The Effect of Population Growth on Economic Growth: An Evidence from Indonesia

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Abstract

Concerning its economy, one significant strength of Indonesia's demographic composition is that the nation has a large number of populations. It means that a large workforce makes it important (educated workforce) to obtain higher skills and be absorbed by employment opportunities. In line with the important number of populations, this study seeks to examine the effect of population growth on Indonesia's economic growth. This study is designed using a quantitative approach through time series data were collected from the Indonesian Central Bureau of Statistics. The data analysed using simple linear time series regression model assisted by econometric software, namely EVIEWS. This study showed that population growth has a significant positive effect on Indonesia's economic growth. In conclusion, we have successfully identified that population growth has contributed significantly to Indonesia's economic growth.

1. Introduction

Economic growth was a process of increasing the economy's production capacity comprehensively and continuously or continuously over time, to result in a higher level of national income (Sukono et al., 2019; Todaro, 2000). According to Zakaria (2009), economic growth was one of the most important indicators in analysing economic development in a country. Economic growth shows the extent to which economic activity will generate additional public income in a certain period. Since economic activity is a process of developing production factors to produce output, this process will result in a flow of remuneration for the community's production factors. With the existence of economic growth, it is expected that people's income as the owner of production factors will also increase. Economic growth has theoretically influenced by population (human resources), natural resources, physical capital, and human capital (Mankiw et al., 2009). As one of the factors affecting economic growth, the population's primary role is to provide labour. Far away, people with the quality of superior human capital will be a more productive workforce. As a country with a large population, Indonesia was expected to take advantage of this population explosion as a booster of economic growth (Purnamasari, 2015). The population growth rate and economic growth information can be seen in Table 1 below:

Table 1. The Rate of Indonesian Population and Economic Growth (2009 – 2018)

Year	Population growth (%)	Economic growth (%)
2009	1,22	4,6
2010	1,46	6,2
2011	1,44	6,2
2012	1,41	6,0
2013	1,37	5,6
2014	1,35	5,0
2015	1,31	4,9
2016	1,27	5,0
2017	1,23	5,1
2018	1,19	5,2

Source: Central Bureau of Statistic, Indonesia, (2019)

Table 1 highlights the population and economic growth rate in Indonesia from 2009 to 2018. It illustrated an increase in population growth from 1.22% to 1.46 in 2010, the economic growth also rises from 4, 6% in 2009 to 6.2% in 2010. It portrays that an increase follows the increase in population growth in economic growth. Also, population growth had decreased continuously to be 1.19% in 2019. Meanwhile, the economic growth had declined for 4 consecutive years from 2011, which had not changed. Then it decreased to 4.9% in 2015. However, economic growth again experienced an incline from 5.0% in 2016 to 5.2% in 2018. The number of populations is an essential indicator in a country. The classical economists who Adam Smith pioneered even considered that the population was a potential input that could be used as a production factor to increase a household company's production.

Population growth, according to Purnamasari (2015), could hinder economic development. Population growth that is higher than the increase in output will reduce income per capita. Population growth also hampers economic development when available jobs are few. An increase in population without an increase in employment will increase the number of unemployed. Besides, natural resources relatively limited and tend to constant may not be sufficient to meet the population's needs if the population increases persistently.

On the other hand, the population influences the output produced by an economy. The quantitative dimension of the population plays a role in providing labour. The larger the population, the more labour an economy, the higher its output. The qualitative dimension of the population is related to the quality of human capital embodied in a workforce. A workforce with superior human capital quality will be more productive to contribute to the economy. Population growth had a positive impact on economic growth. Purnamasari (2015) stated that a large population would positively affect economic output if the population has superior human capital quality. The positive effect of population density on output occurs when high population density encourages human resources accumulation. This study, therefore, aims to determine the effect of population growth on economic growth in Indonesia.

2. Literature Review
2.1 Economic Growth
Economic growth defines an increase in people's per capita income regardless of whether there is a change in the economic structure or not (Amalia, 2007). Economic growth can be interpreted as the development of economic activities that cause increased goods and services produced in society (Zulham et al., 2019; Sukono et al., 2019; Muhammad et al., 2018). The term economic growth describes or measures the achievement of the development of an economy. In actual economic activity, economic growth meant the fiscal development of the production of goods and services in a country. For instance, the increase and production of industrial goods, infrastructure development, increase in the number of schools, increase in service sector production and increase in the production of capital goods (Harahap et al., 2019; Zulham et al., 2019; Sirojuzilam et al., 2020; Sukirno, 2008).

The perspective of classical economists suggested that four factors influence economic growth, such as (1) population, (2) total stock of goods and capital, (3) land area and natural wealth, and (4) the level of technology used (Kuncoro, 2004). According to Todaro (2003), there were three main factors in economic growth, such as (i) Capital accumulation will occur if there is saved a portion of current income that is then reinvested to increase output in the future. Capital accumulation is all investments in land, fiscal equipment and human resources, and infrastructure investment, as roads, electricity, clean water, sanitation and communication facilities, to support productive economic activities. (ii) Population growth associated with an increase in the workforce has traditionally been considered as a positive factor in stimulating economic growth. It means that the more the workforce, the more productive the workforce, and the larger the population is, the more potential the domestic market increases and (iii) Technological advances are caused by changes in old technology being transformed into new technology.

