Economic Growth: Analysis of Health, Education and Standard of Living in East Java 2012-2016

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Abstract: Economic growth is the main important thing in order to develop the regional development. East Java has the potential to develop its economic growth because of one of the most populous provinces in Indonesia. This advantage means East Java has more human capital rather than other provinces in Indonesia. In the other hand, economic growth in East Java is not spread evenly. It indicates that each region has varied human capital with different conditions in health, education and standard of living. The objective of this study is to analyze empirically the effect of health, education and standard of living to economic growth in East Java. The data for this paper were obtained from Statistics – East Java (*Jawa Timur*) and consisted of 38 regencies/municipalities. This paper aims to present the use of panel data analysis that use random effect model in order to assess economic growth under the influence of determinant factors. Its main determinant factors are health, education and standard of living. This study finds that health, education and standard of living affect the economic growth in East Java. Implications of the study are the increase of education and standard of living can be encouraged the economic growth in East Java.

Keywords: East Java; economic growth; human capital

1   Introduction

Economic growth is one of the fundamental indicators of a country. The economic growth of a country is supported by economic growth in each region. The sustainable economic growth that can be enjoyed by all people will accelerate the development process of a region. East Java is one of the provinces in Indonesia that has the potential to increase its economic growth because it is one of the most densely populated provinces. The advantage of East Java's human capital can be maximized to support its economic growth through health, education and standard of living. The development of East Java's economic growth is shown in Figure 1:
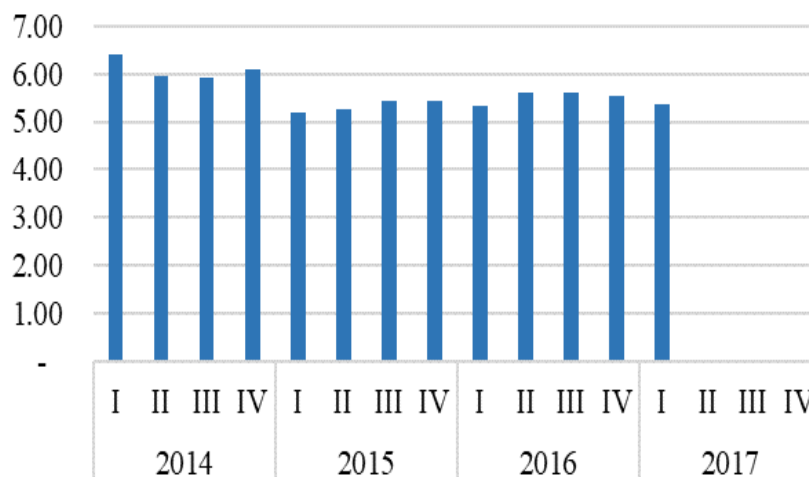

Figure. 1. Economic growth in East Java (%), 2014QI-2017Q1

As indicated in Figure 1, East Java's economic growth tends to fluctuate during the period 2014Q1-2017Q1. It's declined in 2015 and began to increase again in 2016. The condition of the national economic stability is one

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of the causes of East Java's economic growth fluctuating. The condition of health, education and standard of living in East Java can be seen in Figure 2.
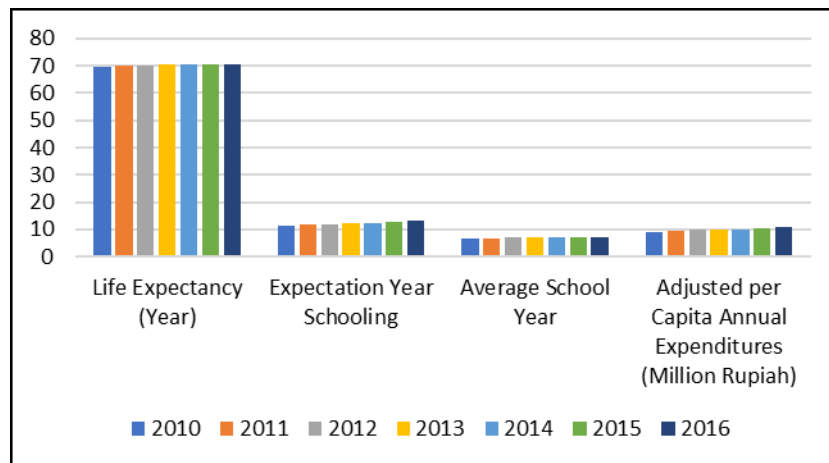

