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The Effect of Demographic Bonus, Labor Force and Population Quality on Economic Growth in East Java 2016-2020

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Abstract

This study aims to discuss the effect of the demographic bonus, the labor force and the quality of the population on economic growth in East Java in the 2016 2020 time period. The independent variables from this research consist of demographic bonus as seen from the dependency ratio, labor force, and population quality as seen from the HDI. While dependent variable from this research is Economic Growth. The method used is panel data, where results of this research show the demographic bonus variable as seen from the dependency ratio has a negative sign on East Java's economic growth, the labor force variable has a positive sign and has an effect on East Java's economic growth, while the population quality variable has a positive effect on economic growth in East Java.

Keywords: Economic Growth, Demographic Bonus (Dependency ratio), Labor Force, Population Quality (HDI)

Introduction

Economic growth is the economic problem a region in a long period of time, in which economic growth measures the ability of a region in inter-year economic development (Eliza, 2015). To support the economic growth, the quality of the population of the region is needed. Population is the main wealth assets and at the same time it is the capital in building the country's economy. In the country's economic development, population is a very important variable. It is a long-term resource and asset owned by the country. The progress of a country can be measured and seen from indicators of a population such as population total, population growth, population composition, and population productivity.

According to Ray in Heryanah (2015) in his book entitled Economic Development explains that not only economic development that has an impact on the population, but the opposite is that changes in population structure affect economic development. From the population problem, the phenomenon of demographic bonus very important for society and economy. The demographic bonus itself is the dependency ratio that continues to decline between the productive age population and the non-productive age population, where the productive age population (15-64) has increased compared to the non-productive age population (0-14) and (65+). Demographic bonus caused by the declining number of births, for a long time it will reduce the ratio of the productive population so that the investment that was originally used to meet needs will decrease, and resources can switch benefits to increase economic growth and improve the family economy.

According to Todaro in Sunusi et al, (2014) traditionally the positive factors causing high economic growth are population and labor force growth. With a high number of productive workers will have an impact on increasing production. The labor force is people who offer services to contribute in producing goods or services, some are already active in producing activities (employed people) then some are in search of work (unemployment) (Syamsuddin, 2013). According to Sukirno in Syamsuddin (2013), in general amount of production is not uncertain, accompanied by a large increase in producing the same product. With a workforce that is able to fulfill and increase the production of goods or services, gradually the GRDP in

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an area will increase.

Then population development becomes one the indicator that affect on economic growth. Human resources or population in an area is a subset of variables in the population have a connection to the economy. Rains in Anggraini & Muta'ali (2013) states that the progress of human quality will have an effect on economic growth, where the population can be an aspect that can influence all profits to the fullest. Development progress is measured by several parameters and the most well-know is the Human Development Index (HDI). HDI was pioneered by UNDP in 1990, HDI serves to shiw measurable and representative human development progress (Pratowo, 2013). To assess the HDI, an index number of around 0 - 100 is applied, a number that is almost 100 means that the HDI are getting better. The high level of population quality in the productive age population determines the ability to absorb and manage sources of economic growth, with the technology is the most important means of increasing economic growth (Dewi & Sutrisna, 2014).

Materials and methods
Types of research
Descriptive exsplanatory is the type used in this research. In quantitative research, it usually uses an explanatory design, where in explanatory research is used to examine the connection between the hypothesized variables (Mulyadi, 2011).

Research Analysis Unit
Economic growth, demographic bonus, labor force and human quality in each district and city in East Java Province are the research units used. This research uses the data which is taken during period of 2016 to 2020. Then the locations on this research were samples from regencies and cities in East Java Province amounting to 27 sample units.

Data Types and Sources
Secondary data is the data used and consists of time series and cross-section data. The dependent variable concists of economic growth of East Java in 2016-2020. The independent variable consists of demographic bonus as viewed from the dependency ratio, labor force and population quality. This research discusses the effect of demographic bonus, labor force and population quality on economic growth in east java 2016-2020. Also, it uses the cross section method which is the province of East Java and with the time series data starting from 2016 to 2020. The equation model estimated is:

$$EG_{it} = \beta_0 + \beta_1 DB_{it} + \beta_2 LF_{it} + \beta_3 HDI_{it} + \varepsilon_{it}$$

Keterangan:
EG_{it} : Economic growth of district/city i in period t
DB_{it} : Demographic bonus of district/city i in period t
LF_{it} : Labor force of distric/city i in period t
HDI_{it} : Population quality of district i in period t
B_0 : Regression coefficient (constant)
i : *cross section*
t : *time series*
ε_{it} : coefficient of disturbance/error

Data Analysis Method
The method used is panel data. The panel data itself consist of cross section and time series. In panel data research, the same cross section unit will be measured in a certain period time, so it said that panel data has dimensions of space and time (Melliana & Zain, 2013).

