The effect of total population, median income, and unemployment rate on poverty risk in Europe

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Abstract
This study aims to prove and examine the effect of some variables on poverty. In this study focus on the effect of the unemployment rate, total population and median income towards poverty risk that occurred in Europe in 2014-2018 and 27 countries as samples. To analyze and prove this hypothesis, an empirical test was conducted in the form of prediction with Smart PLS 3.0 on the magnitude of the influence of the Total Population (X1), Median Income (X2), and Unemployment Rate (X3). The data used are secondary data sourced from the European Statistical Recovery Dashboard. The method used to analyze data is the time series data method. The result showed that Total Population is an independent variable that has a postive and significant effect on the Poverty Risk as a dependent variable. It can be seen that the statistical t value of 6.323> from the t table value of 1.978 and this can be proven by the p values of 0.000 and the significance of 0.000 less than 0.05 which means that Total Population (X1) has positive effect and significant towards Poverty Risk in Europe. But, Median Income is an independent variable and the part of income distribution secondary data that doesn't play the major role of Poverty Risk in Europe for 2014-2018. It can be proven by p values of 0.588 that no significant 0.05 and the statistical t value of 0.542< from t table value of 1.978 which means that Median Income (X2) is not the major effect on the Poverty Risk in Europe in 2014-2018. Unemployment Rate is an independent variable that has a postive and significant effect on the Poverty Risk as a dependent variable. This can be seen that the statistical t value of 3.130 more than the t table value of 1.978 and this can be proven by the p values of 0.002 that less than 0.05 which means that Unemployment Rate (X3) has positive effect and significant towards Poverty Risk in Europe.

Keywords: Total Population, Distribution Income, Median Income, Unemployment Rate, Poverty Risk

1. Introduction
Poverty is a one of the serious and complex problem in the development of each country. There are many factors or variables that affect poverty such as economy, education, and other. In every study of people's perceptions of the causes of poverty, there are 2 perspectives on the causes of poverty, namely (1) an individualistic perspective, poverty factors come from the personality traits and behavior of the person (2) a social perspective, poverty is the result of economic, political, cultural and other. There is a widespread agreement that poverty is a multidimensional phenomenon involving not only low incomes, but also deprivations in other dimensions such as education, health or labour for instance. Because of that, Countries' attention to poverty reduction in their countries is increasingly focused on many dimensions. For example, the European union (EU) has used a multidimensional poverty and social exclusion indicator as a tool to monitor and implement effective poverty-reduction policies. The indicator at hand, namely the At Risk of Poverty or social Exclusion rate, is based on three measures, relative income poverty, material deprivation, and work intensity. Based on Eurostat, In 2014, the at-risk-of-poverty rate (after social transfers) in the EU-27 increased more substantially to reach 17.3 %. Smaller increases were shown in 2015 and 2016 (up 0.1 percentage points each year). In 2017, the first notable decrease was observed, the rate dropped to 16.9 % which was followed in 2018 by a further modest reduction of 0.1 points.

There is a direct influence between population growth on the level of social welfare. The rapid population growth in developing countries causes the level of people's welfare to not significantly improve and in the long run, it will experience a decrease in welfare and increase the number of poor people. The current demographic situation in the EU-27 is characterised by continuing population growth. It consists of two components: natural change and net migration plus statistical adjustment. Natural population change is the difference between the number of live births and the number of deaths. Eurostat reported, In 2018 the total population increased by 0.12% from 2017.

The distribution of income can lead to important changes in the structure and outcomes of the economy. Income distribution as a means of identifying the relationship between indicators of inequality in income distribution and the economy. As the distribution of income in a population is always positively skewed (that is, a long thin tail for the few with high incomes), the median income and percentage poverty are necessarily correlated with any measure of income inequality (Blakely, Kawachi, 2001). Based on Eurostat, the depth of poverty, which helps to quantify just how poor the poor are, can be measured by the relative median at-risk-of-poverty gap. The median income of persons at risk of poverty in the EU-27 was, on average, 24.5 % below the poverty threshold in 2018.

