

GDP, Demographic Transition and Savings in Indonesia

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AN EMPIRICAL ANALYSIS ON DEMOGRAPHIC TRANSITION AND SAVINGS IN INDONESIA

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ABSTRACT

The influence of demographic variables to the economic variable shows positive, negative, or neutral results. This study aims to demonstrate empirically the influence of demographic variables which were measured by the demographic transition as measured by the crude birth rate and the ratio of productivity and life expectancy to the economic variables measured by savings. Using the data for the period 1985-2014 and the technique of ordinary least squares analysis, this study supports the theory that demographic variables do not affect either positively or negatively or neutral to the economic variables.

KEYWORDS

demographic transition, savings.

INTRODUCTION

Demographic variables have various impacts to the development of economic variables within a country, it can be a positive (Kuznets, 1967), negative (Malthus, 1798), and neutral impacts (Kelley, 1988). The concept explains the various possibilities of demographic variables influences on the growth of economic variables. Another concept which also explains the relationship of demography and the economic growth is the theory of demographic bonus that supports the previous theory which stated that there is a positive relationship between demography and the economic growth.

Based on the conception of demographic bonus, the demographic transition (decreasing of birth rate and mortality), accompanied by the appropriate government policies, contributes positively on the economic growth through the mechanism of labor supply, human capital (including health can be measured by life expectancy) and savings.

Savings can be influenced positively or negatively by the demographic transition. Positively, the demographic transition will cause a change in the age structure that makes the condition increase the life expectancy. The increase of life expectancy allows a period of time to work longer so that it makes more savings. Negatively, the increase of life expectancy results in an aging population that causes the condition to decrease the amount of labor. This condition can be a burden on public financing, because the number of seniors is charged to the country/state through a state financing for the seniors causing the increase of state expenditures.

Indonesia is one of few countries in Asia experiencing the demographic transition, which can be measured by declining the crude birth rate during the period of the last thirty years. The crude birth rate in Indonesia in a row in 1975, 1980, 1990, 2000, 2010 were 42.9, 26.9, 20, 9, 17, 4, 17.9, and this numbers continue to decline until today. An inversely proportional trend occurs in the amount of domestic savings in Indonesia.

Starting from the thought of the possibility of positive, negative and neutral effects that can be caused by the demographic transition (as the demographic variable) on the domestic savings (as the economic variable), the study tried to evaluate the relationship of the two main variables in Indonesia.

REVIEW OF LITERATURE

Various theories explain the concept of savings with diverse approaches. Savings can be explained by using various approaches, for example: the consumption approach, using the development capital approach, and using the demographic approach. This research was conducted using a demographic approach. Therefore, the paper will present several theories that discuss the concept of savings based on the approaches.

THE SAVINGS CONCEPT WITH THE DEMOGRAPHIC APPROACH

As explained previously, there are three opinions expressing about the relationship between the growths of demographic variables with the economic variables (Kuznets, 1967; Malthus, 1798; Kelley, 1988). Another theory also states the relationship between the demographic variables (demographic transition) and economic variables (one of them is saving) that is, the demographic bonus theory proposed by Bloom and Williamson (1997).

According to Ananta, Pendit and Wongkaren (1994), the demographic transition consists of three aspects, namely the fertility transition, mortality transition, and transition mobility. The fertility and mortality transitions are vital transitions. The fertility transition can be seen from the declining the birth rate, such as the Crude

Birth Rate and Total Fertility Rate, while the mortality transition can be seen from the decline in death rates, such as the crude death rate and the infant mortality rate.

The demographic transition leads to changes in the age structure, adding the age of the labor force and reducing the age of not workforce. Besides, the demographic transition also enables the achievement of life expectancy to become longer, so the period of work will be much longer, and it is expected to keep more savings. Another theory explains that the age structure, specifically the productive ratio, has a positive effect on savings. (Modigliani,1966).

IMPORTANCE OF THE STUDY

There are quite many researches on the demographic variables and other variables that influence the performance of saving. One of them was carried by Lindh (1999), which states that the age structure will affect savings. The research conducted by Lindh found that the distribution of the age structure of the population has an impact on economic growth, and economic growth is also affected by the age structure which in turn affects the aggregate savings again.

In addition, previous studies conducted by Kokila, (1994) & Nasir and Tahir (2011) states that income (wage) has an effect on savings, since savings are part of revenue. Other research conducted by Daulay (2011) & Huigins (2011) reported that a positive effect on the savings rate, as well as the research by McDonald (2001) and Berry and Kim (2002) which states a factor which influence savings is life expectancy.

This study differs from previous studies because it was done on the empirical condition that occurs in Indonesia in a long time period, ie: for thirty years, and was dominated by the influence of the demographic variables (number of births, the productive and life expectancy ratio) on economic variables (savings).

