



Infrastructure Development and Its Influence on Income Disparities: Case study in Indonesia

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Abstract. This research aims to analyze the impact of infrastructure on income inequality through economic growth. This research employs a quantitative approach using secondary data from the Indonesian Central Bureau of Statistics (BPS) and National Development Planning Agency (Bappenas) from 2015 to 2022. The study utilizes panel data, combining time series and cross-sectional data. A combination of panel data analysis and path analysis was used as methods. The findings indicate that water and electricity infrastructure significantly influence income disparity through economic growth. Economic growth mediates the effects of water and electricity infrastructure on income disparity. However, education, sanitation, and health infrastructure do not significantly influence income disparity through economic growth. Recommendations from this study are as follows infrastructure in Indonesia, particularly in education, sanitation, water, health, and electricity sectors, needs to improve in quality to better serve the community.

Keywords: Economic Growth, Income Disparity, Indonesia, Infrastructure.

1 INTRODUCTION

Indonesia, as one of the developing countries in Southeast Asia, is certainly never free from problems in people's daily lives. Problems that often occur in the social, economic and environmental fields. Various problems are slowly being resolved with intervention from the government. It is important to re-member that Indonesia has a republican form of government which is led by a president. The President and the ranks of parliament or known as the DPR (People's Representative Council) in Indonesia in overcoming problems that occur through designing policies by considering previous policies. This step was taken by the government to deal with problems in people's lives, one of which is to increase economic growth.

The economy in Indonesia needs policies to continue to experience good improvement. The following is data on Y on Y economic growth in Indonesia for 2015-2022:

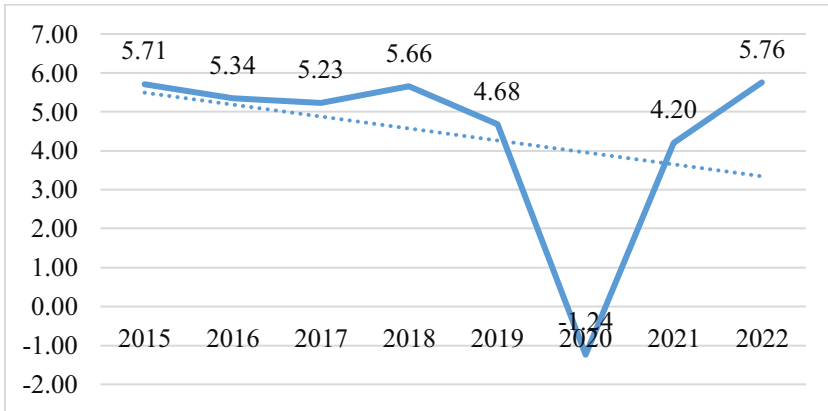


Fig 1. GDP Rate in Indonesia 2015-2022.
 Source: Central Bureau of Statistics (BPS), processed in 2024

It can be seen from the economic growth data in Indonesia that in the last five years, there has been a stable or linear trend. In the period 2018-2022, economic growth in Indonesia was recorded in 2015, 5.71%, in 2016, 5.34%, in 2017, 5.23%, in 2018, 5.66, % in 2019, 4.68 %, in 2020 it is -1.24%, in 2021 it is 4.20%, and in 2022 it is 5.76%.

These policies, specifically to improve the economy in Indonesia, also need to be reviewed by knowing the conditions of income inequality in Indonesia as follows:

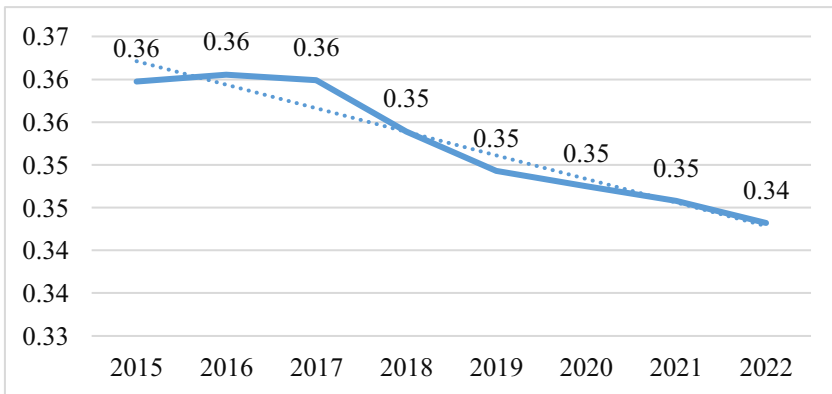


Fig 2. Gini Index in Indonesia 2015-2022.
 Source: National Development Planning Agency (Bappenas), processed in 2024