The unemployment rate is an important indicator with both social and economic dimensions. High unemployment rate will disturb the national stability of the country and will increase poverty risk. Rising unemployment results in a loss of income for individuals, increased pressure with respect to government spending on social benefits and a reduction in tax revenue. From an economic perspective, unemployment may be viewed as unused labour capacity. Eurostat reported, the unemployment rate in the eurozone fell to 7.9% in November 2018. This is the lowest figure in 10 years. Concerning the risk of poverty, the unemployed are a particularly vulnerable group: almost half (48.6 %) of all unemployed persons in the EU-27 were at risk of poverty in 2018, with by far the highest rate in Germany (69.4 %)

2. Literature Review
2.1 Definition of Population
Population is the number of people residing in an area at a certain time and is the result of demographic processes, namely fertility, mortality, and migration (Said 2001). As a tool for objectively studying populations, population ecologists rely on a series of statistical measures, known as demographic parameters. Total population can be known through census or population survey.

2.2 Median Income and Income Distribution
Income distribution is the distribution of income over a geographic area. Income distribution as a measure of inequality or inequality in the distribution of a country's development results among its population. Income distribution is said to be fair if it is evenly distributed to all levels of society. Income distribution greatly affects economic growth and is also a factor in the emergence of poverty. According to Todaro (2003) [20], more equitable distribution in developing countries is a condition or condition that supports economic growth. Todaro also argues that developed countries as a whole show a more even distribution of income compared to third world countries or countries that are classified as developing. The ways of measuring Income Distribution are (1) Distribution size with rank all households by income, from lowest to highest, and then to divide all households into five groups withequal numbers of people (2) Lorenz Curve (3) Gini Coeficient. Median income is the amount of income that divides the population into two equal groups, half of which have an income above that amount, and half have an income below that amount. Blakely and Kawachi examine the using of median income to control the association of income in US and The fact that the estimated income inequality effect size is small controlling for either mean or median income.

2.3 Unemployment Rate
The International Labour Organization definition of the unemployment rate is the most widely used labour market indicator because of its international comparability and relatively timely availability. Besides the unemployment rate, indicators such as employment and job vacancies also give useful insights into labour market developments. According to the Central Statistics Agency (BPS), Unemployed are residents who are not working but are looking for work or are preparing for a new business or residents who are not looking for work because they have been accepted for work but have not yet started working.

2.3.1 How to Measure Unemployment Rate
To measure the unemployment rate in an area, it can be obtained from the percentage ratio of unemployment to the number of jobs in an area.

2.4 Poverty Risk
According to the Central Statistics Agency (BPS), poverty is the inability to meet the minimum standard of basic needs which includes both food and non-food needs. To measure poverty, BPS uses the concept of the ability to meet basic needs approach. Living in poverty is not only living in a lack of money and low income, but also in other matters such as low levels of health and education, unfair treatment in the law, vulnerability to the threat of crime, powerlessness in determining their own path of life (Suryawati, 2005) [19].
Poverty can be divided into two types, namely

1. Absolute Poverty
Absolute poverty is determined according to the income ability of a community to meet minimum basic needs. If the minimum basic needs cannot be fulfilled, then the person concerned is classified as a poor person.

2. Relative Poverty
This poverty is due to income distribution. Even though a person has been able to meet the minimum basic needs, if his income is still much lower than the surrounding community, then that person is still categorized as a poor person (Arsyad 2010) [3]

3. Method
This study uses SmartPLS software version 3.0. which is run on computer media. The data used are secondary data sourced from the European Statistical Recovery Dashboard. The secondary data used are Total Population, Median Income, Unemployment Rate, and Poverty Risk in Europe in 2014-2018.

