration) can be interpreted as a long term relationship among the series, while stationarity in the first or second derivative format describes the short term relationship. The cointegration test was carried out using Augmented Engle-Granger. This test utilizes the DF-ADF test

(Ekananda, 2016). The stages are estimating the regression model and then calculating the residuals, if the residuals are stationary, it means that the regression is cointegration regression. The ECM short-term equivalent form is as follows:

$$DGini = \alpha_0 + \alpha_1 DAgri_t + \alpha_2 DPercap_t + \alpha_3 DLabfor_advance_edu_t + \alpha_4 DUrban_pop_t + \alpha_5 Resid(lag) \dots\dots(3)$$

In which the DGini is the change in the Gini index, the DPercap is the change in per capita GDP growth, the DLabfor_advance_edu is the change in the ratio of above SMA graduates labor force to the working age population in which above SMA graduates, the DUrban_pop is the change in the urban population growth, and the Resid(lag) is the residual in lag 1. While the long-term equivalent form is as follows:

$$Gini = C_0 + \gamma_1 Agri_t + \gamma_2 Percap_t + \gamma_3 lnLabfor_adv_edu_t + \gamma_4 Urban_pop_t + \varepsilon_t \dots\dots\dots(4)$$

In which the Gini is the gini index, the C_0 is a constant, the Agri_t is the growth rate of the agriculture, forestry and fisheries sectors, Percap_t is per capita GDP growth, the Labfor_adv_edu_t is the ratio of the above SMA graduates labor force to the working age population above SMA graduates, the Urban_pop_t is urban population growth, and the γ is coefficient value.

RESULTS AND DISCUSSION

The data stationarity test uses the Augmented Dickey-Fuller (ADF) test. The first step is to test the data level. As a result, there are some information that there are 2 non-stationary variables, namely the Gini index and urban population growth. The probability value of the Gini index is 0.6531, and urban population growth is 0.1596, both of which are greater than an alpha of 5 %. The requirement in the ECM method is that all data must be stationary in the same order. For this reason, it is necessary to test the stationarity of the first derivative data.

Table 1. Augmented Dickey-Fuller Stasionarity Test Results in Data Level

Series	Prob.	Lag
GINI	0.6531	0
AGRI	0.0005	0
PERCAP	0.0000	0
LABOR_ADV_EDU	0.0082	0
URBAN_POP	0.1596	0

Source: Data Processed, 2022

Stationarity test results in the data 1st Difference data showed that all data has been in the stationary condition. It was shown in the each variable probability value which is under 5 %. Therefore, the first derrivative data will be used to explain the effect of predictor variable in a short term

Table 2. Augmented Dickey-Fuller Stasionarity Test Result in First Difference

Series	Prob.	Lag
D(GINI)	0.6531	0
D(AGRI)	0.0005	1
D(PERCAP)	0.0000	0
D(LABOR_ADV_EDU)	0.0082	1
URBAN_POP	0.1596	0

Source: Data Processed, 2022

The Cointegration in the economics interpretation is if two or more series are more related to establish long term balance relationship, so eventhough each series is not a stationary, but those variable always move together all the time and its differences among them will always be stable (Ekananda, 2016).

The result of cointegration test by using Engle-Granger method and DF-ADF test, is obtained that probability value is 0,0293 or under 5 %, and the t-statistik value is bigger than critical value in 5 % level. This result shows that the model in the study has a cointegration, which can explain the variable relationship with the income inequality in a long term. Another meaning, a model which is built in this study is theoritically valid, because the fluctuation of among variable in the short term will be corrected and tend to experience a convergent relationship in the long.

Table 3. Cointegration Test Result with Engle-Granger Method

	t-Statistic	Prob.*
Augmented Dickey-Fuller		
test statistic	-3.257233	0.0293
Test critical values: 1% level	-3.752946	
5% level	-2.998064	
10% level	-2.638752	

Source: Data Processed, 2022

The regression results in the table below have been tested for Gauss Markov conditions, in which the resulting regression avoids the normality, multicollinearity, autocorrelation, and heterocodesticity issues. This test is carried out to provide confidence in the estimated value of the coefficient and probability. The normality test obtained a Jarque-Bera probability value of 0.5174 or above 5 %, so it can be said that the residuals are normally distributed. The speed of increase in variance and covariance can be detected by looking at the Variance-Inflating Factor (VIF) value. If the VIF value exceeds 10, it is said that there is multicollinearity because the R_j^2 value is more than 0.90. The centered VIF values of the predictor variables are 4.12 (Agri), 3.73 (Percap), 1.11 (Labor_advanced_edu) and 1.58 (Urban_pop), or lower than number 10, which means there is no multicollinearity. Autocorrelation testing using the Breusch-Godfrey method obtained a chi-square probability value of 0.1208 or greater than 5 %, this condition indicates that there is no serial correlation between the disturbance variables, or $E(e_i, e_j) = 0$. Next, in the heteroscedasticity test using the Breusch-Pagan-Godfrey method is obtained a chi-square probability value of 0.9282 or above 5 %. In other words, the disturbance variable from the regression model has a constant variance or $E(e_i) = \sigma^2$ (Widarjono, 2018).