RESEARCH METHODOLOGY

TYPES, SOURCES OF DATA AND METHODS OF DATA COLLECTION

The main analysis units used in this study were the birth rate, the ratio of productive age, wages, investments, interest rates, educations and savings in Indonesia. This study used secondary data in the form of time series data (i.e. data were arranged chronologically based on time or collected from time to time on a particular variable in Indonesia), obtained from the various competent institutions and had authority to publish the data to the interests of various parties, including the Central Bureau of Statistics. Data collection methods used in this study was the documentation method, in which, the data used were the birth rate, the ratio of productive age, wages, investments, interest rates, education and savings in Indonesia in 1985-2014.

VARIABLES AND MEASUREMENTS

In this study, the researchers measured savings by using the data of domestic savings in Indonesia, as a dependent variable. While as the independent variable, the researcher observed the data variables of birth rate (as measured by the crude birth rate), the ratio of productive age (as measured by the ratio of the working population and the total population), and life expectancy, wages (as measured by minimum wage), and variables affecting savings, in the form of investment (as measured by domestic investment, PMDN), interest rates (as measured by the interest rate of Bank Indonesia, the BI rate), and domestic savings in Indonesia in the previous period.

To analyze the data, the researcher conducted two approaches, namely the qualitative and quantitative analysis techniques. The qualitative analysis technique was performed by analyzing and describing the discussion in this study based on theories on the literature. While, the quantitative analysis used was to analyze the data in the form of numbers on data collection. The quantitative analysis technique applied in this study was the multiple regression analysis with Ordinary Least Square technique to identify the effects of the crude birth rate, the ratio of productive age, wages, domestic investments, interest rates, life expectancy on domestic savings in Indonesia.

TEST INSTRUMENTS

The data collection was done by using secondary data, the validity and authenticity of the social research results were largely determined by measuring the instruments used. If measurement of instrument used was not valid or cannot be trusted, then the results of research conducted would not describe the actual reality. In accordance with the standards-making instrument, that was, before the test instrument was used as a research instrument, it had to be performed a classical assumption first. Therefore, the test was done by using four kinds of testing, ie test for normality, multicollinearity, and heteroskedasticity, and autocorrelation.

MODEL

The model used in this study was as following:

$$SAVS_t = d_0 + d_1 CBR_t + d_2 SR_t + d_3 MW_t + d_4 DINV_t + d_5 IR_t + d_6 LE_t + d_7 SAVS_{t-1} + e_{4,t} \quad (1)$$

RESULT AND DISCUSSION

STATISTICAL ANALYSIS OF MULTIPLE LINEAR REGRESSION EQUATION

Since the data used were time series data, there would be an autocorrelation so that the researcher needed to anticipate with the addition of the Autoregressive model of order $p = 1$ or AR (1). Mathematically, the formulation of a simultaneous equation model (4) to:

$$\log(SAVS_t) = d_0 + CBR_t + d_2 SR_t + d_3 MW_t + d_4 DINV_t + d_5 IR_t + d_6 LE_t + d_7 \log(SAVS_{t-1}) + e_{4,t} \quad (2)$$

THE CLASSICAL ASSUMPTION TEST

There are some classical assumptions that must be fulfilled. Terms in the classical assumption can be expressed: (1) the random variables and the normal distribution; (2) non multicollinearity; (3) non autocorrelation and homoskedasticity. The OLS assumption test was done in order to get the best model and appropriateness with the OLS assumptions, that was; the Best Linear Unbiased Estimation (BLUE). In this study, the test results on the classical assumption of OLS estimation concluded that the model has a residual Normal distribution, no multicollinearity, no heteroskedasticity, and no autocorrelation.

MODEL ESTIMATION

TABLE 1: TEST OF REGRESSION COEFFICIENT SIGNIFICANCE AND P-VALUE OF EQUATION WITH RESPONSE VARIABLE OF LOG(SAVS) (LOG SAVINGS)

Predictor Variable	Regression Coefficient	P-value
Constant	-2,248758	0,2011
CBR (Crude Birth Rate)	-0,009715	0,3164
SR (Support Ratio)	0,074109	0,1330
MW (Minimum Wage)	-1,91E-08	0,8766
DINV (Domestic Investment)	-6,46E-07	0,3941
IR (Central Bank Interest Rate)	0,009980	0,0189*
LE (Life Expectancy)	0,034840	0,4047
log(SAVS(-1))	0,774230	0,0000*
AR(1)	0,169637	0,5203

Source: data analyzed, 2016

*Significant for significant level (α) = 5%.

