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Analysis of Poverty Determinants in North Sumatra Province

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Abstract

Poverty is a complex problem faced in every country. This research aims to determine the effect of economic growth, population, open unemployment rate and health level on poverty levels in the districts/cities of North Sumatra Province in 2018-2022. This research aims to determine the influence of Economic Growth, Population, Open Unemployment Rate and Health Level on Poverty in Districts/Cities of North Sumatra Province. The type of data used in this research is quantitative data and the data used is data in the form of numbers, namely secondary. This data is then processed using eviews 12 and analyzed using panel data analysis techniques with FEM (fixed effect model) which is selected based on the results of the chow test and Hausman test. The estimation results show that the economic growth variable has a positive and insignificant effect on the poverty level in the districts/cities of North Sumatra Province. The variable population size has a positive and insignificant effect on the poverty level in the districts/cities of North Sumatra Province. The open unemployment rate variable has a positive and significant effect on the poverty level in the districts/cities of North Sumatra Province. The health level variable using the Life Expectancy Rate (AHH) indicator has a negative and significant effect on the poverty level in the districts/cities of North Sumatra Province.

Keywords: Economic Growth; Population; Open Unemployment Rate; Health Level; Poverty Level

1. Introduction

Poverty is a major problem for many countries in the world, especially in developing countries. Poverty is a condition in which a person is unable to meet basic needs such as food, clothing, medicine and shelter[1]. Poverty is a problem facing all countries, especially in developing and lagging behind countries. Poverty has a multidimensional nature caused by many factors not only in the economic sphere, but also in the political, social, cultural and other social systems [2]. The goal of national development is to improve the performance of the economy so that they can create jobs and organise a decent life for everyone, which in turn will realise the welfare of the Indonesian population. One one of the goals of national development is to reducing poverty. Poverty is one of disease in the economy, so it must be cured or at least reduced. The problem of poverty is indeed a complex and multidimensional problem. Therefore, efforts to reduce poverty must be done comprehensively, covering various aspects of community life, and carried out in an integrated integrated manner [3].

Poverty can also be studied further as a multidimensional problem because it is related to the inability to access social, economic, cultural, political and community activities. In principle, the standard of living of a community is not only food needs, but also health and education needs. Poverty is also a problem as a manifestation of the problems of a country's development caused by the negative impact of a country's economic growth over a period of time, this also results in income differences that will widen the news that occurs between communities, causing income inequality. can lead to social conflicts that occur can lead to crime.

Table 1 shows the percentage of poor people by province in Indonesia in 2022. North Sumatra Province is ranked 18th out of 34 provinces in Indonesia with a percentage of poor people of 8.42 per cent. This shows that the percentage level of the poor in North Sumatra is classified as high**.** The variables used as factors that affect poverty in this study are economic growth, population, open unemployment rate and health level.

Table 2 shows that the number of poor people in North Sumatra has fluctuated from 2018 to 2022. The highest percentage rate of poverty in North Sumatra Province is in 2021 at 1,343,860 people with a poverty percentage of 9.01 per cent. Table 1.2 shows that economic growth has fluctuated from 2018-2022. In 2018 economic growth of 5.18 per cent increased in 2019 by 5.22 per cent. In 2020 economic growth greatly decreased due to the increase in the covid-19 rate which destroyed the economy of North

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Sumatra. In 2021-2022 the North Sumatra economy experienced an increase. However, the increase in economic growth did not reduce the poverty rate. Table 1.2 shows that the population data has increased from 2018-2022. The highest population is in 2022, which is 15,115,206 people. The increase in population causes the need for natural resources to increase and increases the dependents of family members, thereby reducing community welfare and causing poverty. In addition, the open unemployment rate in 2018 to 2022 experienced fluctuations. However, in 2020 to 2022 the unemployment rate decreased but could not reduce the poverty rate. The level of health is an important aspect in supporting success in development, especially to improve social welfare. Based on table 1.2, life expectancy from 2018 to 2022 has fluctuated. Life expectancy in 2018 of 68.61 years fluctuated until in 2022 it was 69.61 years. Health in general is all the efforts and actions of a person to maintain, maintain, and improve their own health status in order to have maximum labour. People who have a good level of health will have a high level of work productivity, high income levels, high education levels and a number of other positive things. Based on the description that has been explained, the author is interested in examining *"Analysis of Poverty Determinants in North Sumatra Province".*

