Factors Affecting Poverty on the Island of Sumatera

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ABSTRACT: *Poverty* is a problem faced by many developing countries in general. Poverty is a reflection of the economic activities carried out by a country. The poverty level of a country shows that the development programs implemented by the government are not optimal. This study was conducted to analyze the determinants of poverty in 10 provinces on the island of Sumatra from 2006-2019. Multiple regression equation models were built for this research using the Ordinary Least Squares (OLS) method with the e-views 8 tool. The results show that simultaneously, the independent variable has a significant effect on poverty and partially one variable that does not significantly affect poverty, namely unemployment. An increase in education (literacy rate) and infrastructure (road length) leads to an increase in poverty and inequality in income distribution (the Gini Index), resulting in a decrease in poverty. It is hoped that future researchers will use education, infrastructure, and income distribution variables with different proxies.

KEYWORDS: Education, Infrastructure, Unemployment, Gross Regional Domestic Product, Human Development Index (HDI), Gini Index, and poverty.

I. INTRODUCTION

The classic problem suffered by a country's population in the world, especially developing and third world countries, is poverty. Low levels of education characterize poverty, work productivity, income, health, nutrition, and welfare experienced by residents in a country and, as a whole, will be found in the economy of a country. The problem of poverty is complex and multidimensional, so to overcome it, a comprehensive and integrated way is needed.

Indonesia is a country with a high poverty rate, with more than 10% of the Indonesian population categorized as poor, and in general, they work as farm laborers, small farmers, small traders, fishers, small craftsmen, laborers, street vendors, hawkers, scavengers, homeless people, and beggars (sprawl), and unemployment. This profession is not able to meet a decent standard of living in life. According to the World Bank Institute (2020), poverty must be measured, and the reasons are:

1. So that the poor continues to be on the agenda and attention
2. Identification of the poor, and the need for interventions regarding poverty alleviation
3. Monitoring and evaluation of projects or policies intervention for the poor
4. Evaluation of the effectiveness of government institutions in poverty alleviation

According to the Central Statistics Agency (CSA), in 2019, the total area of Indonesia reached 1,916,906.77 km2 consisting of 16,056 islands and including five large islands (Sumatra, Java, Kalimantan, Sulawesi, and Papua). All of them cannot be separated from the problem of poverty. Based on CSA data, the number of poor people in Indonesia in semester II (September) 2019 was 24.79 million people, and Semester II (September) 2020 was 27.55 million people (10.79%). The high level of poverty has caused the government of the era of President Joko Widodo to pay great attention to the problem of poverty.

In connection with the Covid-19 pandemic, poverty development has increased. The problem is influenced by the slowdown in economic activity and the decline in income. The decline in income due to reduced working time, job loss, and loss of business have a greater impact on poverty, so efforts to reduce poverty are needed nationally and regionally with fiscal stimulus in the form of social assistance.

Sumatra Island, one of the largest islands in Indonesia, which administratively consists of one special region (Aceh) and 9 provinces (North Sumatra, West Sumatra, Bengkulu, Riau, Riau Islands, Jambi, South Sumatra, Lampung, Bangka Belitung Islands) which extends from Ulee Lheue in the north to Tanjung China in the south with an area of 473,600 km².

In Sanskrit, the island of Sumatra is called Suwarnadwipa, which means the island of gold. Sumatra Island is rich in natural products (palm oil, tobacco, petroleum, tin, bauxite, coal, and natural gas). Arif Budimanta, Deputy Chairman of the National Economic and Industrial Committee (NEIC), quoted from Beritasatu.com (6 March 2019), stated that Sumatra is Indonesia's growth engine. Sumatra, with its abundant natural resources, is a new engine of growth for Indonesia. NEIC sees Sumatra's potential to

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obtain six industrial zones (IZ) and six Special Economic Zones (SEZ). Based on the condition of the island of Sumatra, how is the problem of poverty from the population? The number of poor people on the island of Sumatra in the last five years is:

Table 1. Number of Poor People in Sumatra and Indonesia 2016-2020 (in thousands)

No	Year	Sumatera	Δ %	Indonesia	Δ%
1	2016	6214,9	-	27764,3	-
2	2017	5969,1	-3,96	26583,0	-4,44
3	2018	5919,3	-0,83	25674,6	-3,42
4	2019	5851,28	-1,16	25144,72	-2,06
5	2020	5837,46	-0,24	26424,02	5,09