Results & Discussion
Analysis Result
This research is to analysis and examine the effect of demographic bonus, labor force and population quality on economic growth in East Java in 2016-2020. To find out which model is the best among CEM, REM, and FEM in the panel data method by performing the Chow Test and Hausman Test. Chow test function to obtain the appropriate model is used whether CEM and FEM, then Hausman test function to obtain model is used whether FEM ro REM.

Tabel 1: Chow Test

Effects Test	Statistic	df	Prob.
Cross-section F	611.033269	(26,105)	0.0000
Cross-section Chi-square	678.493136	26	0.0000

In the Chow test, it is known that probability of cross-section F and the cross-section Chi-square is 0,000 where the probability is under α 0,05. Based on these results, it is known that H_0 rejected and H_1 accepted, so the appropriate model in the Chow test is *fixed effect models* (FEM).

Tabel 2 : Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	51.950745	3	0.0000

In the table 2, is known that the cross-section probability h0,000 where this porbability value is under 0,05, from these results it can be known that H_1 accepted while H_0 rejected, then the model appropriate model is FEM.

FEM Estimation Result

Tabel 3 : Fixed Effect Model (FEM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.622543	1.289838	3.583816	0.0005
X1	-0.007646	0.006006	-1.273089	0.2058
LOG(X2)	0.227232	0.108947	2.085701	0.0394
X3	0.043204	0.004067	10.62354	0.0000

$$EG_{it} = 4.4622543 - 0.007646 DB_{it} + 0.227232 LF_{it} + 0.43204\ HDI_{it} + \varepsilon_{it}$$
$$(0.2058)\quad(0.0394)\ (0.0000)$$

From these equations, the it can be describe as:
1. The constant has a value of 4.4622543, if GRDP in the research year increased by 4.4622543 with the assumption that the independent variable is constant.

2. The coefficient on the demographic bonus variable (DB_{it}) has a value of -0.007646, meaning that the DB_{it} variable increases by one percent, it will cause a decrease in the real GRDP variable (EG_{it}) by 0.007646

assuming the labor force and HDI variables are constant.

3. On the labor force variable coefficient (LF_{it}) has a value of 0.227232, If that the AK_{it} variable increases by one unit, it will increase real GRDP (EG_{it}) by 0.227232 assuming the demographic bonus and IPM variables are constant.

4. The coefficient on the population quality variable (HDI_{it}) has a value of 0.043204, meaning that the HDI_{it} variable increases by one percent. It will increase real GRDP (EG_{it}) by 0.043204 with the assumption that the demographic bonus and workforce variables are constant.

Classic Assumption
Normality Test
Normality test was conducted to see whether in the regression, dependent variable and independent are normally distributed or not. In the normality test the model used is *Jarque Bera* (JB), has a normal dsitribution if the test performed shows a probability result greater than α 0.05.
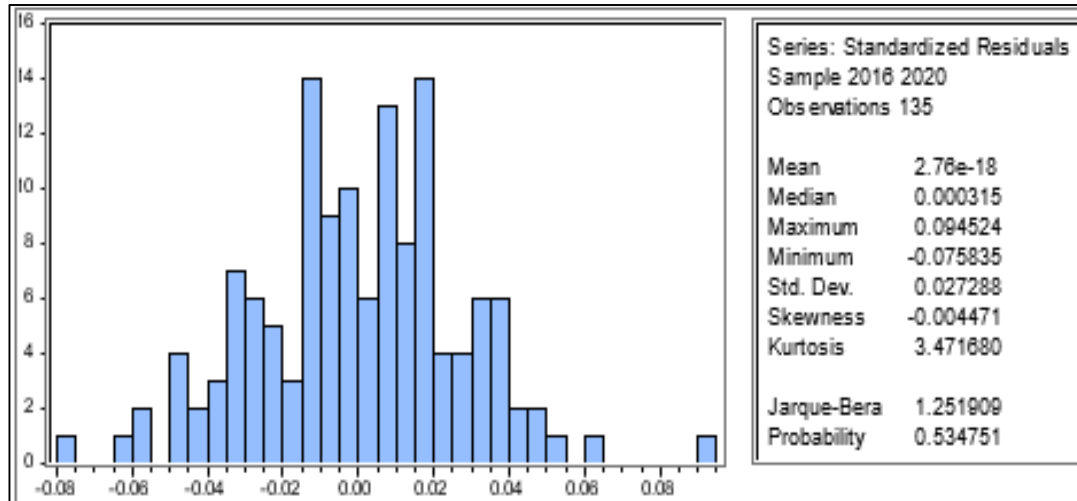
Fig.1: Normality Text

From the figur 1 show the probability value of 0.534751, meaning that the probability value more than α 0.05. this explains that the dependent and the independent variable, both are normally distributed.