Table 1. Percentage of Poor Population by Province in Indonesia in 2022

Regency	**Percentage of Poor Population (%)**	**Rating**
Papua	26,80	1
Papua Barat	21,43	2
Nusa Tenggara Timur	20,23	3
Maluku	16,23	4
Gorontalo	15,51	5
Aceh	14,75	6
Bengkulu	14,34	7
Nusa Tenggara Barat	13,82	8
Sulawesi Tengah	12,30	9
Sumatera Selatan	11,95	10
Sulawesi Barat	11,92	11
DI Yogyakarta	11,49	12
Lampung	11,44	13
Sulawesi Tenggara	11,27	14
Jawa Tengah	10,98	15
Jawa Timur	10,49	16
Sulawesi Selatan	8,66	17
Sumatera Utara	**8,42**	**18**
Jawa Barat	7,98	19
Jambi	7,70	20
Sulawesi Utara	7,34	21
Kalimantan Utara	6,86	22
Riau	6,84	23
Kalimantan Barat	6,81	24
Kalimantan Timur	6,44	25
Maluku Utara	6,37	26
Banten	6,24	27
Sumatera Barat	6,04	28
Kepulauan Riau	6,03	29
Kalimanatan Tengah	5,22	30
Kepulauan Bangka Belitung	4,61	31
DKI Jakarta	4,61	32
Kalimantan Selatan	4,61	33
Bali	4,53	34
INDONESIA	9,57	
Source: Badan Pusat Statistik		

Table 2. Economic Growth, Population, Open Unemployment Rate, Health Rate (Life Expectancy), Number of Poor People and Poverty Percentage in Regency/City of North Sumatra Province in 2018-2022

Tahun	Pertumbuhan Ekonomi (%)	Jumlah Penduduk (Jiwa)	Tingkat Pengangguran Terbuka (%)	Angka Harapan Hidup (Tahun)	Jumlah Penduduk Miskin (jiwa)	Persentase Kemiskinan (%)
2018	5,18	14.415.391	5,56	68,61	1291990	8,94
2019	5,22	14.562.549	5,41	68,95	1282040	8,83
2020	-1,07	14.703.532	6,91	69,10	1283290	8,75
2021	2,61	14.936.148	6,33	69,23	1343860	9,01
2022	4,73	15.115.206	6,16	69,61	1268190	8,42

2. Literature Review

2.1. Poverty

Poverty is a situation where an individual or group of people is unable to fulfil their basic needs, such as food, clothing, shelter, education, and health, which are considered minimal needs and have certain standards. The poverty line set by the Central Bureau of Statistics in 2022 is IDR 535,547/month, which means that each individual has an income of IDR 17,000/day. People who live below the poverty line determined by the Central Bureau of Statistics are considered poor [4]. Poverty is a deprivation in welfare. Based on this definition, poverty can be viewed from several sides. From the conventional view, poverty is seen from the monetary side, that is, poverty is measured by comparing the income/consumption of individuals with certain limits, if they are below these limits, then they are considered poor [5].