Figure. 2. Life expectancy (year), expectation year schooling, average school year and adjusted per capita annual expenditures in East Java, 2010-2016

According to Figure 2, East Java's life expectancy, expectation year schooling, average school year and adjusted per capita annual expenditures continues to increase from 2010-2016. This reflects a positive condition on the quality of human capital in East Java. East Java has enormous potential to increase its economic growth through increasing the quality of human capital as one of the most populous provinces in Indonesia, but that improvement in quality of human capital is not always followed by economic growth which tends to fluctuate. The role of the government in efforts to increase economic growth through the quality of human capital through health, education and the standard of living certainly deserves special attention.

Nowak & Dahal (2016) finds that secondary and higher education contributes significantly to economic growth in Nepal. The elementary education also positively influences economic growth but statistically less significant. There is a high contribution of education to economic growth and ultimately socio-economic development of developing countries. (Babatunde, 2003) shows that the effect of health measured by life expectancy is significant and positive on economic growth even after controlling for initial levels. Quantitatively, a 1 percent change in the life expectancy rate increases the level of growth by 0.876 percent. Audibert, Motel, & Drabo (2011) finds health remains an important determinant of economic growth. There are other limiting global factors to growth other than health such as education quality.

Bhargava, Jamison, Lau, & Murray (2001) investigates the effects of health indicators such as Adult Survival Rates (ASR) on economic growth at 5-year intervals in several countries. The finding showed positive effects of ASR on economic growth in low income countries. Malik (2006) shows that the health do not have a significant effect on economic growth and the correlation between the health indicators do not show high correlation. (Kotásková et al., 2018) finds that there is compelling evidence proving a positive effect between the levels of education and economic growth in India which might influence governmental actions and shape the future of India. The higher education quality, the greater impact of education on the economic growth.

Education quantity when measured by enrolment ratios, unambiguously influences economic growth. The government expenditure effect on economic growth is largely indirect through its impact on improved education quality. Excluding private-public enrolment ratio all other education components in term of quality and quantity had not favourable effects on economic growth. The contribution of secondary school enrolments to economic growth has been shown to be negative. Noticeably, a more growth in higher education graduate students in technical colleges and universities related negatively with economic growth.

According to the preconditions, this paper objective is to analyse empirically the effect of health, education and standard of living in East Java that consisted of 38 regencies/municipalities.

2 Methods

2.1 Data and variables

The definitions of the variables that are used in this paper as follows: (a) Economic growth in East Java is approached by the gross regional domestic product at 2010 constant market prices in East Java that consisted of 38 regencies/municipalities, with the unit of measurement is Rupiah, EG. (b) Health in East Java is approached by the life expectancy in East Java that consisted of 38 regencies/municipalities, with the unit of measurement is year, H. (c) Education in East Java is approached by expectation year schooling (EYS) and average school year (ASY), with the unit of measurement is index, E, which is standardized by formula as follows:

$$I_{EYS} = (EYS - EYS_{min}) / (EYS_{max} - EYS_{min}) \tag{1}$$

$$I_{ASY} = (ASY - ASY_{min}) / (ASY_{max} - ASY_{min}) \tag{2}$$

$$Education = (I_{EYS} + I_{ASY}) / 2 \tag{3}$$

(d) Standard of living in East Java is approached by adjusted per capita annual expenditures in East Java that consisted of 38 regencies/municipalities, with the unit of measurements is Rupiah, S.

The data are collected quarterly from 2010 to 2016 that consisted of 38 regencies/municipalities in East Java.