Income disparity or inequality in Indonesia has a decreasing trend between 2015 and 2022. The recorded Gini index in Indonesia in 2015 was 0.36; in 2016, 0.36; in 2017, 0.36; in 2018, 0.35; in 2019, 0.35, in 2020, 0.35; in 2021, 0.35; and in 2022 it is 0.34. Even though the Gini index trend in Indonesia from 2015 to 2022 has decreased to near the origin point, not every province has experienced this too. This is proven by the existence of 5 provinces that still have an increasing trend of the Gini index. These provinces are DKI Province. Jakarta, DI Province. Yogyakarta, NTB Province,

Gorontalo Province, and West Sulawesi Province. The following are economic conditions and income disparities in Indonesia, especially in 5 provinces which have increasing income disparity conditions from 2015 to 2022. These five provinces have increased economic growth, but income disparities have also increased. For example, West Nusa Tenggara Province has the least ideal conditions, namely the economic growth of West Nusa Tenggara Province in the period 2015-2022 has decreased and income disparities have increased.

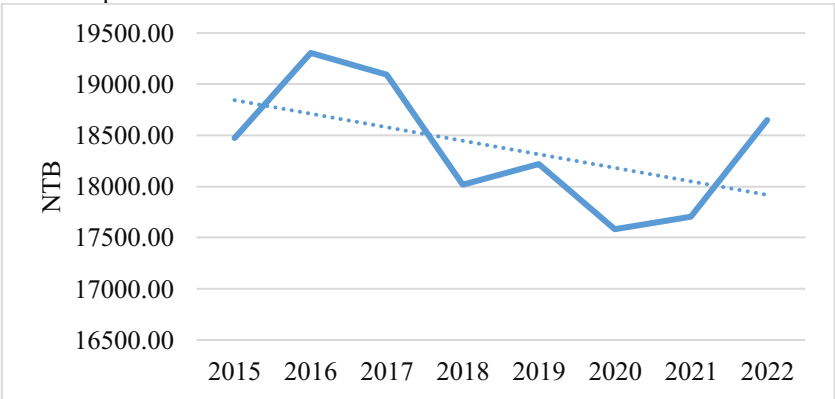


Fig 3. GDRP Rate in NTB (West Nusa Tenggara) 2015-2022.
Source: Central Bureau of Statistics (BPS), processed in 2024

Economic growth in NTB Province has a good trend, namely an upward or increasing trend. In 2015, recorded economic growth in NTB Province was 18.475,14 (billion Rupiah), in 2016 it was 19.305,79 (billion Rupiah), in 2017 it was 19.091,26 (billion Rupiah), in 2018 it was 18.020,50 (billion Rupiah), in 2019 it is 18.219,11 (billion Rupiah), in 2020 it is 17.583,11 (billion Rupiah), in 2021 it is 17.706,47 (billion Rupiah), and in 2022 it is 18.648,19 (billion Rupiah). Economic growth in NTB Province has a spike point in 2016, 2017 and 2022.

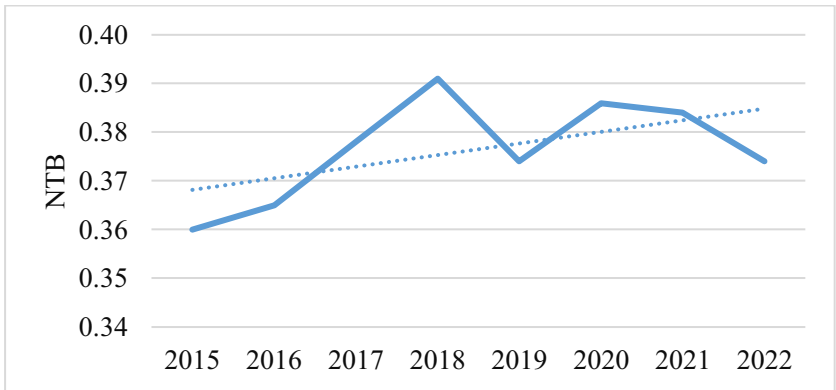


Fig 4. Gini Index in NTB (West Nusa Tenggara) 2015-2022.
Source: National Development Planning Agency (Bappenas), processed in 2024

Data on income disparities in NTB Province as seen from the Gini index has a decreasing trend, which means that income disparities are decreasing and approaching the origin or zeropoint, equality. In 2015, the Gini index was recorded at 0.36; in 2016, 0.37; in 2017, 0.38; in 2018, 0.39; in 2019, 0.37; in 2020, 0.39; in 2021, 0.38; and in 2022 it is 0.37. It can be seen from the Gini index data in NTB Province that it has a downward trend, although in 2018, 2020, and 2021 it experienced an increase.