According to Suparmoko (2000), measuring the progress of an economy required precise measuring tools. As for several measuring tools for economic growth, such as (i) Gross Domestic Product (GDP), or at the regional level it is called as Gross Regional Domestic Product (PDRB) is the amount of final goods and services produced by an economy in one year and expressed in market prices. (ii) Gross domestic product per capita or gross regional domestic product per capita at a regional scale can be used as a better measure of economic growth since it reflects more accurately the welfare of a country's population than the value of PDB or PDRB only. (iii) The income per working hours is the best tool for measuring the progress of an economy, usually, a country that has a higher level of income or wages per working hours than the wages per working hours in other countries for the resemble type of work, it can be said that the former is more developed than the latter. (iii) Life expectancy has a positive correlation with the level of PNB per capita. In a high level of income per capita, people will be able to gain a good quality of life, including food, housing, clothing, recreation, etc. Briefly, the level of health will be high as well. The average life will be long and (iv) Human Development Index (HDI) is a composite indicator for three criteria, such as health (measured by life expectancy at birth), knowledge (measured by literacy rates and the average length of schooling, and income (measured by purchasing power parity).

2.2 Population Growth
According to BPS (2005), population growth was a change in population growth in a certain area and time from the previous time. The rapid population growth poses serious problems for both welfare and development. Consequently, if not balanced with high economic support, the large population will cause various problems such as poverty and instability of the national condition. For this reason, efforts to suppress growth and increase population growth from year to year need to be carried out to provide facilities and infrastructure. The development of quality human resources can reduce population growth as an important step in accelerating the rate of economic growth. According to Sukirno (2011), population growth would increase community prosperity and vice versa. Todaro (2000) said that population growth encourages economic, sociological, and psychological problems closely related to backwardness and hinder the prospect of a better life. The things that needs to reduce is the high population growth, such as (a) Promoting the family planning program (KB) to limit the number of children in a family in general and in mass, to reduce the number of births and (b) Postponing the marriage period to reduce the number of high birth rates. Generally, Mulyadi (2002) categorised three main factors that affect population growth: Fertility as a demographic term is defined as the real reproductive result of a woman or women group. In other words, fertility refers to the number of babies born alive. Mortality is one of the three demographic components that can affect population change. The size of death shows the number or index used to determine the level of death of a population and Migration is the movement of population to settle from one place to another beyond political / state boundaries or administrative boundaries within a country.

2.3 The Effect of Population Growth on Economic Growth
The population is a factor that influences regional economic growth (Neni, 2000). Population growth puts negative

pressure on output growth (GDP). Barthos (1990) stated that the effect of population growth on economic growth appeared basically in the form of:

Residents as consumers
The most important condition for balanced economic growth is that society's goods and services are needed by society because it is the sole consumer of goods and services. In this case, the population is the main factor of economic growth. The increase in population growth creates an increase in demand which in turn encourages accelerated economic growth. The effect will arise if the population's income is high so that some of the incomes are not directly spent but stored in household savings, which is a potential source of expansion of production.

The population as a source of labour
Population growth is a new source of employment. Briefly, it is a factor of economic growth. In this case, the workforce can work productively and finally can encourage economic growth. As a result of economic growth, people's livelihoods will have improvements, increasing work productivity. A more meaningful effect of population growth on economic development is given by the population, which acts as a labour source. In this sense, the population is a source of productive energy on the one hand, which guarantees economic development. On the other hand, guaranteeing full employment opportunities for existing workers is the main condition for their development. The population has multiple functions in the economy. In the context of the market, it exists both on the demand and supply sides. On the demand side, residents are consumers, the source of demand for goods and services. On the supply side, residents are producers; if they are entrepreneurs or traders or workers, they are only workers.

In development, the perspective on the population was divided into two; some considered it an obstacle to development, while others suggested it as a trigger for development Dumairy (1996). In 2008, Jhingan pointed out the bad effect of high population growth on the economy, income per capita. Astuti, (2015) stated that the population growth tends to slow down per capita income in three ways, such as (i) increasing the population burden on land. (ii) increasing consumer goods because of the lack of supporting factors to increase their supply and (iii) the decline in capital accumulation. With the increase in family members, costs will increase. This condition will be worse if the percentage of children in the whole population is high because children only spend and do not add to the product. The number of children responsible for the family is greater than the number of those who produce so that income per capita is low. Based on the theory, the hypotheses or estimates of this study are:

H_o: Population growth does not affect economic growth in Indonesia.
H_a: Population growth affects economic growth in Indonesia.

