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Influence of Total Population Against Poverty Numbers Using Linear Regression Method in Jakarta

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ABSTRAK
Penelitian ini bertujuan untuk mengetahui pengaruh populasi jumlah penduduk terhadap jumlah angka kemiskinan di DKI Jakarta selama periode 2017-2022. Alat analisis yang digunakan adalah regresi sederhana. Hasil penelitian ini mengungkapkan bahwa jumlah penduduk memang mempunyai pengaruh yang bertahan lama terhadap angka kemiskinan di DKI Jakarta selama Tahun 2017-2022

Kata kunci: Kemiskinan, Regresi, Faktor Kemiskinan.

ABSTRACT
This study aims to determine the effect of population on poverty rates in Jakarta during the 2017-2022 period. The analytical tool used was simple regression. The results reveal that population does have a lasting effect on poverty rates in Jakarta during 2017-2022.

Keywords: *Poverty, Regression, Poverty Factor.*

INTRODUCTION

Poverty is a concern for countries of the world especially the developing countries. Indonesia is one of the examples of developing countries in South East Asia. As it goes, the numbers of poverty in Indonesia were not something new. This issue had been a hot topic for a very long time as it is always a main campaign topic for every presidential election. Its candidate had always made a point that poverty was the main challenge for development and that it should be erased at all costs. As cited by the Ministry of National Development Planning (2004), poverty is a condition in which people or groups of people, male or female, was unable to fulfill their rights to lead dignified life.[1] Poverty was a complex problem as it did not just stem from own earnings and consumption. But, education levels, health and inability to participate in human development programs such as malnutrition, poor healthcare and a bad education system (Sukirno, 2002).

Population number was one of the main problems in economy development as uncontrolled increase in population could slow down economy development and reduce poverty numbers by a great percentage. Looking at a more detailed view, the numbers of poverty were not only affected by the number of unemployment alone but it could be inferred that the mass does not have the quality enough to participate in economy development. Sometimes, the mass increase in population numbers could be a factor that hinders economic development as it lowers productivity and unemployment will rise exponentially as a result.

Classic economy experts such as Adam Smith cited that population was a potential input that could be used as a production factor to increase household business production. The greater the population, the more labor force that could be utilized (Spengler, 1976). However, contrary to Adam Smith, Malthus (1798) cited that a bigger population could indeed help in economic development. But, after reaching some optimum condition, the expunge in population would not help economic development and would instead slow down economic progression.

The calculation of the number and percentage of poor people is done using the basic needs approach. Using this approach, the poor would be defined as one without the ability to fulfill its basic needs for a decent life like food and non-food needs. Differentiation between the poor and the wealthy would need a value to separate them. This research was to analyze the influence of population number against poverty number in Jakarta from 2017 to 2022.

METHOD

One main factor of poverty was the rapid increase in population whereas the birth number was still very high while the number of death was still high albeit relatively lower than expected. Hence, the increase in population would lower wages and production costs. This condition would be a golden opportunity for capitalists to continue increasing their production. However, this comes with setbacks as the condition would last only for a moment as effective demand would decline since the labor force wages decline too. It would not be an exaggeration to say poverty was a complex problem as it is influenced by a lot of outside factors such as wages, education, access to goods and services, geography, gender and environment. Various policy and poverty countermeasures strategies

have been executed whether locally or nationally, in spite of that the result was not necessarily bright.

This condition happens especially in developing countries. Some believe poverty was a disease that plagued those not fortunate enough to receive material and non-material shortages such as food, nutrition, education, and information access as well as other shortages. Retrieved from Central Bureau of Statistics, residents with expenses lower than the poverty index would be categorized as poor. Here is the data for Population number (X) and Poverty number (Y) in Jakarta from 2017 to 2022.

Table 1
Population and Povertynumber in Jakarta 2017-2022

Year	Population (X)	Poverty (Y)
2017	10,374,235	389,690
2018	10,467,629	373,120
2019	10,557,810	365,550
2020	10,562,088	480,860
2021	10,609,681	501,920
2022	10,679,951	502,040
Total	63,251,394	2,613,180

Source: Central Bureau of Statistics Jakarta

RESULT

Regression is a statistic method used to estimate the relationship between one dependent variable with other independent variable. Regression is divided into 3 different variation namely linear, compound linear and non-linear. Regression analysis consist of 2 variables :

1. Response Variable also known as dependent variable in which the value is affected by other variable.
2. Predictor Variable also called as independent variable in which the value was not affected by other variable and is denoted as X.