The 2020 - 2024 National Medium Term Development Plan (RPJMN) is a crucial step in achieving the development goals set out in the 2005 - 2025 RPJPMN. In this period, it is predicted that Indonesia's per capita income will reach the level of upper middle-income countries (upper-middle income). middle-income countries). Characterized by adequate infrastructure, improvements in the quality of human resources, better public services, and followed by increased community welfare. According to the 2005-2025 RPJPN guidelines, the development focus is on the medium term, namely the period 2020 to 2024. This development has a vision to create an independent, advanced, just, and prosperous Indonesian society by accelerating progress in various development sectors in Indonesia. The realization of this vision is emphasized by strong economic development, based on competitive advantages in all regions, and supported by competent and competitive human resources. The development referred to in the 2020-2024 RPJMN has prioritized achievements based on the 17 Sustainable Development Goals (SDGs). The targets and performance indicators of the 17 Sustainable Development Goals (SDGs) have become an essential part of Indonesia's future development agenda.

Minister of Finance Sri Mulyani Indrawati (Minister of Finance 2020) infrastructure has several important roles in encouraging the development of creative industries in Indonesia. Its first function is as the main support for the growth of the creative sector. Apart from that, infrastructure also plays a role in developing quality human resources. Apart from these two functions, infrastructure is also useful in realizing equitable development, with the hope that all levels of society will have equal opportunities for economic participation. Through equitable infrastructure development, it is hoped that new jobs can be created for residents in various regions. It is hoped that increased productivity will attract investors to contribute to advancing the region.

The availability of adequate infrastructure is expected to have a strategic impact on a location, influencing the interest of many private parties to invest. With increased private investment, economic growth can increase significantly. Meanwhile, improving the quality of life will improve people's welfare, because infrastructure development can reduce the level of poverty and unemployment in an area.

Previous research as a basis for this research has varied research results. Previous research regarding the influence of infrastructure on economic growth. The first is previous research regarding the influence of infrastructure on economic growth. First, research from [1] with the title "Physical infrastructure and economic growth". The results of this research are that road infrastructure does not have a significant influence on economic growth, railway infrastructure does not have a significant influence on economic growth, and electricity infrastructure has a positive and significant influence on economic growth.

Second, research from [2] with the title "The Influence of Infrastructure on Economic Growth in North Sulawesi Province". In this research, 5 regional samples were used, namely Minahasa Regency, North Minahasa Regency, the research result regencies, Bolan Mongondow Regency, Sangihe Regency, and Manado City. In Minahasa Regency, the results are that road infrastructure has a positive and significant influence on economic growth, electricity infrastructure has a negative and significant influence on economic growth and clean water infrastructure has a positive and significant influence on economic growth. In North Minahasa Regency, the results are that road infrastructure has a positive and significant influence on economic growth, electricity infrastructure has a negative and significant influence on economic growth and clean water infrastructure has a positive and significant influence on economic growth. In Bolang Mongondow Regency, the results are that road infrastructure has a positive and significant influence on economic growth, electricity infrastructure has a negative and significant influence on economic growth and clean water infrastructure has a positive and significant influence on economic growth.

In the Regency of Sangihe has the results, that road infrastructure has a positive and significant influence on economic growth, electricity infrastructure has a negative and significant influence on economic growth and clean water infrastructure has a positive and significant influence on economic growth. In Manado City, the results are that road infrastructure has a positive and significant influence on economic growth, electricity infrastructure has a negative and significant influence on economic growth and clean water infrastructure has a positive and significant influence on economic growth.

Previous research regarding the influence of infrastructure on income disparities. Research from [3], with the title "Analysis of the Influence of Infrastructure on Regional Economic Development Inequality in Aceh Province". The results of this research are that electricity infrastructure has a negative and significant influence on income disparities, educational infrastructure has a negative and significant influence on income disparities, road infrastructure does not have a significant influence on income disparities and health infrastructure does not have a significant influence on income disparities.

The second research is from [4] and has the title "The Role of Infrastructure Development on Income Inequality in Cities and Regencies of Java Island". The results of this research are that road infrastructure has a positive and significant influence on income disparities, electricity infrastructure has a positive and significant influence on income disparities and clean water infrastructure has a positive and significant influence on income disparities.

Previous research on the effect of economic growth on income disparities. Research from [5] with the title "Analysis of the Effect of Economic Growth, General Allocation Funds, Fuel Subsidies on Indonesian Income Disparities". The results of this research are that economic growth does not have a significant effect on income disparities. The second research is from [6], with the title "Analysis of Determinants of Income Distribution Disparities in Districts/Cities of South Sulawesi Province 2017-2021". The results of this research are that regional gross domestic product has a positive and significant influence on income disparities. The three studies from [7], with the title "Analysis of the Determinants of Income Inequality in West Southeast Maluku

Regency". The results of this research are that gross regional domestic product has a negative and significant influence on income disparities.