2.2. Economic Growth

Economic growth can be defined as the production of more output in a country accompanied by changes in the technical and institutional arrangements by which that output is produced and distributed [6]. High and sustainable economic growth is a must for the continuation of economic development and welfare improvement. The traditional development approach is interpreted as development that focuses on increasing per capita production in a province, district or city. Furthermore, economic development is not solely measured based on overall GRDP growth, but also the extent to which income distribution has spread to the layers of society and who has enjoyed the results. Income distribution from economic growth has a strong impact on human development. As incomes rise, the poor have the capital to improve their quality of life, both in terms of health and education. This will have an impact on improving people's welfare and reducing poverty. In addition, the benefits of economic growth can also be allocated to infrastructure development, so that the economic climate can grow properly.

2.3. Total Population

Population according to the Central Bureau of Statistics (BPS) is all people who live in a geographical area for 6 months or more and or those who live for less than 6 months but aim to settle down. According to Dwi Puspa in [7] population growth is the process of changing the population and its composition which is influenced by three demographic components, namely: fertility, mortality, and migration. So, population growth is the change in population from one period to the next in an area. Socio-economic facilities, especially educational facilities as a means of increasing people's intelligence, and the existence of health facilities to improve public health and economic facilities that serve to fulfil the needs of the community in presenting population data data, especially population growth data in the form of maps will facilitate planning and decisions taken by local governments related to population issues. The existence of population if in the economic development of a region is a horizontal problem, because uncontrolled population growth can result in not achieving development goals.

Fertility, the performance of a woman giving birth to a number of live babies. Mortality is an aspect of population studies that is very important for developing health programmes. Death is the permanent disappearance of all signs of life, which usually occurs after a live birth. Migration is the movement of people from one region to another or from one country to another.

2.4. Open Unemployment Rate

According to the Central Bureau of Statistics (BPS) in the labour indicators, unemployment is a population that is not working but is looking for work or is preparing a new business or a population that is not looking for work because they have been accepted for work but have not yet started working. According to Mankiw in [8] unemployment is a macroeconomic problem that directly affects human survival so that for most people the loss of a job is a decline in living standards. Unemployment is a macroeconomic problem that directly affects human survival. For most people the loss of a job represents a decline in living standards.

According to Sukirno in [9] the adverse effect of unemployment is to reduce people's income, which in turn reduces the level of prosperity that a person has achieved. The decline in people's welfare due to unemployment will certainly increase their chances of being trapped in poverty because they have no income. If unemployment in a country is very bad, political and social chaos always prevails and causes bad effects.

2.5. Health Level

According to Juanita in [10] one of the basic capitals in the implementation of economic development is good public health conditions. In economic development, the implementation of health development must also be considered. Both of these must run in balance in order to achieve the expected goals for all, namely prosperity and welfare for all Indonesian people. The health development in question is a process of changing the level of public health from an unfavourable level to a better one in accordance with health standards. Therefore, health development is development that is carried out as an investment to build the quality of human resources. Health can be seen from the productivity of a person carrying out their daily activities such as school, college, and social activities for the elderly. Health in general is all efforts and actions of a person to maintain, maintain, and improve their own health status in order to have maximum labour. Health is a basic need for every human being, because without proper health people cannot produce optimal productivity.

3. Research Method

The type of data used in this research is quantitative data and the data used is numerical data, namely secondary. The secondary data used in this study are *time series* data from 2018-2022 and *cross section of* 33 regencies / cities in North Sumatra Province. This study aims to analyse the effect of independent variables, namely economic growth, population, open unemployment rate, health level whether they have an interrelated relationship with the dependent variable, namely poverty. The data sources in this study were taken from the Central Bureau of Statistics, books, journals and sites related to the title of this study. This research was conducted in the Regency / City of North Sumatra province consisting of 33 Regency / City with the research time from 2018 to 2022.