2.2 Empirical models

To achieve the research objective, this paper employs Random Effect Model (REM), which is useful to estimate the effect of independent variables to dependent variable by accommodating the limitations on Fixed Effect Model (FEM) through Least Square Dummy Variable (LSDV) which are accommodated through disturbance term uit in REM. Determination of the REM is done by testing the model first between pooled Ordinary Least Square (pooled OLS) model or common model with FEM by using Redundant Fixed Effect Test – Likelihood Ratio. The next step is to test the model between FEM and REM using the Hausman Test.

(Gujarati, 2009) The basic idea is to start with equation:

$$LEG_{it} = \theta_{1i} + \theta_2 LH_{it} + \theta_3 LE_{it} + \theta_4 LS_{it} + u_{it} \tag{4}$$

where L indicates the natural logarithm operator. Instead of treating θ1i as fixed, we assume that it is a random variable with a mean value of θ1. The intercept value for an individual company can be expressed as:

$$\theta_{1i} = \theta_1 + \varepsilon_i \qquad i = 1, 2, \dots, N \tag{5}$$

where εi is a random error term with a mean value of zero and a variance of σε2. Substituting equation (5) into equation (4), we obtain:

$$LEG_{it} = \theta_1 + \theta_2 LH_{it} + \theta_3 LE_{it} + \theta_4 LS_{it} + \varepsilon_i + u_{it} \tag{6}$$

$$LEG_{it} = \theta_1 + \theta_2 LH_{it} + \theta_3 LE_{it} + \theta_4 LS_{it} + w_{it} \tag{7}$$

$$w_{it} = + \varepsilon_i + u_{it} \tag{8}$$

3   Result and Discussion

Table 1 displays a summary of model determination. From Table 1, it can be seen that the first model determination is determining whether it's pooled OLS model or FEM will be used, where the results are determined by the Redundant Fixed Effect Test – Likelihood Ratio. From this test result we got a significant F value which means that FEM is better than the pooled OLS model or in other words FEM provides significant added value compared to the pooled OLS model. The next test is to determine whether FEM or REM that will be used, where this result is determined by the Hausman Test. The Hausman Test uses Chi-square distribution. From the result we found out that the Chi-square value was not significant so the model used was REM.

Table 1. Estimation result of model determination.

Test	Result	Model
Redundant Fixed Effect Test – Likelihood Ratio	Significant	Pooled OLS Model / Fixed Effect Model*
Hausman Test	Not significant	Fixed Effect Model / Random Effect Model*

Note: *) Model chosen.

Table 2 displays a summary of REM estimation. It can be seen from Table 2 that E and S are both significant at 1 percent level of confident, ceteris paribus. In the other hand, H is significant at 5 percent level of confident, ceteris paribus. The influence of H, E and S to EG can be explained based on Table 2; the increase of

H by 1 percent lowers the EG by 0.545 percent, and vice versa. The E increases by 1 percent and EG increases by 0.046, and vice versa. The increase of S by 1 percent increases the EG by 2.008, and vice versa.

Table 2. Estimation result of REM: dependent variable is LEG.

Variable	Coefficient	t statistic
LH	-0.545	-2.080**
LE	0.046	2.923*
LS	2.008	23.187*

Note: *) significant at 1%, **) significant at 5%, ***) significant at 10% level of confident.

4. Conclusion

By employing quarter data with 38 regencies/municipalities observed, it can be empirically proven by the study that the effect of the health, education and standard of living to economic growth in East Java is real. It should be concerns by the government and policy maker that the quality of human capital can affected economic growth.

Education and standard of living must be improved, such as the development of facilities related to supporting education, increasing international cooperation between educational institutions such as educational scholarships to world-ranked schools or universities, scholarship for underprivileged students and persons with disabilities. It is also important to be noticed by the governments, the stability of the domestic economy include costs and prices related to adjusted per capita annual expenditures in East Java.

To produce more comprehensive research in the future, by some method limitations and data availability in this study, development can be carried out. For the improvement of the data and variables, extension of data coverage can be carried out and added other independent variables that are considered to affect economic growth, including both social and economic variables, such as unemployment, inflation, exchange rate, etc.

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