The study aims to analyze infrastructure's influence on income disparities in Indonesia in 2015-2022. The second objective is to analyze the influence of infrastructure on economic growth in Indonesia in 2015-2022. The third objective is to analyze economic growth's effect on Indonesia's income disparities in 2015-2022. The fourth and main objective is to analyze the influence of infrastructure on income disparities through economic growth in Indonesia in 2015-2022 and analyze the role of economic growth variables in mediating infrastructure variables on income disparity variables in Indonesia in 2015-2022. This research is new and has never been studied. The variables used by the study, including independent variables, dependent variables, and mediator variables, have not been used by previous studies. Therefore, this research can have advantages and disadvantages for study. The advantage referred to is that it is new research; the disadvantage is that it is a researcher with no supporting journals or previous studies. Apart from that, remember that the variable used, especially the dependent variable, namely income disparity, is a crucial topic in people's lives in Indonesia, especially in the economic aspect.

2 RESEARCH METHODS

Research can be defined as a systematic process that uses scientific methods to solve specific problems and achieve predetermined goals. This research is included in the quantitative descriptive research category, which adopts an approach using numerical data to analyze a problem. In the quantitative approach, various methods are used, including descriptive methods which aim to explain and interpret facts related to problems being faced in society. This method focuses on ongoing processes and the impact of a phenomenon [8].

In this research, the type of data used is secondary data, which was obtained not directly by the researcher, but through other parties, institutions, or related documents. The data source in this research comes from the Indonesian Central Statistics Agency (BPS) (<https://www.bps.go.id/id>) and BAPPENAS (National Development Planning Agency) (<https://www.bappenas.go.id/id>). The data taken are Gini index data, Gross Regional Domestic Product (GRDP) at Constant Prices (ADHK) series 2010, data on the number of educational facilities, data on the number of health facilities, data on the percentage of households having access to sanitation, data on the potential production capacity of clean water, and electricity distribution data in the 2015 – 2022 time period.

In this research, a combination of panel data analysis and path analysis was used. This approach was chosen because path analysis is useful for identifying indirect influences between independent variables and dependent variables through moderator variables. The combination of these two analyses is applied to analyze various variables in each province in Indonesia in various periods.

The panel data estimation model is as follows:

$$Y = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + e_{it} \quad (1)$$

Information:

- Y : Dependent variable
- X : Independent variable
- i : Cross Section
- t : Time Series
- β : Constanta
- et : Error Term

The panel model used in the research is as follows:

Y = Income Disparity

$$DP = \beta_0 + \beta_1 LOGINP_{it} + \beta_2 INSL_{it} + \beta_3 LOGINA_{it} + \beta_4 LOGINRS_{it} + \beta_5 LOGINL_{it} + e_{it} \tag{2}$$

Information:

- DP : Income Disparity
- LOGINP : Education Infrastructure
- INSL : Sanitation Infrastructure
- LOGIN : Water Infrastructure
- LOGINRS : Health Infrastructure
- LOGINL : Electrical Infrastructure
- i : Cross Section
- t : Time Series
- β : Constanta
- et : Error Term

Y = Economic Growth

$$LOGZ = \beta_0 + \beta_1 LOGINP_{it} + \beta_2 INSL_{it} + \beta_3 LOGINA_{it} + \beta_4 LOGINRS_{it} + \beta_5 LOGINL_{it} + e_{it} \tag{3}$$

Information:

- LOGZ : Economic growth
- LOGINP : Education Infrastructure
- INCL : Sanitation Infrastructure
- LOGIN : Water Infrastructure
- LOGINRS : Health Infrastructure
- LOGINL : Electrical Infrastructure
- i : Cross Section
- t : Time Series
- β : Constanta
- et : Error Term

Y = Income Disparity and Z = Economic Growth

$$Y = \beta_0 + \beta_1 \text{LOGZit} + \text{eit} \quad (4)$$

Information:

DP	:	Income Disparity
LOGZ	:	Economic growth
i	:	Cross Section
t	:	Time Series
β	:	Constanta
et	:	Error Term

The panel regression used needs to go through several stages of testing so that the data can be used, the classical assumption test. The classical assumption test consists of the normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test. After carrying out the classical assumption test, the panel data that has been regressed is analyzed using the coefficient of determination analysis (R-Square), F test (Joint Test), and T-test (partial test). The coefficient of determination (R^2) is a useful tool for assessing the extent to which a model can explain variation in the dependent variable. The F test is used to test whether there is an influence of the independent variables simultaneously or together on the dependent variable. The F test is carried out by comparing the F-statistics with the F table. The t-statistical test is a test to determine the independent variable partially on the dependent variable.

This research also uses path analysis or what is known as path analysis. According to [9], path analysis is a development of multiple regression which allows analysis of the relationship between independent variables and dependent variables directly or indirectly. In path analysis, variables are generally divided into exogenous and endogenous. The relationship between variables is one-way, so there is no reciprocal relationship. Variables cannot act as cause and effect simultaneously.