This study uses one dependent variable four independent variables. The dependent variables in this study are Poverty (Y), Economic Growth (X_1), Population (X_2), Open Unemployment Rate (X_3), Health Level (X_4). The data analysis technique used in this research is panel data analysis. Panel data is a combination analysis of*time series* data and*cross-section* data. The difference between ordinary regression and panel regression is that in panel data regression there is a *random effect*, there is a *fixed effect*, meaning that there is an effect on time and region, while if ordinary regression, if it is a time series, it only sees changes in the effect at each time and if it is a cross-section time series, it sees differences in each region. Panel data in addition to looking between time also sees how changes between regions. In addition, the panel in eviews has a *fixxed effect / random effect* menu. There is a regression form for panel data in this study, which is as follows:

$$Y_{it} = \beta_0 + \beta_1 PE_{it} + \beta_2 J_{pit} + \beta_3 TPT_{pit} + \beta_4 TK_{it}\ \varepsilon_{it} \quad (1)$$

Description

Y	: Dependent variable
X	: Independent variable
N	: Number of observations
T	: Number of time
$\beta_1 - \beta_4$	: Coefficient
PE	: Economic Growth
JP	: Total Population
TPT	: Open Unemployment Rate
TK	: Health Level
NxT	: Number of Panel data

Determination of Estimation Model

1. Common Effect Model, The Common Effect model is a combination of time series and cross-section data using the ordinary least square method to estimate the panel data model.
2. Fixed Effect Model, The fixed effect model is a model that assumes the existence of intercept differences in the equation. The fixed effect model technique is a technique that estimates panel data using dummies to capture differences in intercepts.
3. Random Effect Model, The random effect model is a model that will estimate panel data where the disturbance variables are interconnected between time and between individuals.

Selection of Estimation Method

1. Chow test, The chow test is to determine which of the two methods, the common effect method and the fixed effect method, should be used in panel data modelling.
2. Hausman test, The Hausman test is to determine which of the two methods, the fixed effect method or the random effect method, should be used in panel data modelling.
3. Lagrange Multipler test, Lagrange Multipler is a test to determine whether the most appropriate Random effect or Common Effect model is used. The LM test is not used if the Chow test and Hausman test show that the most appropriate model is the Fixed Effect model.

Classical Assumption Test

1. Normality test aims to test whether in regression the independent variable and the dependent variable or both have normally distributed data or not. A good regression model is residuals that are normally distributed or close to normal. The normality test in panel data can be seen by comparing the probability values.
2. Multicollinearity test aims to test whether the regression model found a correlation between independent variables (independent). A good regression model should not have a correlation between the independent variables.
3. Heteroscedasticity test is a classic assumption test used to see if there are assumption deviations in the regression model. This deviation is caused by the unequal variance and residuals for all observations in the regression model.
4. Autocorrelation test is a disturbance in a regression function that often appears among the independent variables included

in the model. The autocorrelation test aims to test whether in the regression model there is a correlation between confounding errors in period t and confounding errors in period t-1.

4. Results and Discussion

Table 3. Result of Chow Test

Effect Test	Statistic	Df	Prob
Cross-section F	419.818550	(32,128)	0.0000

The probability value is <0.05, this means that H1 is accepted, and Ho is rejected, namely the Fix Effect model is better than the common effect model. Because, the fix effect model is selected, the test continues to the Hausman Test. Where Hausman testing is used to compare the Fix effect model (FEM) with Random effect (REM).

Table 4. Result of Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob
Cross-Section Random	42.823270	4	0.0000

The table above shows the magnitude of the random cross-section probability value of 0.0000 which is smaller than α = 5%. Then reject H0, which means that the model used is the Fixed Effect Model.

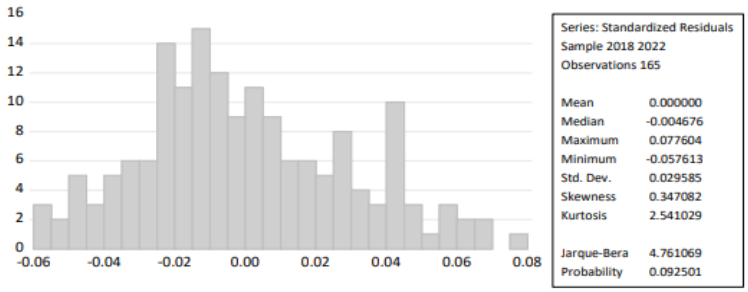

Figure 1. Result of Normality Test (Source: E-views processed)

The table above, the probability value of 0.092501 is greater than the significance value of 0.05, meaning that the data in the study are normally distributed.