Model of simultaneous equation by using all variables as portrayed:

$$\log(SAVS_t) = -2,248758 + (-0,009715) CBR_t + 0,074109 SR_t + (-1,91 \times 10^{-8}) MW_t + (-6,46 \times 10^{-7}) DINV_t + 0,009980 IR_t + 0,034840 LE_t + 0,774230 \log(SAVS_{t-1}) + e_{4,t} \quad (3)$$

For the validation process, the researcher used the coefficient of determination (R^2) and Root Mean Square Error (RMSE). The determination coefficient (R^2) (at the output of R-Squared) was obtained 0.997340, which means that the diversity of SAVS variables which enabled to explain were CBR, SR, MW, DINV, IR, and LE

simultaneously/together 99.71% and 0.29% were explained by error or other variables not included in the regression model. In other words, the goodness of regression model formed was 99.71%.

In order to assess the goodness of the model, the researcher also used RMSE size, SSE value was obtained from the output value of **Sum squared resid**, and the value of *n* was the number of data observations and the *p*-value was the number of model coefficients. This model produced a good MSE value of 0.08465 (small). From the Table 1 output results, the test gave results and analysis that:

1. It was obtained that the regression coefficient for **IR** variable was 0.009980 (positive effect); meaning that, if there is an increase of 1 unit of **IR (Central Bank Interest Rate)**, it will be obtained the increase of the **log (SAVS)** value 0.009980 (or the increase of **SAVS (SAVINGS)** as $\exp(0.009980) = 1.009747197$); and vice versa, in case of a decrease of 1 unit of **IR (Central Bank Interest Rate)**, it will be obtained an impairment of **SAVS (SAVINGS)** 1.009747197, thus, it can be concluded that there is a significant influence of **IR (Central Bank Interest Rate)** on **SAVS (SAVINGS)**.
2. Based on the results of data processing, it was also found that, if an increase/decrease of 1 unit of each individual **CBR (Crude Birth Rate)**, **MW (Minimum Wage)**, **DINV (Domestic Investment)**, and **Communities (First Secondary School Enrollment)** to **SAVS (SAVINGS)**, then the value of **SAVINGS** will not be affected, in other words, there is no partial/individual effect of **CBR (Crude Birth Rate)**, **MW (Minimum Wage)**, **DINV (Domestic Investment)**, and **Life Expectancy (LE)** on **SAVS (SAVINGS)**.

FINDINGS

There is a positive and significant effect of the interest rate on the savings to support previous research carried out by Daulay (2011) & Huigins (2011). But it was not found a significant effect between crude birth rate on savings. Thus, it does not support the theory stated by Bloom and Williamson (1997). Likewise, when there is no influential minimum wage, domestic investment and life expectancy, it also does not support theories or studies proposed previously conducted by Kokila (1994) and Nasir and Tahir (2011), McDonald (2001), as well as research from Berry and Kim (2002).

Some reasons why these variables do not affect the domestic savings in Indonesia are even though Indonesia is experiencing a demographic transition, which **2** be measured by the declining of the crude birth rate, accompanied by the increasing of productive ratio and life expectancy, the increase was only the increase in terms of the number of people working compared to the total population in Indonesia.

If it is measured in terms of quality, the real productivity of labor in Indonesia is still low, since over 50% of the working population has the highest educational level of primary school, with a low minimum wage rates though there an increase in the minimum wage since the 1980s to the present. Obviously the low productivity of labor and a low minimum wage leads to low levels of savings that may be excluded from the income earned. Besides, the increase in the working population has not been followed by the improvements needed with the increasing of life expectancy, as there is a large number of unemployed in Indonesia, even there is an increasing number of the open unemployment. Based on the data from the Indonesian Central Bureau of statistics, during last year the number of unemployed increased 320 thousand inhabitants, in the period of August 2015 the open unemployment rate reached 7.56 million was higher than the number of unemployed in the period August 2014 7.24 million.

RECOMMENDATIONS

Based on the finding of this research, public need to raise awareness and start from themselves to achieve the state of planned population in both quantity and quality, so the decline in birth rates and rising life expectancy as demographic variables can contribute positively to the economic variables. Because both the government as an institution and the public in groups and individually need to realize that the poor condition of the population (number of births) and government policies that go with it, will have a long-term impact on the economy in Indonesia.

CONCLUSIONS

Results from this study support the theory previously proposed by Kelley (1988) which states that there is no positive or negative effect of demographic **3** variables on economic variables. Therefore, there is a recommendation for the **2** government to be more serious to create the conditions that can support the development of the birth rate and health (life expectancy) as a part of efforts to improve the performance of savings in order to use the window of opportunity to obtain a demographic bonus, so that Indonesia can reach an economic sustainability condition.

LIMITATIONS

This research has some limitations, for instance it has not included education as one of variable, since it is predicted the higher ones education, more likely he has more savings. This research also excluded the working population variabel, since there is a tendency that the working population has more savings than the unworking one.

SCOPE FOR FURTHER RESEARCH

1 Considering the limitation of this study, it is recommend to do further research using this type of research, theoretical basis, diverse variables and different methods, so you can find a number of new research that are useful in widening horizons and developing theories and knowledge that can be used as tools in solving the existing problems.

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