The path analysis uses the Sobel test technique with an analysis tool, namely Sobel calculator. The Sobel test according to [10] and [11] is used to test the influence of the mediator variable in mediating between the independent variable and the dependent variable. This sobel test can be used when the test uses large or large samples. A variable can be said to be a mediating variable when it can mediate between the independent variable and the dependent variable.

In solving problems using path analysis with a Sobel test, as follows:

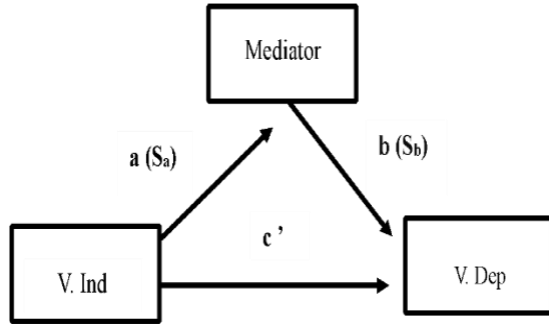


Fig 3. Sobel Test Equation

Sobel test equation model:

$$Sab = \sqrt{b^2 \cdot Sa^2 + a^2 \cdot Sb^2 + Sa^2 \cdot Sb^2} \tag{6}$$

Information:

a, b, c' : Path coefficient

a : Regression coefficient of the independent variable on the mediator variable

b : Regression coefficient of the mediator variable on the dependent variable

c' : Regression coefficient of the independent variable on the dependent variable

Sa : Standard error of a

Sb : Standard error of b

3 RESULTS AND DISCUSSION

The impact of infrastructure on income inequality through economic growth is the goal to be achieved in this study. The results of regression can be seen in Table 1.

Table 1. Regression

Variable	Equation 1		Equation 2		Equation 3	
	Coefficient	Prob. t-stat	Coefficient	Prob. t-stat	Coefficient	Prob. t-stat
LOGINP	0.003219	0.2891	-0.026190	0.1262	-	-
INSL	-2.09E-06	0.0102	1.14E-05	0.0126	-	-
LOGINA	-0.020736	0.0015	0.184124	0.0000	-	-

LOGINRS	-8.91E-05	0.9771	-0.008864	0.6129	-	-
LOGINL	-0.012930	0.0137	0.159104	0.0000	-	-
LOGZ	-	-	-	-	-0.065205	0.0000
C (DP)	0.615232	0.0000	-	-	1.034858	0.0000
C (LOGZ)	-	-	7.877.612	0.0000	-	-

The research results begin with panel data regression, selecting the best model, classical assumption testing, panel regression analysis, and Sobel test. Results as follows:

Table 2. Chow Test

Normality Test	Equation 1	Equation 2	Equation 3
Jacque-Bera	2.804113	118.745	6.079903
Prob	0.246090	0.00000	0.047837

From the results above, it can be seen that the model used is the Fixed Effect Model (FEM), because it is seen from the probability of Cross-Section F and Cross-Section Chi-Square. The probability of Cross-Section F and Cross-Section Chi-Square data in this study has a result of 0.00000, which means the probability is less than a significance value of 5%. So, the model chosen is the Fixed Effect Model. The next test is the classic assumption test, which includes the normality test Multicollinearity Test, Heteroskedasticity Test, and Autocorrelation Test

Table 3. Normality Test

Redundant Fixed Effects Tests	Probability		
Effects Test	Equation 1	Equation 2	Equation 3
Cross - Section F	0.0000	0.0000	0.0000
Cross -Section Chi-square	0.0000	0.0000	0.0000

Table 3 shows that only one equation has normally distributed and the others are not normally distributed. However, according to [12] based on the Central Limit Theorem theory, namely research where the number of observations is more than 100, there is no need to carry out a normality test. This is confirmed by the opinion of [13], regarding the normality test in panel regression that is not necessary. This has a reason, namely that the normality test is only carried out if the number of observations is less than 30.

Table 4. Multicollinearity Test

Equation 1						
	DP	LOGINP	INSL	LOGINA	LOGINRS	LOGINL
DP	1.000000	0.160206	0.025237	0.181982	0.251135	0.260408
LOGINP	0.160206	1.000000	-0.161248	0.646346	0.769803	0.661634
INSL	0.025237	-0.161248	1.000000	0.208744	-0.030613	0.257156
LOGINA	0.181982	0.646346	0.208744	1.000000	0.672249	0.877202
LOGINRS	0.251135	0.769803	-0.030613	0.672249	1.000000	0.730252
LOGINL	0.260408	0.661634	0.257156	0.877202	0.730252	1.000000
Equation 2						
	LOGZ	LOGINA	LOGINL	LOGINP	LOGINRS	INSL
LOGZ	1.000000	0.225470	0.294869	-0.207418	-0.041953	0.340439
LOGINA	0.225470	1.000000	0.877202	0.646346	0.672249	0.208744
LOGINL	0.294869	0.877202	1.000000	0.661634	0.730252	0.257156
LOGINP	-0.207418	0.646346	0.661634	1.000000	0.769803	-0.161248
LOGINRS	-0.041953	0.672249	0.730252	0.769803	1.000000	-0.030613
INSL	0.340439	0.208744	0.257156	-0.161248	-0.030613	1.000000
Equation 3						
	DP	LOGZ	-	-	-	-
DP	1.000000	-0.019399	-	-	-	-
LOGZ	-0.019399	1.000000	-	-	-	-