4. Result and Discussion
4.1 Result
4.1.1 Descriptive Data

Table 1: Descriptive Statistics

	Mean	Median	Min		Standard Deviation	Excess Kurtosis	Skewness	Number of Observations Used
Median Income (X)	0,000	184	- 2,925	1,720	1,000	2,535	-1,689	135,000
Poverty Risk (Y)	0,000	43	- 3,513	3,314	1,000	2,912	0,053	135,000
Total Population (X1)	0,000	-0,157	- 1,931	4,062	1,000	2,898	1,271	135,000
Unemployment Rate (X3)	0,000	-184	- 1,390	3,527	1,000	2,238	1,313	135,000

***Source*:** Results of processing with SmartPLS (2021)

Based on Descriptive Statistics Table, it can be seen that the minimum value of Total Population (X1) is -1.931 and the highest value is 4.062 with average value is 0.0 and the median value is -0.157. The average value of Median Income (X2) is 0.0 with the minimum value is -2.925, the highest value is 1.720 and the median value is 0.184. The average value of Unemployment Rate (X3) is 0.0 with the minimum value is -1.390, the highest value is 3.527 and the median value is -0.184. For the dependent variable, Poverty Risk (Y) it can be seen that the average value of it is 0,0 with the minimum value is -3.513, the highest value is 3.314 and the median value is 0.043.

The result of t-statistics value can be presented through tables and model path coefficients as in Figure 1 below
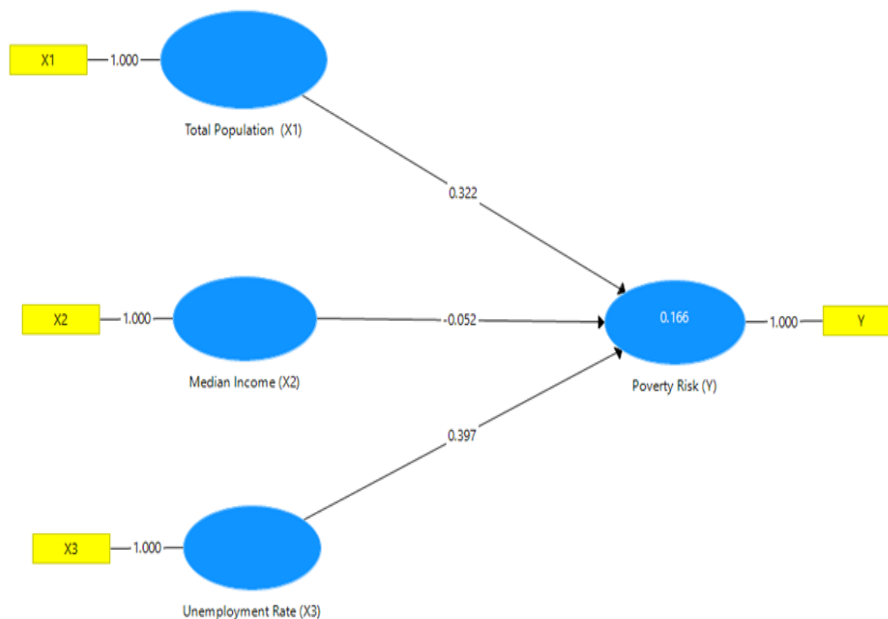

Fig 1: Overall model with coefficients

Based on Figure 1, it can be seen that Total Population and Unemployment Rate has a major influence on Poverty Risk but it can be seen that Median Income does not play a major role on Poverty Risk in Europe in 2014-2018. It can be proven more clearly in The Hypothesis test results presented in the following table 2

Table 2: Path Coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Median Income (X2) -> Poverty Risk (Y)	-0,052	-0,045	0,097	0,542	0,588
Total Population (X1) -> Poverty Risk(Y)	0,322	0,324	0,051	6,323	0,000
Unemployment Rate (X3) -> Poverty Risk (Y)	0,397	0,376	0,127	3,130	0,002

***Source*:** PLS output (2021).

Based on the hypothesis test, it can be seen that Total Population is an independent variable that has a postive and significant effect on the Poverty Risk as a dependent variable. It can be proven in Table 2 that the statistical t value of 6.323> from the t table value of 1.978 and this can be proven by the p values of 0.000 and the significance of 0.000< 0.05 which means that Total Population (X1) has positive effect and significant towards Poverty Risk in Europe. The Median Income is an independent variable which is not the major effect on the Poverty Risk in Europe in 2014-2018. It can be proven in Table 2 that p values of 0.588 that no significant or less than 0.05 and the statistical t value of 0.542< from t table value of 1.978 which means that Median Income (X2) is not the major effect on the Poverty Risk in Europe in 2014-2018. The Unemployment Rate is an independent variabel that has a positive and significant effect towards Poverty Risk. It can be seen in Table 2 that the statistical t value of 3.130> from the t table value of 1.978 and this can be proven by the p values of 0.002< 0.05 which means that Unemployment Rate (X1) has positive effect and significant towards Poverty Risk in Europe.