The long-term regression results in the table below obtain an R-squared value of 0.775854, meaning that the proportion of variation from the Gini index can be explained by the predictor variable of 77.58 %. Meanwhile, the probability value of the F-statistic is 0.000006, meaning that there is at least one predictor variable that has a significant effect on income inequality, or it can also mean that the existing

model is feasible to be used in predicting income inequality.

The results of the partial test show that the ratio of the workforce with above senior high school graduates to the working age population with graduates above high school has a significant positive effect on the Gini index. The probability value is 0.0036, significantly below the 1 % degree of error, with a coefficient value of 0.441. The interpretation is that when the ratio of the work force of the above senior high school graduates increases by 1 %, the Gini index will increase by 0.441 index. The increase in the ratio of above senior high school graduates, especially in the working population, has an impact on increasing inequality of income among residents in Indonesia.

The findings are reminiscent of the development conditions described by Kuznets (1955) as early phases of growth, followed by widening inequality. This condition is strongly suspected due to the relative striking difference in the wage structure based on the level of education of the workers. Residents who work with a higher level of education relatively earn much higher wages than workers with lower levels of education.

In addition, the proportion of the workers who graduated above senior high school to the total number of workers is still low, which strengthens the notion of the results obtained. The distribution of workers above senior high school graduates to total workers in 2021 will be 12.92 %, and will decrease by 12.60 % in 2021. Meanwhile, the proportion of workers who graduated from senior high school in 2021 will be 31.13 %, junior high school graduates will be 18.54 %, elementary school graduates by 26.11 %, and incomplete elementary school / do not attend school by 11.29 %. Workers who

graduated from elementary school and incomplete elementary school / do not go to school are dominant in the status of self-employed, working with the help of temporary / unpaid workers, and family workers / unpaid.

The 2019 BPS National Labor Force Survey (Sakernas) report informs that undergraduates earn an average monthly wage of IDR 4.59 million, diploma graduates of IDR 3.68 million, senior high school/vocational school graduates of IDR 2.7 million, junior high school graduates of IDR 2.01 million, and elementary school graduates of IDR 1.79 million. There is a conspicuous relatively differences in the amount of wages received among levels of education and the distribution of employment status, moreover the workers proportion above senior high school graduates in the total workforce is not dominant yet, so that the development of a less significant ratio still tends to encourage widening income disparities among the population.

Another allegation is that capital-intensive-based production is still dominant, especially in medium to upper scale businesses. Highly educated workers who are relatively more skilled in terms of soft skills and hard skills, enjoy a significant increase in income, and on the other hand, reduced employment absorption, along with the slowness of the lower income group moving up creates conditions of increasingly divided inequality.

This explanation is enhanced by the findings of Rahman et al., (2022), where an increase in the industrial sector in Indonesia actually strengthens the poverty rate. The effect anomaly that occurs cannot be separated from the phenomenon of early deindustrialization that is taking place.

This study supports the research of Wahyuni & Monika (2016) who found that the more effect of education on income along with income distribution (decile) increases. In other words, the increase in income due to education is higher at the top of the income distribution (decile 9). As a result, there is income inequality. The effect of education on different incomes is likely to be influenced by over-education,

education-ability interactions, and differences in the quality of schools or departments. This result is not in line with the findings of Istiqomah et al. (2020) which shows the effect of RLS which contributes negatively to inequality in Central Java.

It is a different case with urban population growth, which is significantly negative for the Gini index in Indonesia. The coefficient value is -4.6344 with a degree of error below 1 %. The high value of the coefficient of the city's population growth rate, illustrates that the city is still a magnet for people in seeking a fortune to obtain a better income and livelihood. The rapid growth of small and medium cities in the last 2 decades has stimulated economic opportunities that can reduce the income gap among the residents in Indonesia. This result is in line with the research of Mardiansjah & Rahayu (2019) which showed that although the process of urbanization in Indonesia is still concentrated in Java Island, the large concentration of urbanization and growth of cities encourages the need to expand the process of urbanization and growth of cities to other areas, including to other islands that are still relatively small in terms of urbanization and growth of cities. The data from the 2000 Population Census and the 2015 Inter-Census Population Survey show that more than half of cities in Indonesia are small and medium-sized cities with a population of less than 300 thousand people per city. Cities of this size increased from 37 cities in 2000 to 55 cities in 2015. Cities with a population of 300 thousand – 1 million people also experienced an increase from 26 cities to 39 cities in 2015.