Source: Central Bureau of Statistics and processed

Based on Table I above, it can be seen that the island of Sumatra in the percentage of poverty reduction is relatively smaller than nationally (Indonesia). In 2020 Sumatra Island, there was a decrease in the number of poor people, only 0.24% from the previous year, while for Indonesia, there was an increase in the number of poor people by 5.09%. The increase in the number of poor people in 2020 is none other than the COVID -19 Pandemic, where economic activity is slowing due to restrictions on population movement to anticipate the spread of the virus. According to Asep Suryahadi et al. (2020), the mechanism of transmission from COVID-19 to poverty is to start (1) Declining economic activities, (2) Declining economic growth, (3) Declining average household expenditure, (4) Distribution impact on household expenditure (5) Poverty incidence.

The problem of poverty and its impact in developing countries has caused many researchers to know the causes. Several researchers who discuss the factors that influence poverty are Muhammad Zahir Faridi, PhD et al (2015), Olanrewaju Makinde Hassan Ph.D and Olanrewaju Makinde Hassan Ph.D (2015), Ali Attibrizi et al (2016), Nur Sakinah and Hary Pudjianto (2018), Amaluddin Amaluddin et al (2018), Nurisqi Amalia, Anisa Nurpita, Rina Oktavia (2018), Asrol ASROL and Hafsah AHMAD (2018), Firman, Nurul Bariyah and Erni Panca Kurniasih (2019), Ali Asghar Salem and Neda Bayat (2019), Ade Marsinta Arsani (2020).

Based on the above studies, poverty can be influenced by various things, including economic activity/Regional Gross Domestic Product, education, unemployment, Human Development Index (HDI), infrastructure, income distribution, and others. It makes researchers want to see the effect of the above variables on poverty on the island of Sumatra.
This research questions are:
1. Can education, unemployment, gross regional domestic product, Human Development Index (HDI), infrastructure, Gini index simultaneously affect poverty on the island of Sumatra?
2. What is the level of education, unemployment, gross regional domestic product, Human Development Index (HDI), infrastructure, Gini index partially on the island of Sumatra?

II. LETERATURE REVIEW
Poverty is a macroeconomic phenomenon according to several economists, among them are Todaro and Smith (2006) state that the high level of poverty in a country depends on the level of average national income and the width and narrowness of the gap in income distribution. While Omoniyi, M.B.I. (2013), argues that poverty is not only a problem of lack of money but has dimensions of short life, illiteracy, social exclusion, and lack of material means to improve family conditions.

Conceptually, poverty can be divided into relative poverty and absolute poverty. According to the Central Statistics Agency, relative poverty occurs due to the influence of development policies that have not reached the entire community. In contrast, absolute poverty is poverty that occurs due to the inability of individuals to meet minimum basic needs such as food, clothing, health, housing, and education.

According to Jhingan (2014), in developing countries, the cause of poverty is inadequate educational infrastructure and facilities, causing a high number of illiterate people and lack of skills or expertise in health facilities and poor consumption patterns so that only a small portion of the population can become workers. Productive, and the population is concentrated in the agricultural and mining sectors with outdated and outdated production methods. This condition causes a cycle of poverty in the country.

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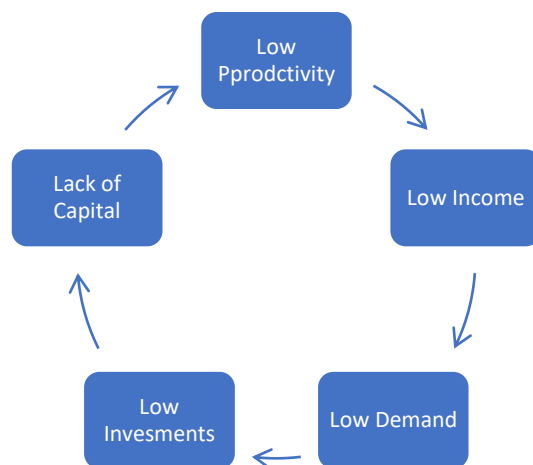
Figure 1. The Circle of Poverty (Vicious Circle Nurkse)
Source: Jhingan (2014)

The Central Statistics Agency (CSA), to measure poverty, uses the concept of the ability to meet basic needs (basic needs approach). The method used in calculating the Poverty Line (PL) is the sum of the components of the Food Poverty Line (FPL) and the Non-Food Poverty Line (NFPL), written as follows:

$$PL = FPL + NFPL$$

Education is regulated in the Law of the Republic of Indonesia Number 20 of 2003, where the definition is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious, spiritual strength, self-control, personality, intelligence, noble character. Moreover, the skills needed by themselves, society, nation, and state. Thus, through education, residents can develop their potential and have the skills to meet the needs of life. With the fulfillment of these life needs, the population comes out in the poor category. Research on the effect of education on poverty was carried out by Isnaini Khorunisa and Prasojo (2020), which state that the effect is positive and not significant. Meanwhile, Sindi Paramita Sari and Deky Anwar (2016) and Sodik Dwi Purnomo and Istiqomah (2019) stated that the influence was negative and significant.