3. Methodology
The data analysis method used in this research is quantitative, such as statistical data collection to facilitate the calculation using statistical data. The quantitative research was a study that uses numbers in data presentation and analysis using statistical tests (Saebani, 2007). To investigate the effect of population growth on economic growth in Indonesia, we applied a simple linear regression model with the Eviews program's assistance. The formulation of the simple linear regression model in this study is as follows:

$$Y = a + bX + e$$

Where,
Y = Economic growth
a = Constant
b = Regression coefficient
X = Population growth
e = *Error Term* (Confounding Variable)

4. Results and Discussion
To examine whether there is an autocorrelation or not, we performed the Breusch-Godfrey Test or Langrange Multiplier (LM) Test. From the LM test results, if the Obs*R-squared value is greater than the X^2 table value with a probability $X^2 < 5\%$, it confirms that the model contains autocorrelation problems. Likewise, on the other hand, if the Obs*R-squared value is smaller than the X^2 table value with a probability $X^2 > 5\%$, it confirms that the model has no autocorrelation problems, (Sukmaraga, 2011). The results of autocorrelation testing with the LM Test method, as seen in Table 1 below:

Table 2. The result of autocorrelation testing

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	3.965749	Prob. F(2,6)	0.0799
Obs*R-squared	5.693213	Prob. Chi-Square(2)	0.0580

Table 2 displays the result of autocorrelation testing. The Obs*R-squared value as much as 5.693213 is smaller than the X^2 table value as many as 16.91898 with a probability $X^2 > 5\%$. In conclusion, the model in this study is free from autocorrelation problems. Economic growth variable as the dependent variable is influenced by population growth as an independent variable. It is evidenced using simple linear regression analysis to examine the effect of population growth (X) on economic growth (Y). Based on the estimation results using the EViews program assistance to the variables under study, the following results are obtained:

Table 3. The result of Hypothesis testing

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.320966	1.545033	-0.854976	0.4174
Population Growth	5.057333	1.163321	4.347323	0.0025

R-squared	0.702594	Mean dependent var		5.380000
Adjusted R-squared	0.665418	S.D. dependent var		0.578888
S.E. of regression	0.334847	Akaike info criterion		0.826568
Sum squared resid.	0.896978	Schwarz criterion		0.887085
Log likelihood	-2.132838	Hannan-Quinn criter.		0.760181
F-statistic	18.89922	Durbin-Watson stat		0.818631
Prob(F-statistic)	0.002454			
t-table	2.30600			

Table 3 shows a constant value as many as -1.320966 and population growth (X) 5.057333. The model described that the constant value (a) has a coefficient of -1.320966, meaning that if the population growth variable is considered constant, then economic growth in Indonesia has decreased by 1.3%. The population growth coefficient (b) is of 5.057333, which means that if population growth is increased by 1%, economic growth will increase by 5.1%, assuming other variables are considered constant. The t-test is conducted to see the significance of the independent variables' effect on the dependent variable by assuming the other independent variables are constant. The test is used with the decision criteria if t_{count} is greater than t_{table}, the independent variable partially affects the dependent variable, and vice versa, if the t_{count} is smaller than the t_{table} value, the independent variable partially has no effect on the dependent variable. Based on the test results as highlighted in Table 3, it depicts that population growth (X) has a t_{count} value of 4.347323 with a significance value of 0.0025 while the t_{table} value with (df) = nk (10-2 = 8) at $\alpha = 0.05$ is obtained a value of 2.30600. Then $t_{count} > t_{table}$, namely 4.347323 > 2.30600 with a significance value < 0.05, So the decision is that a hypothesis accepts Ha and rejects Ho, which means that population growth partially affects economic growth in Indonesia.

Also, Table 3 above shows the R^2 value is 0.702594 (0.703), it means that the influence of the population growth variable on economic growth in Indonesia is as many as 0.703 or 70.3%, while the remaining of 29.7% is influenced by other variables not examined under this research model. Research results found that the population growth variable influenced economic growth in Indonesia. This is evidenced by the t_{count} value as many as 4.347323 with a significance value of 0.0025 while the t_{table} value with (df) = n-k (10-2 = 8) at $\alpha = 0.05$ obtained a value of 2.30600. So $t_{count} > t_{table}$, namely 4.347323 > 2.30600 with a significance value < 0.05, briefly, the decision is that the hypothesis accepts Ha and rejects Ho. This study's results are in line with previous research conducted by Rosyetti (2009), showing that population growth influences economic development. Furthermore, based on the estimation results, this study has an R^2 (R Square) value as many as 0.702594 (0.703), which means that the population growth variable's influence on Indonesia's economic growth is as much as 0.703 or 70.3%. In comparison, the remaining of 29.7% is influenced by other variables, which not considered in this research model.

5. Conclusion

This study showed that population growth has a significant positive effect on Indonesia's economic growth. In conclusion, we have successfully identified that population growth has contributed significantly to Indonesia's economic growth.

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Acknowledgements

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