Multicollinearity Test
In the Multicollinearity Test, if the result of correlation coefficient between independent variables is below 0.8 then the variable is safe from multicollinearity problem. Otherwise, if the correlation coefficient between independent variables is more than 0.8, then that variable has a multicollinearity problem.

Tabel 4: Multicollinearity Test

	X1	LOG(X2)	X3
X1	1.000000	-0.194311	-0.544490
LOG(X2)	-0.194311	1.000000	0.332995
X3	-0.544490	0.332995	1.000000

In the table 4, it is known that each correlation coefficient between independent variables is below 0.8. in the table proves that there is a problem in the multicollinearity test.
Heteroscedasticity Test

The result of heteroscedasticity test is known to have the chi-square probability value for each independent variable. The variable is free from the heteroscedasticity problem if the value of probability more than 0.05.

Tabel 5: Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.368820	0.698037	-0.528367	0.5984
XI	-0.000276	0.003250	-0.084951	0.9325
LOG(X2)	0.039036	0.058960	0.662079	0.5094
X3	-0.001710	0.002201	-0.777179	0.4388

From table 5 explains that the probability value of independent variable is above α 0.05. than this model is free from heteroscedasticity problem.

Statistical Test Result
F-Tes
The effect of independent variable and the dependent variable simultaneously is explained by performing the F-test (Melliana & Zain, 2013). It is stated that the independent variable has a effect on the dependent variable because the F-statistic probability is lower than 0.05.

Tabel 6: F-Test

R-squared	0.998964	Mean dependent var	10.34110
Adjusted R-squared	0.998678	S.D. dependent var	0.847922
S.E. of regression	0.030826	Akaike info criterion	-3.927758
Sum squared resid	0.099778	Schwarz criterion	-3.282141
Log likelihood	295.1237	Hannan-Quinn criter.	-3.665397
F-statistic	3492.380	Durbin-Watson stat	1.601749
Prob(F-statistic)	0.000000		

From table 6 it stated that the probability of the F-Statistic is 0.000000. if the probabilty value of F-statistical under α 0.05 so that H_0 is rejected and H_1 is accepted. So that it is known the demographic bonus, labor force, HDI variables have a significant positive impact on East Java's economic growth.

t-Test

The t-test is use to determine whether the independent variables on the dependent variable has a signifikiant effect on individuals (Melliana & Zain, 2013).

Tabel 7: t-Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.622543	1.289838	3.583816	0.0005
XI	-0.007646	0.006006	-1.273089	0.2058
LOG(X2)	0.227232	0.108947	2.085701	0.0394
X3	0.043204	0.004067	10.62354	0.0000

From the figure shown in table 7, it can besaid that the t-test on each variable is:

1. The effect of demographic bonus on East Java's economic growth.

From table 7 it is known that the value of probability 0.2058 is greater than α 0.05. It is known that there no effect betwen demographic bonus variable (DB_{it}) on economic growth variable (EG_{it}).

2. The effect of labor force on economic growth in East Java.
   From table 7 it is known that the probability value of 0.0394 is under α 0.05. It is known that there is a significant off the labor force variable (LF_{it}) on economic growth variable (EG_{it}).

3. The effect of HDI on economic growth in East Java.
   From table 7 it is known that the probability value of 0.0000 is under α 0.05, means that there is a significant positive effect on the population quality variable (HDI_{it}) on economic growth variable (EG_{it}).

R^2 Test

The coefficient of determination test is conducted to show the presentation of the dependent variable which can be explained by the regression equation (variation of independent variance).

Tabel 8: R^2Tets

R-squared	0.998964	Mean dependent var	10.34110
Adjusted R-squared	0.998678	S.D. dependent var	0.847922
S.E. of regression	0.030826	Akaike info criterion	-3.927758
Sum squared resid	0.099778	Schwarz criterion	-3.282141
Log likelihood	295.1237	Hannan-Quinn criter.	-3.665397
F-statistic	3492.380	Durbin-Watson stat	1.601749
Prob(F-statistic)	0.000000		

Table 8 shows that the value R^2 is 0.998964, meaning that 99% of the economic growth variables can be describe by the demographic bonus variable as viewed from the dependency ratio, labor force variable, population quality variable (HDI). albeit the remaining 1% be affected by other variables outside of the result.

Result

The effect of the demographic bonus viewed from the dependency ratio on East Java's economic growth

From the panel data regression analysis test, can be illustrated that coefficient of the demographic bonus variable on East Java's economic growth in 2016-2020 is -0.007646. meaning if there is an enchancement in the demographic bonus in East Java by 1%, it will lessen economic growth (GRDP at current prices) of -0.007646. The t-test of this research indicate that the demographic bonus variable (DB) has a probability of 0.2058 this value is greater than 0.05, meaning that the demographic bonus variable (DB) has no significant effect on economic growth variable (EG).