Unemployment, according to BPS, is the workforce who does not have a job, is looking for work, works less than two days a week, is trying to get a decent job, or is preparing for an independent business. Their condition is a national problem. All relevant stakeholders must carry the solution simultaneously and in an integrated manner across sectors and the community by expanding job opportunities both inside and outside the employment relationship. The causes of unemployment are inadequate employment, high population, and population growth, and the number of the labor force or job seekers is not proportional to the number of existing jobs. Meanwhile, Sukirno (2011) argues that unemployment is a complex problem and adversely affects the economy, politics, and society. The effect of unemployment is that the population has no income, so they cannot meet basic needs in life. People who cannot meet their needs are included in the poor category. Several studies on the relationship between unemployment and poverty, namely Nonce Hasan and Muammil Sun'an (2020), Isnaini Khorunisa and Prasojo (2020), and Inda Arfa Syera (2017), stated that the relationship was positive and significant.

Gross Regional Domestic Product (GRDP), defined by the Central Statistics Agency (CSA), is the amount of added value produced by all business units in a region or is the total value of final goods and services produced by all economic units in a region or it can be said is the amount of added value produced by all business units in a certain area or is the total value of final goods and services produced by all economic units in a region. This Gross Regional Domestic Product (GRDP) is one indicator to determine the economic conditions in an area in a certain period. If the Gross Regional Domestic Product (GRDP) of an area is low, it reflects that the activities carried out by economic actors are also low. The low level of economic activity reflects the inability of the population to meet basic needs, and the population is categorized as poor.

The study results, which stated that the relationship between Gross Regional Domestic Product (GRDP) to poverty was negative and significant, were Sindi Paramita Sari and Deky Anwar (2016), while A U Putra et al. (2020) stated that there was a relationship between GDP and poverty.

The Human Development Index (HDI) is used to measure the achievement of human development based on the quality of life. According to the Central Statistics Agency (2018), the measure of the quality of life is measured based on three approaches, namely longevity and health using life expectancy at birth; knowledge is used the expected length of schooling and the average length of schooling, and a decent life is used the average amount of expenditure per capita. According to the standards of the United Nations Development Program (UNDP), human development consists of 4 criteria, namely HDI >80 very high category, HDI 70-79 high category. And HDI 60-79 in the medium category. In general, the formula used to calculate the Human Development Index

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(HDI) is one-third of the total sum of the health index, education index, and decent standard of living index. Research on the relationship between HDI and poverty was carried out by Amaluddin Amaluddin et al. (2018), stating that the relationship is negative and significant. While Yolanda et al. (2020) stated a significant relationship.

Infrastructure is considered a stock of capital, and its provision directly impacts production activities in the economy, which ultimately improves the standard of living and quality of life. According to the Presidential Regulation of the Republic of Indonesia Number 38 of 2015, infrastructure is the technical, physical, system, hardware, and software facilities needed to provide services to the community and support the structural network so that the economic and social growth of the community can run well. Physical infrastructure can be in the form of roads, and this research was conducted by Peter Warr (2006). Meanwhile, Muhammad Zahir Faridi, Ph.D. et al. (2015) in his research divides infrastructure into two indices, namely the physical infrastructure index and the social infrastructure index, and states that infrastructure can negatively and significantly affect poverty.

Income distribution will reflect income inequality received by residents of a country. The indicators to measure the inequality of income distribution are the Lorenz Curve and the Gini index, the quantile ratio, the Palma ratio, and the World Bank criteria. The Lorenz curve depicts the cumulative distribution of national income among the layers of the population. And the Gini index is a measure of evenness whose value ranges between 0 and 1, if: G < 0.3 = low inequality, 0.3 G 0.5 = moderate inequality, G > 0.5 = high inequality. Meanwhile, the world bank version is based on the share of national income enjoyed by three layers of the population, namely 40% of the population with low income, 40% of the population with middle income, and 20% of the population with high income. According to Pramono Hariadi (2009), increasing income inequality is not a tradeoff for poverty alleviation, while the results of research from Ferdinand Niyimbanira (2017) state that the Gini index and poverty have a negative and significant effect.