According to [14] multicollinearity is a test used to determine whether there is a perfect or definite linear relationship between several or all of the variables that explain (independently) the regression model used. According to [15], if there is no correlation or relationship between the two variables, then the coefficient in compound regression will be the same as the coefficient in simple regression. This matter shows that the relationship between the independent variables (independent variables) has a linear relationship. In the three equations above that are affected by multicollinearity problems, the variables LOGINL (Electricity Infrastructure) and LOGINA (Water Infrastructure).

Table 5. Heteroskedasticity Test

Resabs	Prob. Equation 1	Prob. Equation 2	Prob Equation 3
LOGINP	0.0004	0.0004	-
INSL	0.1180	0.1180	-
LOGINA	0.9080	0.9080	-
LOGINRS	0.7505	0.7505	-
LOGINL	0.6155	0.6155	-

LOGZ	-	-	0.5153
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The heteroscedasticity test evaluates whether the variations between observations are different. The goal is to determine whether there is a difference in variation. The ideal model is not affected by heteroscedasticity problems, which means that the variations are constant or homogeneous. There are several methods for detecting heteroscedasticity, such as the Glejser test, Park test, statistical (formal) test, and White's test. In this research, statistical tests (formal) are used. The results of statistical (formal) tests provide information about the probability of each independent variable being tested. Only the LOGINP (Education Infrastructure) variable in equation 1 and the LOGINP (Education Infrastructure) variable in equation 2 are affected by heteroscedasticity problems. Apart from that, other variables are free from heteroscedasticity problems.

Table 6. Autocorrelation Test

Equation		Equation 1	Equation 2	Equation 3
Durbin	Watson	1.4000564	0.902076	1.299530
Stat				
DL		1.1439	1.1439	1.3929
4 - DL		2.8561	2.8561	2.6071
DU		1.8076	1.8076	1.5136
4 - DU		2.1924	2.1924	2.4864

The autocorrelation test aims to evaluate and find out whether there is a correlated relationship between consecutive numbers or data. The three equations above are free from autocorrelation problems. Regarding the autocorrelation test, according to [16], the autocorrelation test does not need to be carried out because this test only applies to time series data. So, if the autocorrelation test continues, it can be said to be in vain. After carrying out the classical assumption test, the next step is to carry out a panel regression testing analysis

Table 7. Coefficient of Determination (R-Square)

Equation	R-Square (R2)
Equation 1	0.914966
Equation 2	0.986421
Equation 3	0.912517

In equation 1 value R-Squared from equation 1, it is 0.914966, which shows that 91.49% of the income disparity in this study is explained by educational facilities infrastructure, proper sanitation infrastructure, clean water infrastructure, hospital/health infrastructure, and electricity infrastructure.

Meanwhile, the remaining 8.51% is explained by other variables outside the model.

Equation 2, the R-squared value from equation 2 is 0.986421 which shows that 98.64% of the income disparity in this research is explained by educational facilities infrastructure, proper sanitation infrastructure, clean water infrastructure, hospital/health infrastructure, and electricity infrastructure. Meanwhile, the remaining 1.36% is explained by other variables outside the model.

Based on the data processing results in the table, the R-Square value from equation 3 is 0.912517, which shows that 91.25% of the Income Disparity in this study is explained by Economic Growth. Meanwhile, the remaining 8.75% is explained by other variables outside the model.

Table 8. F-Test (Together Testing)

Equation	Prob(F-Statistic)
Equation 1	0.000000
Equation 2	0.000000
Equation 3	0.000000

The F test is used to test whether there is an influence of the independent variables simultaneously or together on the dependent variable. The F test is carried out by comparing the F-statistics with the F table. Of the three equations, the F probability is 0.000000 or less than a significance value of 5% (< 0.05), which means there is a joint influence.

Table 9. T-Test (Partial Test)

Variable	Equation 1	Equation 2	Equation 3
	Prob. t-stat	Prob. t-stat	Prob. t-stat
LOGINP	0.2891	0.1262	-
INSL	0.0102	0.0126	-
LOGINA	0.0015	0.0000	-
LOGINRS	0.9771	0.6129	-
LOGINL	0.0137	0.0000	-
LOGZ	-	-	0.0000
C (DP)	0.0000	-	0.0000
C (LOGZ)	-	0.0000	-

The t-statistical test is a test to determine the independent variable partially on the dependent variable. The t-test is carried out by looking at the probability values of the independent variables. With the following analysis, the probability value $> 5\%$ significance level means there is no significant influence between all independent variables on the dependent variable partially. Meanwhile, if the

probability value is <5% significance level, there is a significant influence between all independent variables on the dependent variable partially.