Table 5. Result of Multicollinearity test (Source: E-views processed)

	PE	JP	TPT	TK
PE	1.000000	-0.002965	-0.156737	-0.093456
JP	-0.002965	1. 000000	0.418381	0.319479
TPT	-0.156737	0.418381	1. 000000	0.199736
TK	-0.093456	0.319479	0.199736	1. 000000

The Multicollinearity Test results in the table above show that there is no high correlation value between the independent variables not exceeding 0.90 so it is concluded that there is no multicollinearity between the independent variables.

Based on the results of the Heteroscedasticity test using the Harvey test, it can be seen that the F-Statistic is 0.0519> 0.05, it can be concluded that there is no heteroscedasticity problem

Based on the results of the Heteroscedasticity test using the Harvey test, it can be seen that the F-Statistic is 0.0519> 0.05, it can be concluded that there is no heteroscedasticity problem

Autocorrelation can be seen from Durbin Watson, the Durbin Watson value is 1.823432. Where the Durbin Watson value is greater than -2 and smaller than 2 so it can be concluded that there is no autocorrelation.

Panel data analysis in this study aims to determine the effect of economic growth, population, open unemployment rate and health level in North Sumatra Province in 2018-2022. From the results of panel data processing with the Fixed effect method, the

regression equation is obtained as follows:

Table 6. Result of Heteroscedasticity test (Source: E-views processed)

Heteroskedasticity Test: Harvey Null hypothesis: Homoskedasticity			
F-Statistic	2.403909	Prob. F(4,160)	0.0519
Obs*R-squared	9.353972	Prob. Chi-Square(4)	0.0528
Scaled explained SS	8.481552	Prob. Chi-Square(4)	0.0754

Table 7. Result of Autocorrelation test (Source: E-views processed)

R-s quared	0. 998246	Mean dependent var	10.32078
Adjusted R-squared	0.997753	S.D. dependent var	0.706406
S.E of regression	0.033488	Akaike info criterion	-3.760677
Sum s quared res id	0.143547	Schwarz criterion	-3.064192
Log likelihood	347.2559	Hannan-quinn criter	-3.547950
F-statistic	2023.502	Durbin-Wats on stat	1.823432
Prob(F-statistic)	0.000000		

Table 8. Estimation Result of Fixed Effect Model (Source: E-views processed)

Variabel	Coefficient	Std. Error	t-Statistic	Prob
C	20.58244	2.430858	8.467151	0.0000
PE	0.000546	0.001405	0.388425	0.6983
LOG(JP)	0.092482	0.092482	1.028855	0.3055
LOG(TPT)	0.033945	0.033945	3.481200	0.0007
LOG(TK)	-2.710549	0.682703	-3.970321	0.0001
Cross-section fixed (dummy variables)				
R-Squared	0.998246			
Adjusted R-Squared	0.997753			
Prob (F -statistic)	0.000000			

$$Y = 20.58244 + 0.000546PE + 0.092482JP + 0.033945TPT - 2.710549TK \quad (2)$$

Description:
Y = Poverty Rate
X1 = Economic Growth (PE)
X2 = Total Population (JP)
X3 = Open Unemployment Rate (TPT)
X4 = Health Level (TK)

Based on the regression results, the R-Squared coefficient value is 0.998246 or 99.8246%. This shows that the independent variables namely Economic Growth, Population, Open Unemployment Rate and Health Level have a relationship with the poverty rate variable by 99.8246%. Based on the regression results, the Adjusted R-Squared value is 0.997753 or 99.7753%. This shows that the independent variables namely Economic Growth, Population, Open Unemployment Rate and Health Level can explain the poverty rate variable by 99.7753% with the remaining 0.2247% explained by other variables not included in this study. Based on the regression results, the Prob (F-Statistic) value of 0.000000 is smaller than the significance value of 0.05, which means that the independent variables, namely Economic Growth, Population, Open Unemployment Rate and Health Level together have a significant effect on the variable Poverty Level of Regency / City in North Sumatra Province.