III. RESEARCH METHODOLOGY

This study uses secondary data in the form of panel data consisting of cross-sectional data obtained by the Central Statistics Agency from the provinces on the island of Sumatra (North Sumatra, West Sumatra, Bengkulu, Riau, Riau Islands, Jambi, South Sumatra, Lampung, Bangka Belitung Islands).) in 2006 – 2019. In contrast, the secondary data is historical data on the dimensions of Education, unemployment, regional gross domestic product, Human Development Index, infrastructure, income distribution (Gini index), and poverty. All data used in this study were collected from the Central Statistics Agency (CSA).

To measure poverty is to look for the best model between the common effect (OLS), fixed effect, and random effect because this study uses panel data. Model selection among the three approaches will be carried out using the Chow test, Hausman test. And the Lagrange multiplier (LM) test. The Chow test is used to select the best model between the common effect and the fixed effect. Meanwhile, the random effect approach to the fixed effect will be selected based on the Hausman test criteria. Meanwhile, the Lagrange multiplier (LM) test examines the common and random-effects models. The next step is the F test hypothesis, and the t-test, and the coefficient of determination.

The equation model of the panel data in this study can be written

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6)$$

Prov = f (EDU, OUR, GRDP, HDI, Infras, Gini Index)

Ln Prov = $a_0 + \beta_1$ Ln Edu$_{it}$ + β_2 Ln OUR$_{it}$ + β_3 Ln GRDP$_{it}$ + β_4 Ln HDI$_{it}$ + β_5 Ln Infras$_{it}$ + β_6 Gini Index$_{it}$ + e_{it}

Where :
Prov = Poverty
Edu = Education
OUR = Open Unemployment Rate
GRDP = Gross Regional Domestic Product
HDI = Human Development Index
Infras = Infrastructure
Gini Index = Income Distribution
a_0 = Constant Number (Intercept)
e_{it} = Error term

IV. RESEARCH RESULTS AND DISCUSSION

This section is an empirical analysis of the poverty variable as the dependent variable using cross-sectional time-series data from 10 provinces on the island of Sumatra from 2006 to 2019. Poverty is a multidimensional problem in development because overcoming the problems faced is not only limited to the -Things that concern the causal relationship of poverty but also involve preferences, values, and politics. In the 2006 – 2019 time period, it can be seen that the poverty variable calculated with the lowest number of poor people at 66,620 people is in the Province of Bangka Belitung Island in 2015, and the highest number of poor people

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of 1,897,100 people were in North Sumatra Province in 2006. The number of poor people in the provinces on Sumatra Island can be shown in Figure 2 below.
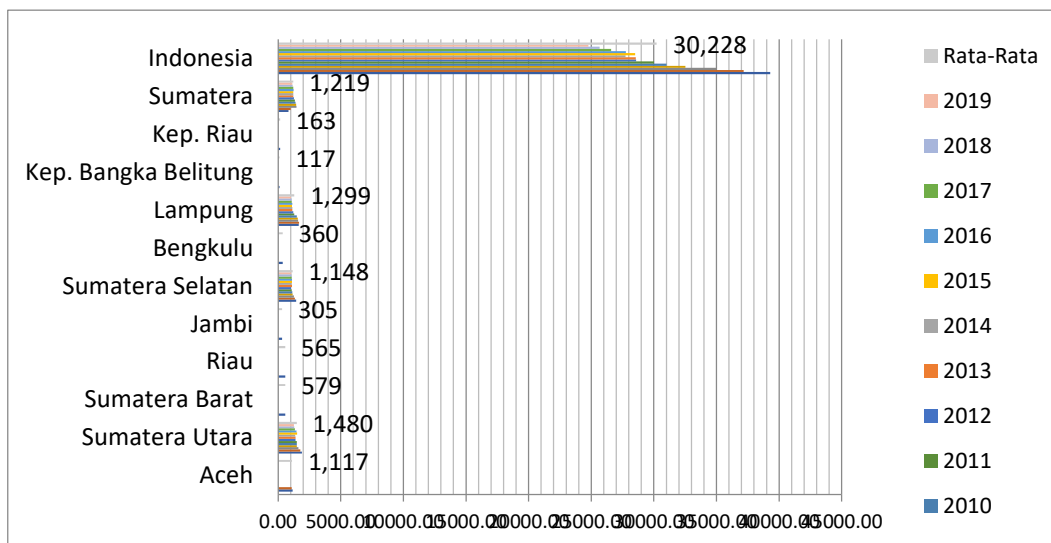
Figure 2. Development of Provincial Poverty Variables on Sumatra Island in 2006 – 2019
Source: Statistics Indonesia, 2020