Below is the model for simple linear regression : $Y = \alpha + \beta X$

Where : Y = Response Variable/Dependent Variable; X = Predictor Variable/Independent Variable; α = Constant; and β = Regression Constant; the amount of Response elicited by Predictor

Determining the a and b constant could be done using smallest quadratic method, in which determining the smallest value equation coefficient from quadratic function between dot and line regression. Hence, it could be described as follow: (Usman & Akbar, 2022)

$$\alpha = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2}; \beta = \frac{n(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2}$$

Below is the steps to Simple Linear Regression Analysis : determine the objective from simple linear regression analysis, identify response variable and predictor variable; gather data, determine X^2, Y^2, XY and each total of the three variable, count a and b from equation above, create a simple linear regression model, and make a predictions against response or predictor variable. Simple linear regression analysis is used to determine the mathematical relationship between response and predictor variable. the b from linear regression above would only be applicable if the effect was only from predictor variable against the response variable. Hence, b is a function from correlation coefficient. This affects b greatly whereas the value of the correlation coefficient was high then the value of b is also high. Simple linear regression also known as SLR was one of statistic method used to predict both quality or quantity.

Table 2
Linear Equation Table

Year	Population (X)	Poverty (Y)	X2	Y2	XY
2017	10,374,235	389,690	107,624,751,835,225	151,858,296,100	16,343,711,431,882,600
2018	10,467,629	373,120	109,571,256,881,641	139,218,534,400	15,254,349,795,428,000
2019	10,557,810	365,550	111,467,351,996,100	133,626,802,500	14,895,025,830,380,800
2020	10,562,088	480,860	111,557,702,919,744	231,226,339,600	25,795,079,300,316,600
2021	10,609,681	501,920	112,565,330,921,761	251,923,686,400	28,357,873,126,645,900
2022	10,679,951	502,040	114,061,353,362,401	252,044,161,600	28,748,498,179,187,700
Total	63,251,394	2,613,180	666,847,747,916,872	1,159,897,820,600	129,394,537,663,842,000

source: processed data

Calculating Regression Equation:

$$a = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2} = \frac{(2613180)(666847) - (63251394)(129394)}{6\,(666847) - (63251394)^2} = \frac{-6.44175964\,x\,10^{12}}{-4.000773884\,x\,10^{15}} = 0.001610142501$$

$$b = \frac{n(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2} = \frac{4001082 - (8.18435088\,x\,10^{12})}{4001082 - (4.00073884\,x\,10^{15})} = \frac{-8.18434688\,x\,10^{12}}{-44.000773884\,x\,10^{15}} = 0.002045708857$$

In this case, a equal to a constant with value of 0,0016. This value suggest that if there are no population number (X) then number of poverty (Y) was 0,0016. Whereas the regression coefficient b equal to 0,002. This number indicates that an increase of 1% in population number (X) would increase the number of poverty (Y) as much as 0,002. As the regression coefficient was a positive value, it could be concluded that the influence of population number (X) was positive against poverty number (Y). Hence, the regression equation could be described as follow: $Y = 0.0016 - 0.002X$

Research shows that as population growth increases, poverty rates also increase. This aligns with the theory that population growth is influenced by fertility rates, mortality rates, and migration. Fertility refers to the rate of birth growth in a population. Mortality rates refer to the rate of population decline through death. Socioeconomic factors significantly influence mortality rates, with a lack of knowledge about healthcare, nutrition, and environmental health, including poverty, being significant factors. Migration refers to the movement of people from one place to another with the intention of settling there. Migration is often permanent, as suggested by Malthus's theory (1798), which states that if rapid population growth is not controlled, natural resources will sooner or later be depleted due to the inability to meet the demands of the massive population explosion. This will result in disease outbreaks, famine, and various other human sufferings.

Hauser & Duncan (1959) concludes that poverty emerges from the inability of labor force to work efficiently as there was an incompatibility of the labor force education and the labor that was done. Most number of population increase in Indonesia comes from the poor. In response to this, there wasn't really an increase in other things such as education, healthcare and wealth. This would cause the poor to be unable to gain a good healthcare and education to suffice their life. These conditions affect pregnant mom more so than other because poor healthcare and malnutrition while pregnant would affect the baby and mostly would give birth to baby that was not normal. Hence, infant mortality rate and maternal mortality rate in poor family tend to be huge.

There are three main reasons why rapid population growth will actually slow down development progress, namely: (1) rapid population growth will make it difficult to choose whether to increase current household consumption or prepare for future consumption which will certainly be higher than before; (2) a large number of countries still depend on the agricultural sector, therefore rapid population growth will disrupt the balance between supply and demand; and (3) as the population grows rapidly, it becomes increasingly difficult to improve social and economic conditions.

CONCLUSION

The results of this study reveal that population size does have a long-lasting influence on poverty rates in DKI Jakarta during 2017-2022.

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