Meanwhile, the other two predictor variables have no significant effect on the development of the Gini index in the long term. The growth rate of the agriculture, forestry and fisheries sectors has not been able to have a significant role in the Gini index in Indonesia in the long term with a probability value of 0.1655. These results support submitted by Kuncoro (2016), that there is still minimal impact of the expansion in the center of economic activity to relatively underdeveloped areas through increased demand for agricultural products. This

is because many agricultural and industrial products are still being imported from outside, and the connection between the large and small businesses are weak. This result is relatively different from Sa'diyah & Irham (2016) who concluded that the agricultural sector plays a bigger role in reducing income inequality in Papua after special autonomy. The same with the results of a study by Ikhsan, Ariusni, & Putri (2019) concluded that agricultural sector income has a significant negative effect on income distribution inequality in Indonesia in the 2012-2016 period. The lack of agricultural infrastructure in boosting agricultural productivity is one of the obstacles to relate this sector to reduce the inequality. As concluded by Hesda (2022), agricultural infrastructure is negatively associated with inequality and positively correlated with social capital. Agricultural productivity is an important instrument in connecting the effects of agricultural infrastructure on reducing the inequality with increasing social capital.

The GDP per capita growth rate has a probability value of more than 10 % alpha, in which this variable does not a significant effect in the long term. The unconnected rate of growth of GDP per capita to the decline in the Gini index illustrates the state of exclusive economic growth, where the conditions for capital-intensive development increasingly minimize the role of participation of all citizens at all income levels, and ultimately tend to be discriminatory.

The policy focus, which is only oriented towards increasing economic growth, has been adjusted so that it focuses more on reducing the Gini index consistently, so that it can be related to reducing the poverty. As concluded by Lakner et al. (2022), that reducing each country's Gini index by 1 % per year has a greater impact on reducing global poverty than increasing each country's annual growth by 1 %. These results differ from Fitri's findings (2018), which concluded that per capita GRDP has a negative and significant effect on provincial income inequality in Indonesia in 2012-2016.

Table 4. Long Term Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGRI	0.852875	0.591378	1.442181	0.1655
PERCAP	-0.265729	0.178559	-1.488186	0.1531
LABOR_ADV_EDU	0.441102	0.132980	3.317060	0.0036
URBAN_POP	-4.634435	0.735296	-6.302817	0.0000
C	10.86059	10.78177	1.007310	0.3264
R-squared	0.775854	Mean dependent var		36.28750
Adjusted R-squared	0.728665	S.D. dependent var		3.422218
S.E. of regression	1.782627	Akaike info criterion		4.177105
Sum squared resid	60.37742	Schwarz criterion		4.422533
Log likelihood	-45.12526	Hannan-Quinn criter.		4.242217
F-statistic	16.44152	Durbin-Watson stat		1.311711
Prob(F-statistic)	0.000006			

Source: Data Processed, 2022

The short-term regression table below provides an ECT(-1) probability value of 0.0344 or <5 %, with a coefficient value of -0.3947. The error correction term value indicates that the short term error will be corrected by the model, and regain its balance in the long term around 4 years. The R-squared value of 0.3049 illustrates the proportion of variation from the Gini index that can be explained by the predictor variable of

30.49 %. The proportion of variation of the Gini index in the short term is smaller than in the long term. If it is viewed from the probability of the F-statistic which is greater than 5 %, it indicates that the independent variables simultaneously have no significant effect on the Gini index.

Based on the partial test, it is known that only the ratio of the above senior high school graduates work force has a significant positive

effect on the Gini index at an error degree below 10 %. The probability value result is 0.0778 with a coefficient of 0.1489, which is smaller than the long-term effect of 0.4411. This condition reflects what is described by Kuznets (1955) as the initial phases of growth, followed by widening inequality, over the fact that after 77 years of Indonesia's independence. The uneven distribution of highly educated workers is one of the logical reasons, as stated by Piketty (2015) in explaining the purchasing power of workers in less developed and developed countries which reaches one-tenth, where most workers in developed countries have completed secondary education, while 50% of those in least developed countries are illiterate, and this plays a key role. In the long term, it is undeniable that a marked increase in the purchasing power of workers is caused by an increase in the productivity of the workers themselves. Meanwhile, other predictor variables, such as the rate of growth in the agricultural, forestry and fisheries sectors, per capita GDP growth, and the growth rate of urban populations does not have significant effect in the short term at alpha above 10%. The agricultural, forestry and fisheries sectors have not been able to contribute to reducing inequality, due to the fact that there is no significant connection between the industrial world and this sector.