Poverty is a fundamental national problem and requires systematic, integrated, and comprehensive measures and approaches to reduce the burden and fulfill the basic rights of citizens properly to lead and develop a dignified life, as stated in the Presidential Regulation (PER PRES). Number 96 of 2015 Amendment to Presidential Regulation Number 15 of 2010 concerning the Acceleration of Poverty Reduction. Factors that influence poverty in this study are education , unemployment, gross regional domestic product (GRDP), Human Development Index (HDI), infrastructure, and income distribution (Gini Ratio).

Education is one of the progress determinants and improvement of the quality of human resources and the improvement of skills and the ability to adapt to the world of work and the social environment. Quality human resources can create production effectiveness that can encourage economic growth and, at the same time, reduce poverty. Education level is measured by the Literacy Rate. The lowest literacy rate is in Lampung Province at 93.47 in 2006 and the highest literacy rate at 99.92 in Riau Province in 2019.

The infrastructure referred to in this study is physical infrastructure (road length). Road development is the economy's lifeblood that connects economic activities between regions so that the distribution of goods and services can move smoothly or indirectly, and roads are the driving force of the economy. The wheels of the economy that run smoothly can reduce the level of poverty in an area.

In the 2006 – 2019 time period, the average length of road infrastructure for the island of Sumatra is 170,660 km, which is below the average length for national road infrastructure, which is 495,820 km. The 10 (ten) provinces with the highest average length of road infrastructure are in North Sumatra Province at 37,765 km, while the lowest average length of road infrastructure is in the Bangka Belitung Islands Province at 4872 km.

Unemployment is one of the main problems faced by the Indonesian nation and state. High unemployment directly or indirectly impacts poverty, crime, and socio-political problems, which are also increasing. Unemployment in this study is calculated based on the Open Unemployment Rate (OUR).

In the 2006 – 2019 time period, the average open unemployment for the island of Sumatra was 6.36, below the national open unemployment rate average of 6.89. Of the 10 (ten) provinces, the highest average open unemployment rate is in Aceh Province at 8.62, while the lowest open unemployment rate average is in Bengkulu Province at 4.24.

Gross Regional Domestic Product (GRDP), during the 2006 – 2019 Period, the lowest Gross Regional Domestic Product at Constant Prices (PDRB ADHK) was on Sumatra Island at 6,610 Billion Rupiah in Bengkulu Province in 2007 and the highest ADHK GRDP at 539,527 Billion Rupiah in North Sumatra Province in year 2019.

To improve the competitiveness and progress of the provinces in Sumatra, there are eight programs carried out by the regional government and the central government in synergy, namely: (1) construction of the Trans Sumatra toll road,(2) construction of the Trans Sumatra railway line, (3) the connectivity of the islands in Sumatra, (4) the connectivity of Sumatra Island with Java Island, (5) increasing the utilization of the western shipping lanes of Sumatra Island, the alternative to the Malacca Strait, (6) strengthen the sea highway. (7) improving airport connectivity, downstreaming Sumatra's superior products, (8) accelerate the formation of new economic growth centers through the acceleration of the proposed or proposed Special Economic Zones (SEZs).

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The Human Development Index (HDI) is used to measure the extent to which the success of the quality of human life and) serves to measure the achievement of human development based on several basic components of quality of life. During 2006 – 2019, Riau Islands Province had the highest HDI of 71.81 and made Riau Islands Province a leading province in building highly competitive human resources. Different conditions were experienced by Lampung Province, which received the title as the lowest province in terms of HDI, which was 67.63, and made Lampung Province the lowest position.

Income distribution reflects inequality in terms of income distribution among community groups in a country or region. To see the income inequality is to use the Gini index. In 2006 - 2019, the highest Gini index was in Lampung and Bengkulu Provinces at 0.351, while the lowest Bangka Belitung Islands Province was 0.285.

The Chow test, Hausman test, and LM test are used to obtain the best model from panel data. The best model to be used based on the tests that have been done is the fixed effect model.