The results of equation 1 which have a significant influence on the income disparity variable are the sanitation infrastructure, water infrastructure, and electricity infrastructure variables. Equation 2 has a significant influence on the economic growth variable, sanitation infrastructure, water infrastructure, and electricity infrastructure variables. Meanwhile, in equation 3, the growth variable has a significant influence on income disparity.

Table 10.
Test

Variable	Prob. Sobel Test
LOGINP	0,133536
INSL	0,801343
LOGINA	0,000038
LOGINRS	0,613243
LOGINL	0,000016

Sobel-

The Sobel test according to [10] and [11] is used to test the influence of the mediator variable in mediating between the independent variable and the dependent variable. This sobel test can be used when the test uses large or large samples. A variable can be said to be a mediating variable when it can mediate between the independent variable and the dependent variable.

The indication of the Sobel test is that the probability value of the Sobel test is smaller than the significance value of 5%, meaning that it is significant and the economic growth variable is indirectly able to mediate the influence of the infrastructure variable on income disparities. Meanwhile, the Sobel test probability value is greater than the significance value of 5%, meaning it is not significant and the economic growth variable is indirectly unable to mediate the influence of the infrastructure variable on income disparities. The results of the Sobel test show that water infrastructure and electricity infrastructure have a significant influence on income disparities through economic growth or economic growth is able to mediate the water infrastructure and electricity infrastructure variables on the income disparity variable.

Kuznet's theory according to [17], [18], [19] states that differences in income often arise due to variations in the resources owned and the availability of capital goods as a production factor. Kuznets' theory, known as the inverted U curve, explains that in the early stages of development, economic inequality tends to increase. However, over time, this inequality can decrease due to more equal income redistribution and increased access to education [20].

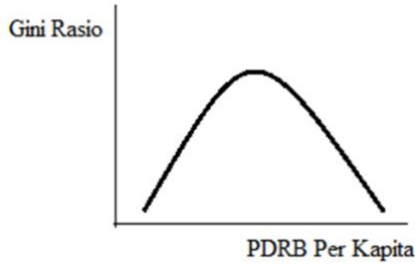


Fig 4. Kuznets Curve. Source: Research Gate

Gini ratio with the following formula:

$$GR = 1 - \sum f_i(Y_i + Y_{i-1}) \quad (7)$$

Information:

- f_i : Number of percent (%) of recipients of class i income
 Y_i : Cumulative amount (%) of income in class i

Economist [21] hypothesized the existence of an inverted U curve that when development begins, income distribution will become increasingly unequal. However, after reaching a certain level of development, income distribution will become more equal. The Kuznets curve is formed through a continuous growth process, starting with the expansion of the modern sector and continuing with a country's transition from a traditional to a modern economy [22] and [23]

The Lorenz curve in [24] is a visual representation of the cumulative distribution of national income among the population. This curve is located within a rectangle, with the vertical axis representing the cumulative percentage of national income, while the horizontal axis represents the cumulative percentage of population. This curve is placed along the diagonal of the rectangle. When the Lorenz curve approaches the diagonal (becomes straighter), it indicates that the distribution of national income is more equal. Conversely, if the Lorenz curve moves away from the diagonal (becomes more curved), it indicates worsening inequality in the distribution of national income [23].

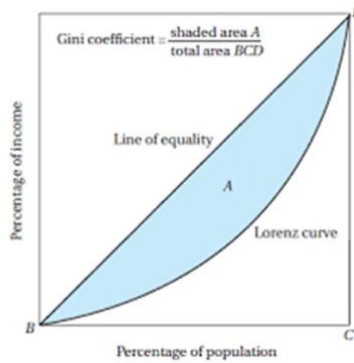


Fig 5. Lorenz Curve. Source: <https://satudata.depok.go.id>

According to [25] the Gini index is a measure of evenness that is calculated by comparing the area between the diagonals and the Lorenz curve divided by the area of the triangle below the diagonal. The Gini index has a value between zero and one. If the Gini index is close to zero, it indicates low inequality and if the Gini index is close to one, it indicates high inequality [23].

New growth theories emerged in response to intellectual deficiencies and empirical evidence in neoclassical growth models. This model criticizes three main assumptions of the neoclassical approach: first, the idea that profits or investment returns will continue to decrease as capital increases (diminishing returns to capital). Second, the assumption that technology is considered an external factor that is not influenced by the variables in the model. Third, the concept is that all input and output will grow in balance (constant returns to scale) [26].