In line with the study by Armelly et al. (2021) which shows that the processed industrial sector uses more of its own inputs to produce its products compared to using inputs from other sectors. This result is a reflection of the portion of the absorption of agricultural raw materials to be further processed into the domestic industrial sector which is still relatively low, so that the development of income in the agricultural sector is relatively slow.

The hypothesis built on GDP per capita is not proven, either in the long term or in the short

term. The lack of effect of this variable on inequality indicates that the pattern of income distribution has not changed much in line with the increase in GDP per capita. A similar study was conducted by Dabla-norris et al., (2015) which was limited to developed countries. The results show that an increase in the Gini coefficient is associated with lower output growth. An inverse relationship was found between the income share of the rich (the top 20%) and economic growth, with a 0.08% increase that was lower than the level of inequality. Conversely, a 1% increase in income from the bottom 20% can drive growth 0.38% higher.

Meanwhile, the urban population growth rate only affects the long term, not the short term. The phenomenon of the emergence of new cities in Indonesia requires time, in line with the dynamics of the development of each region in utilizing its superior potential. On the other hand, the rate of plant population in the old city tends to stagnate, due to limited land area and narrow living areas. Basically, the speed of population growth tends to slow down.

As Kuznets (1955) points out, there has been a movement in the rate of urbanization, in the sense that the proportion of urban population additions and migration measures that result in this population shift may increase temporarily from much lower levels beforehand, but then decrease as migration from rural areas becomes urban. much smaller in proportion. Then raises the movement in the proportion of savings or capital formation to total production. After the turmoil of the initial phase of industrialization and urbanization had passed, various forces gathered to support the economic position of the lower ethnic group in urban areas

Table 5. Short Term Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(AGRI)	0.428823	0.366466	1.170159	0.2581
D(PERCAP)	-0.108811	0.101373	-1.073368	0.2981
D(LABOR_ADV_EDU)	0.148995	0.079395	1.876635	0.0778
D(URBAN_POP)	-0.706337	1.398647	-0.505015	0.6200

ECT(-1)	-0.394711	0.171665	-2.299311	0.0344
C	0.227346	0.284143	0.800111	0.4347
R-squared	0.304917	Mean dependent var		0.247826
Adjusted R-squared	0.100481	S.D. dependent var		1.229882
S.E. of regression	1.166456	Akaike info criterion		3.365276
Sum squared resid	23.13055	Schwarz criterion		3.661492
Log likelihood	-32.70067	Hannan-Quinn criter.		3.439774
F-statistic	1.491503	Durbin-Watson stat		1.667232
Prob(F-statistic)	0.244315			

Source: Data Processed, 2022

CONCLUSION

The results of the long-term regression show that two variables have a significant effect on the Gini index. Those intent variables are the ratio of the above senior high school graduates work force to the above senior high school graduates working age population, and the growth rate of the urban population. The ratio of the above senior high school graduates work force has a positive effect on the Gini index, while urban population growth has a negative effect on the Gini index.

In the short term, only the ratio of the above senior high school graduates workforce to above senior high school graduates working age population has a significant positive effect on the Gini index. Meanwhile, other predictor variables, such as growth in the agricultural, forestry and fisheries sectors, per capita GDP growth, and urban population growth does not have a significant effect on the Gini index in Indonesia.

The contribution of highly educated workers to the development of new cities (small and medium) is an alternative focus in expanding new livelihood opportunities connected to the agricultural sector, and is believed to be able to boost per capita income, to be able to make a more real contribution. The lack of support from the agricultural sector in pushing the Gini index down, and the positive role of the highly educated work force, reflects the ongoing development process which still seems exclusive.