Table 2. The results of Multiple Linear Regression

Dependent Variable: POOR?
Method: Pooled Least Squares
Date: 10/25/21   Time: 11:51
Sample: 2006 2019
Included observations: 14
Cross-sections included: 10
Total pool (balanced) observations: 140

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-164.3058	14.75990	-11.13190	0.0000
LnEdu?	45.92697	3.184871	14.42036	0.0000
LnOUR?	-0.181711	0.311029	-0.584226	0.5601
LnGRDP?	-0.528315	0.151138	-3.495578	0.0007
LnHDI?	-5.95E-07	2.41E-07	-2.467925	0.0150
LnInfras?	0.304614	0.135845	2.242366	0.0267
GINI Index?	-8.530635	0.900733	-9.470775	0.0000
R-squared	0.953831	F-statistic		170.7874
Adjusted R-squared	0.948247	Prob(F-statistic)		0.000000
S.E. of regression	0.272672			
Sum squared resid	9.219422			

Source: E-view 8

Based on table 2 above, the equation obtained is

$$\text{Ln Prov} = -164{,}31 + 45{,}93\,\text{Ln Edu}_{it} - 0{,}18\,\text{Ln OUR}_{it} - 0{,}53\,\text{Ln GRDP}_{it} - 5{,}95E\text{-}07\,\text{Ln HDI}_{it} + 0{,}31\,\text{Ln Infras}_{it} - 8{,}53\,\text{Gini Index}_{it} + e_{it}$$

The results of the analysis from the table above are
1. The constant value from the above equation is – 164.31, which means that poverty will decrease by 164.31 even though there is no change in the variables studied and the relationship is significant. In this case, there are other variables not examined that can reduce poverty.
2. Education (Edu) has a positive and significant effect on poverty. That is, the more the literacy rate will increase poverty. If education (literacy rate) increases by 1 percent, it will increase poverty by 45.92 percent.
3. Open Unemployment Rate and poverty have a negative and insignificant relationship. A negative relationship shows that a 1 percent change in unemployment will reduce poverty by 0.18 percent.
4. Gross Regional Domestic Product (GRDP) has a negative and significant relationship with poverty. If there is an increase in GRDP of 1 percent, it will reduce poverty by 0.53 percent, and the form of the relationship is inelastic.
5. The Human Development Index (HDI) and poverty have a significant and negative relationship. This relationship shows that a 1 percent increase in the Human Development Index (HDI) will reduce poverty by 5.95E-07. The impact of HDI on poverty is very small.
6. Infrastructure proxied by road length shows that the relationship with poverty is positive and significant. If there is a 1 percent increase in the road length, it will increase poverty by 0.31 percent. The relationship is inelastic, which means that large changes in road length only have a small impact on poverty.

7. Income distribution and its relationship with poverty are negative and significant. This relationship shows that small changes in income distribution as measured by the Gini index have a large impact on poverty.

Simultaneous Test (F-test) is used to see the simultaneous effect of all the independent variables studied (contained in the model). These independent variables' effect on poverty is positive and significant with probability (F-statistics) = 0.0000. The magnitude of the variation of the influence of Education, unemployment, Regional Gross Domestic Product (GRDP), Human Development Index (HDI), infrastructure, income distribution (Gini Index) on poverty is 95 percent while other variables influence 5 percent.

V. CONCLUSION

The research results can be concluded that simultaneously, the independent variables in this research model have a positive and significant effect on poverty in 10 provinces on the island of Sumatra. Furthermore, partially only one variable that is not significant, namely unemployment, at the 95% confidence level.

The study results found that the relationship between education and infrastructure proxied from the length of the road with poverty was positive and significant. At the same time, income distribution (Gini index) had a negative and significant effect on poverty. This study explains that increasing literacy rates and road lengths impact increasing poverty, and the unequal income distribution makes poverty even lower. Then Gross Regional Domestic Product (GRDP) and Human Development Index (HDI) has a significant and negative effect on poverty. It explains that the increase in Gross Regional Domestic Product (GRDP) and the Human Development Index (HDI) can reduce poverty in 10 provinces on the island of Sumatra.

Based on the description above, to reduce/reduce poverty on the island of Sumatra is through increasing Gross Regional Domestic Product (GRDP) and the Human Development Index. Efforts to increase Gross Regional Domestic Product (GRDP) are through increasing economic activities that focus on the regional economic potential that can truly be superior. This superior potential can create different supplies and demands for goods and services produced by each province on the island of Sumatra so that these differences can complement each other to create economic sustainability between regions and increase the Gross Regional Domestic Product (GRDP) of each province. Meanwhile, the increase in the human development index (HDI) can be achieved by improving human resources' quality of life.

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