4.1.2 Predictive Relevance
The result of Predictive Value is presented in the following Table 3 as a follows:

Table 3: Predictive Relevance

	Income Distribution (X2)	Poverty Risk (Y)	Total Population (X1)	Unemployment Rate (X3)
Median Income (X2)		-0,052		
Poverty Risk (Y)				
Total Population (X1)		0,322		
Unemployment Rate (X3)		0,397		

Source: PLS output (2021).

In Table 3 is shown that there is a direct relationship between each independent variable on the dependent variable. Total Population and Unemployment Rate, independent variable, have positive relationship on Poverty Risk a dependent variable. Median income has a negative relationship on Poverty Risk which means if there is an increase in income, there will be a decrease in the risk of poverty (Kutner, Nachtsheim and Neter, 2004) [11].

4.1.3 Determination Coefficient Test Results
The result of Determination Coefficient Test is presented in the following Table 4 as a follows:

Table 4. The determination coefficient

	R Square	R Square Adjusted
Poverty Risk (Y)	0,166	0,147

Source: PLS output (2021).

The results of testing the coefficient of determination in Table 4, the R Square value is 0.166 and the Adjusted R Square value is 0.147. Thus, the value of R Square illustrates that all of the independents consisting of the Total Population (X1), Median Income (X2), and Unemployment Rate (X3) in this study are able to represent GDP in Europe (Y) as the dependent variable of 16.6%. While the remaining 83.4% is influenced by other variables outside this equation or the variables studied.

4.2 Discussion
From the predictive relevance, it can be seen that Unemployment Rate is the variable that has the greatest influence on poverty risk. It can be shown by the predictive value is 0.397. The Unployment Rate has positive effect towards Poverty Risk. It means that the higher the unemployment rate, then the poverty level will also be higher. Unemployment can occur due to many factors. These factors include increasing labour force but decreasing employment opportunities (job vacancy), lack of education or training, increasing population, limited opportunities to open a business and others. When people lose their job, they will not get additional income, so the income received is reduced and can lead to an increase in poverty risk. An increase in the poverty rate can disrupt economic stability in a country. According to Eurostat, there were consistent signs of strengthening in the labour market, as there were modest annual increases in the job vacancy rate for the period 2014-2019 (up 0.1, 0.2 and even 0.3 points in 2017). It shows that job vacancy are increasing slowly and continously and have an impact on reducing unemployment rate.
Based on the results of hypothesis testing using the T test that T count is higher than the table so that it can be stated that Total Population has postive and significant effect towards

Poverty Risk. It means that the higher the total of population, then the poverty risk will also be higher. The total population is one of the small causes of unemployment. Population is getting bigger every year. Because of that, The problem of unemployment has always been a difficult problem to solve in every country. Besides that, humans need food to live, while the growth of foodstuffs is much slower than population growth. If there is no emphasis on population growth, humans will experience food shortages. This is the source of poverty. Besides having an effect on the unemployment rate, Demographic (population) change tends to increase inequality.
Median income is the amount of income that divides the population into two equal groups, half of which have an income above that amount, and half have an income below that amount. Based on the results of hypothesis using T test that T count is less than the table so it can be seen that median income does not have positive and significant effect towards poverty risk. Based on Poverty Risk secondary data in 2014-2018 in Europe, median income doesn't play as a major role of Poverty Risk.

5. Conclusion
The result show that Total Population and Unemployment Rate influence to the Poverty Risk. This study does not find positive and significant effect of Median Income on poverty risk. In order to reduce the risk of proverty, the total population and the unemployment rate must be reduced. The state must be suppress population growth and also make efforts to reduce unemployment rate.

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