A study conducted by Fitriani et. al. (2012) states that the dependency ratio variable does not have a good effect on economic growth. That is, if the dependency ratio is higher, economic growth will be lower. The demographic bonus has a relationship with population, where in population theory does not always if the number of high population growth will have a good impact on economy. The result showed that the demographic bonus had a negative effect on economic growth. This is because the productive age population must sufficent the needs of the non-poductive age population, namely consumption needs and other basic needs.

The effect of the labor force on economic growth in East Java.

From the analysis of panel data test, it is known that the the labor force variable has a significant positive effect on economic growth in East Java in 2016-2020 is 0.22732. this means that if workforce in East Java has increased by one unit, it will increase economic growth by 0.22732. The t-test in this result explain that the value of probability is 0.0394 less than α 0.05, meaning that the labor force variable (LF) has a significant positive effect on the economic growth variable (EG).

As in the study conducted by Syukron & Fahri (2018) where the research represents that the labor force variable is significant at = 5% with a coefficient that has a positive effect, so can be explained that the high number of workforce will have an impact on increasing the provincial GRDP in Indonesia. The high number of the labor force have a positive impact on economic growth due to the large number of working labor force. From the tests, it is known that the East Java labor force has an positive effect on economic growth. This working workforce will produce maximum output which the result in the encourage aggregate supply which causes the economic to be boosted (Supartoyo, 2013).

The effect of population quality on economic growth in East Java

From the panel data analysis test, it represents that the variable of population quality as seen from the HDI on economic growth with a coefficient of 0.043204. Meaning if the HDI has increased by 1%, it will increase economic growth by 0.043204. The t-test on this variable indicate that

the probability value of 0.0000 less than α 0.05, meaning the population quality variable (HDI) has a significant positive effect on variable economic growth (EG).

The positive outcome on the HDI variable on East Java's economic growth are same as the study conducted by Izzah (2015). which shows that the HDI has a significant positive impact on economic growth in Riau Province, If the HDI is high, it will cause high economic growth. This high HDI will result in an increase in economic growth. This is because a high DHI determines the ability of the population to manage sources of economic growth both related to technology and institutions as an important tool in achieving economic growth goals (Dewi & Sutrisna, 2014).

Conclusions

1. The results illustrated that the demographic bonus can be spotted from the dependency ratio has a negative efeect on the economic growth of districts and cities in East Java Province. It can be answered that the demographic bonus has a negative effect and has no effect on economic growth in East Java. Due to the burden of the productive age population on the needs of the non-productive age population, so the income that should be saved and invested must be divided and reduced.
2. The results indicated that the positive result of the workforce had a good effect on the economic growth of districts and cities of East Java Province. This positive effect as a large number of labor force, including those who are already working, which will produce maximum output then it will encourage aggregate supply which causes economic growth to be boosted.
3. The results indicated that there was positive effect of the HDI on the economic growth of districts and cities of East Java Province. This is because the HDI in each district and city of East Java Province continues to increase from 2016-2020. Further, there are several regions with the standar for an upper-middle HDI. This is the cause economic growth because HDI is a contributor to the stable economic growth of a region.

Suggestion

1. From the results obtained from this study, it is known that demographic bonus can be a opportunity or even a disaster, where a high population does not guarantee economic growth. Bangkalan and Sampang distric are the area with the largest dependency ratio. Therefore, the municipality of East Java Province must be capable to manage the comunity by promoting family planning programs and improving health facilities. This is intended to keep track the number of number individuals in unproductive age does not increase too high so as the productive age population capable to set aside their income for investment and as savings.
2. As a result of the analysis data from this research, it is known that there are positive result of workforce variable on increasing economic growth in East Java. So the local authotityhad to be more cooperative with companies in providing job opportunities, by holding various events such as job fairs. In addition, it can provide entrepreneurship training to the community according to what the community has. Furthermore to opening up employment opportunities, this is quite

effective in the view of the fact that are some people who choose to become entrepreneurs but do not have sufficient experience or knowledge.
3. In the view of the fact that analysis obtained from this study, it is known the HDI variable on economic growth in east java has a positive impact. Even so, there are still areas with lower-middle HDI, such as Sampang Regency. Therefore, governments should improve health facilities as a supporter of life expectancy. Furthermore, local authorities must improve educational facilities. Moreover to repairing and upgrading facilities, socialization about the adventage of education and maintaining health should be provided with the purpose that the community is willing Maximizing the use of the available facilities.

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