The models that have been developed by previous experts do not provide satisfactory answers about economic growth. In Modern theory, the crucial factors are not only labor and human capital, but also the growth of capital goods and machines, entrepreneurship, raw materials, and materials. Apart from that, other factors that modern theory also considers to be very influential on economic growth are the availability and condition of infrastructure, laws and regulations, political stability, government policy (government spending), bureaucracy, and international trade exchange rates or Terms of Trade (TOT). The importance of these factors can be seen from cases in African countries.

The infrastructure theory presented by [27] is that infrastructure is a physical system that provides facilities such as drainage, water, transportation, buildings, and other public facilities needed to meet various basic human needs, both social and economic needs. Infrastructure is not only a place for development, but also acts as a driver of development itself. Building infrastructure means realizing social justice for all Indonesian people. The availability of infrastructure aims to facilitate people's access to resources, which in turn increases efficiency and productivity and encourages economic development in an area or region [28].

This research aims to determine the effect of infrastructure on income disparities through economic growth in Indonesia in 2015-2022. Presidential

Regulation number 122 of 2016 is an amendment to Presidential Regulation Number 75 of 2014 concerning the Acceleration of Priority Infrastructure Provision. To accelerate the realization of priority infrastructure in Indonesia, a body, namely KPPIP, was formed which is expected to be able to properly manage these priority infrastructure projects. KPPIP was established as a center of excellence to accelerate, prepare, and monitor the achievement of priority infrastructure projects by Presidential Regulation number 75 of 2014. KPPIP has the authority to make decisions is directly involved from the project planning stage, and is responsible for increasing human resource capacity. The main tasks include establishing Pre-Feasibility Study quality standards, reviewing and revising projects if necessary, establishing a list of priority projects, and funding schemes, as well as monitoring and overcoming obstacles in project implementation. Apart from that, KPPIP also determines strategies and policies in the infrastructure sector and facilitates increasing the capacity of apparatus and institutions related to priority infrastructure. KPPIP members include the Coordinating Minister for Economic Affairs, Coordinating Minister for Maritime Affairs, Minister of Finance, Minister of National Development Planning/Bappenas, Minister of Agrarian Affairs and Spatial Planning/BPN, and Minister of Environment and Forestry. It is hoped that after this research is carried out, the government can pay more attention to all aspects. which has a direct and indirect influence on the problem of income disparities in Indonesia. One thing that is meant is to improve priority infrastructure in overcoming income disparities in Indonesia. The future hope is that by monitoring this infrastructure, related problems can be addressed both in the short term and for better sustainability (Kementerian Koordinator Bidang Perekonomian Republik Indonesia, 2018)

4 CONCLUSION

Indonesia, as one of the developing countries in Southeast Asia, is certainly never free from problems in people's daily lives. Problems that often occur in the social, economic, and environmental fields. Various problems are slowly being resolved with intervention from the government. It is important to remember that Indonesia has a republican form of government which is led by a president. The President and the ranks of parliament or known as the DPR (People's Representative Council) in Indonesia in overcoming problems that occur through designing policies by considering previous policies. This step was taken by the government to deal with problems in people's lives, one of which was to increase economic growth.

The problem of income disparities in Indonesia, especially in the 34 provinces, there are still indications of income inequality. In the spotlight, income disparities are experiencing increasing inequality, namely in the DKI province. Jakarta, DI. Yogyakarta, NTB Province, Gorontalo Province, and West Sulawesi Province. Based on Kuznet's theory which explains that in the early stages of development, economic inequality tends to increase. However, over time, this

inequality may decrease due to more equal income redistribution and increased access to education

The research results show that. Water infrastructure and electricity infrastructure have a significant influence on income disparities through economic growth and economic growth can mediate the water infrastructure and electricity infrastructure variables on the income disparity variable. Meanwhile, the educational infrastructure, sanitation infrastructure, and health infrastructure variables do not have a significant influence on the income disparity variable through the economic growth variable. In other words, the economic growth variable is unable to mediate the educational infrastructure, sanitation infrastructure, and health infrastructure variables on the income disparity variable.

According to Presidential Regulation Number 122 of 2016 concerning the Acceleration of Priority Infrastructure Provision. This regulation contains the types of infrastructure that are included in the priority infrastructure category, namely transportation infrastructure, road infrastructure, water infrastructure, drinking water infrastructure, wastewater infrastructure, waste facilities, telecommunications & information technology infrastructure, electricity infrastructure, oil & natural gas infrastructure. , educational facility infrastructure, regional infrastructure, tourism infrastructure, and health infrastructure. Infrastructure in Indonesia, especially the focus of this research, is included in the priority infrastructure as stated in the Presidential Regulation. The infrastructure in question is education infrastructure, sanitation infrastructure, water infrastructure, health infrastructure, and electricity infrastructure.

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