REFERENCES

- Armelly, A., Rusdi, M., & Pasaribu, E. (2021). *[Analisis sektor unggulan perekonomian Indonesia: Model input-output]*. Sorot, 16(2), 119. <https://doi.org/10.31258/sorot.16.2.119-134>
- Badan Pusat Statistik. (2022). Tabel Dinamis. Jakarta: Badan Pusat Statistik. Diakses November 2022 dari <https://www.bps.go.id/site/pilihdata>
- Damanik, A. M. (2018). *[Faktor-faktor yang mempengaruhi ketimpangan pendapatan melalui pertumbuhan ekonomi di Provinsi Jambi]*. 7(1), 15–25.
- Dabla-norris, E., Kochhar, K., Ricka, F., Suphaphiphat, N., & Tsounta, E. (2015). Causes and Consequences of Income Inequality: A Global Perspective. International Monetary Fund, 1–39.
- Ekananda, M. (2016). *[Analisis Ekonometrika Time Series]*. Edisi Kedua. Jakarta: Mitra Wacana Medika.
- Firdaus, M. (2010). *[Teori Regresi Linier]*. Diakses dari <https://docplayer.info/67223278-Muhammad-firdaus-ph-d.html>
- Fitri, A. (2018). *[Ketimpangan Pendapatan Provinsi di Indonesia Tahun 2012-2016]*. Jurnal Ekonomi Dan Pembangunan, 1(1), 23–32.
- Gu, Y., & Wang, Z. (2022). Income Inequality and Global Political Polarization: The Economic Origin of Political Polarization in the World. *Journal of Chinese Political Science*, 375–398. <https://doi.org/10.1007/s11366-021-09772-1>
- Hesda, A. R. (2022). *Economics Development Analysis Journal*. 1.
- Ikhsan, Ariusni, & Putri, D. Z. (2019). *[Analisis pengaruh sektor pertanian, sektor pertambangan, dan sektor industri terhadap ketimpangan distribusi pendapatan di indonesia]*. Jurnal Kajian Ekonomi Dan Pembangunan, 1(3), 731–738.
- Istiqomah, Purnomo, S. D., Rahmawati, G. P., & Rahmawan, P. G. (2020). Does Migration Outflow Reduce Income Inequality in the Sending Province? 9(708), 159–168.
- Klasen, S. (2010). ADB Sustainable Development Working Paper Series Measuring and Monitoring Inclusive Growth: Multiple Definitions, Open Questions, and Some

- Constructive Proposals Measuring and Monitoring Inclusive Growth : 12.
- Kuncoro, Mudrajad. (2016). Trickle-up Effect Dan Unbalanced Growth. EBNEWS (22) 2016.
- Kuznets, S. (1955). Economic Growth and Income Inequality. *The American Economic Review*, XLV, 1–28. <https://doi.org/10.2307/2118443>
- Lakner, C., Mahler, D. G., & Negre, M. (2022). How much does reducing inequality matter for global poverty ? 20, 559–585.
- Mardiansjah, & Rahayu. (2019). [*Urbanisasi Dan Pertumbuhan Kota-Kota Di Indonesia : Suatu Perbandingan Antar-Wilayah Makro Indonesia Urbanisasi Dan Pertumbuhan Kota-Kota Kawasan Makro Indonesia*]. *Jurnal Pengembangan Kota*, 7(1), 91–110. <https://doi.org/10.14710/jpk.7.1.91-108>
- Myrdal, Gunnar. (1957). Economic Theory and Underdeveloped Regions. by Gerald Duckworth & Co. Ltd
- Novokmet, F., & Piketty, T. (2017). From Soviets to Oligarchs : Inequality and Property in Russia 1905-2016 From Soviets to Oligarchs : Inequality and Property in Russia 1905-2016. *July*.
- Piketty, Thomas. (2015). The Economics of Inequality. Translated by Arthur Goldhammer. London: *The Belknap Press of Harvard University Press*.
- Rahman, A., Pratomo, W. A., Sari, I. G., Sugeng, W., Soeparno, I., Hakim, S. H., & Syafii, M. (2022). [*Anomali pengaruh sektor industri terhadap tingkat kemiskinan di Indonesia*]. *SOROT*, 17, 91–103.
- Sa'diyah, S. H., & Irham. (2016). [*Peran sektor pertanian dalam mengurangi ketimpangan pendapatan di wilayah papua sebelum dan sesudah otonomi khusus*]. 27(1), 1–18.
- Uzar, U., & Eyuboglu, K. (2022). Does income inequality increase the ecological footprint in the US : evidence from FARDL test ? *Environmental Science and Pollution Research*, 0123456789. <https://doi.org/10.1007/s11356-022-22844-w>
- Wahyuni, R. N. T., & Monika, A. K. (2016). The Impact Of Education On Income Inequality Among Indonesian Workers. *Jurnal Kependudukan Indonesia*, 11(1), 15–28.
- Widarjono, Agus. (2018). [*Ekonometrika Pengantar dan Aplikasinya Disertai Panduan Eviews*]. Edisi Kelima. Yogyakarta: UPP STIM YKPN.
- World Bank. (2022). World Development Indicators. Accessed from: <https://databank.worldbank.org/source/world-development-indicators>