Analysis of the Relationship Results of Independent Variables to Dependent Variables

1. The Effect of Economic Growth on Poverty in North Sumatra Province in 2018-2022
   From the regression results of the fixed effect model, the economic growth variable has a positive and insignificant effect on poverty in North Sumatra Province. The higher the level of economic growth does not have an impact on the higher poverty rate in North Sumatra. This is not in accordance with the hypothesis that economic growth has a negative effect. The above results are in accordance with research conducted by [11] entitled Analiisis Pengaruh Inflasi dan Pertumbuhan Ekonomi Terhadap Kemiskinan di Indonesia which in the study states that economic growth is positively related and has

no significant effect on poverty in Indonesia. Economic growth is positively related and insignificant because the pattern of economic growth in North Sumatra is unstable where in 2020 economic growth has greatly decreased due to the impact of covid-19. So the number of poor people cannot be reduced significantly if there is no economic growth that benefits the poor, especially those affected by covid-19.

2. The Effect of Population on Poverty in North Sumatra Province in 2018-2022
   From the regression results using the Fixed effect model, the population variable has a positive and insignificant effect on poverty in North Sumatra Province. The population variable has a coefficient value of 0.092482 with a significance value of more than the significance level used (0.05), this means that the population variable has a positive and insignificant effect on poverty in 2018-2022 in North Sumatra Province. The results of this study indicate that in the long run population has a positive effect on poverty. Several things make population an obstacle to development and have a positive impact on poverty. Population growth without progress in other development factors does not increase income or demand. Therefore, population growth actually leads to lower wage rates and thus lower production costs. The results of this study are the same as previous research by [12] with the research title The Effect of Population and Unemployment on Poverty Levels in Tolitoli Regency where the study states that the population variable does not have a significant effect on poverty.
3. The Effect of Open Unemployment Rate on Poverty in North Sumatra Province in 2018-2022
   From the processed data results, the regression coefficient of the Open Unemployment Rate variable (TPT) has a significant effect on the poverty rate with a probability value of 0.0007 smaller than the significance value of 0.05 and a positive value indicated by a coefficient of 0.033945. This means that the open unemployment rate variable has a significant effect and has a positive relationship with the poverty rate in North Sumatra Province in 2018-2022. If the open unemployment rate increases, the poverty rate increases and vice versa, if the open unemployment rate decreases, the poverty rate decreases.
4. Effect of Health Level (TK) on Poverty in North Sumatra Province in 2018-2022
   From the processed data, the regression coefficient of the health level variable as measured by life expectancy has a significant effect on the poverty rate with a probability value of 0.0001 smaller than the significance value of 0.05 and a negative value shown by the coefficient of -2.710549. This means that the health level variable has a significant effect and has a negative relationship with the poverty rate in North Sumatra Province in 2018-2022. If the health level increases, the poverty rate decreases and vice versa, if the health level decreases, the poverty rate increases.

5. Conclusion

Based on the results obtained from research on the analysis of poverty determinants in North Sumatra province in 2018-2022 using panel data regression and classical assumptions, it can be concluded as follows:

1. Economic growth variables have a positive and insignificant effect on poverty in North Sumatra province.
2. Population variables have a positive and insignificant effect on poverty in North Sumatra province.
3. Open unemployment rate variables have a positive and significant effect on poverty in North Sumatra province.
4. Health level variables have a negative and significant effect on poverty in North Sumatra province.

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