Does Demographic Transition Contribute To Economic Development? Case Studi In Indonesia

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Abstract— Population becomes an important instrument as a driver of development. The existence of a large population will contribute to creating a greater output and will have an impact on development in the long run. This study aims to determine the contribution of Indonesia's demographic profiles in future development. The results of analysis show that fertility, population growth, dependency ratio and life expectancy have a significant influence on Indonesia's development through GDP per capita. Suggestions that can be made to optimize the role of demographics in future development can be through improving the quality of human resources and from the fiscal side can be more optimized the role of government expenditure in building infrastructure to encourage the improvement of the quality of human resources.

Index Terms— Demography, GDP per kapita, Fertility, Mortality, Population Growth, Dependency ratio, Life Expectancy, GMM.

1 INTRODUCTION

Population becomes an important component in a development which acts as a subject and object of development. A country with a large population has the opportunity to get a demographic bonus that will play a role in a development such as Indonesia. Indonesia is noted to be the fourth largest population in the world after China, India and the United States with a total population of 265 million in 2017 (Worldbank, 2017). The concept of population is closely related to the Malthusian view which illustrates that the movement of high population rates must be balanced with food availability to minimize the emergence of socio-economic conflicts and maintain stability of prosperity (Malthus, 1798). Indeed, the population is one of the strongest components or subjects in economic development especially for developing countries such as Indonesia. This population growth will have a significant impact on welfare and the economy. If the quantity of the population is accompanied by its quality, it will have a positive impact on the economy and welfare. On the other hand, if there is imbalance in the quantity and quality of the population, it will have a negative impact and become a burden on the development of a country. The concept of Solow model (1956) can be a combination of Malthusian's views on the importance of population management or population and economic growth in the long run through observing capital accumulation, labour or population growth, and increasing productivity. One of the main components in the Solow Swam model is related to the availability of the population as the creator of the workforce as technology advances and the quality of the workforce grows (Accinelli and Brida, 2007). The phenomenon of population in Indonesia can be identified from the pattern of population structure based on age resulting from the 2010 population survey in the form of expansive type. The condition of this expansive pyramid confirms the condition of Indonesia's population which is dominated by productive age population (ages 15-64 years). Meanwhile, the non-productive age population between 0-14 years of age also shows a magnitude that dominates even though it tends to be lower (BPS, 2010). This situation is the basis of various institutions and institutions of population and national development in projecting opportunities for demographic bonuses. The role of the population with age structure according to Bloom and Williamson (1998) can provide opportunities for demographic reform that can encourage the progress of developing countries as well as contributors to development dividends. But the dominance of the age structure at non-productive age will actually hold back and slow down the course of growth and development of a country. The elements of population such as birth rates, mortality rates, dependency ratio and life expectancy in Indonesia are currently experiencing massive improvements (Hayes and Setyonaluri, 2015). Another thing that is of concern today regarding the age structure of the population is that it is possible to bring opportunities for bonus demographics which will be focused on the quality of the population that can be converted to productivity (Bappenas, 2017). Several empirical studies have strengthened that the demographic structure managed optimally in the long run will contribute positively to the development and economic growth of a country. The empirical study of Koduru (2016) conducted in India found that long-term population growth can have a positive impact on development. In addition, the role of social elements such as labor, unemployment and corruption perception index also has an impact on development in India. Another empirical discussion carried out in developed countries like Japan by Sundman (2011) actually shows different results. Demographic profiles such as life expectancy and dependency load ratio actually have a negative impact on Japanese economic growth. This result is also an affirmation that the Japanese government must be proactive in reducing demographic changes and policies related to in-migration. So it can be concluded that the demographic conditions experienced by developed and developing countries generally require treatments different. From theoretical studies, it originated from Malthus's growth theory and Neo-classical economic concepts which explained that the need for new growth that could accelerate a country's economy so that it would be possible to create new sources of growth, one of them through the role of demographic

elements. Then it was modified with the Solow Swan growth model that played the role of human capital as the driving force of the economy which was emphasized in the quality of human resources.

2 LITERATURE REVIEW

The economic growth approach of this study refers to the growth and framework of Malthus and Neoclassical theories which tend to test declining determinants such as macroeconomics, demography, trade and human resources to recommend policies. The main study representing this research is Jayasooriya, (2017) and Eichengreen, et al. (2011, 2013). The Malthusian Theory of Population (1766) is a theory of exponential population growth and the growth of arithmetic food supplies. Thomas Robert Malthus was a pioneer of Malthusian and a British scholar who wrote and studied related to population principles. Malthus believes that through alternatives that alternatives in controlling and controlling the growth of population that cannot be balanced with food supply are important. The approach to growth slowdown was aimed at involving the economic growth of the Neo classical model with a slowdown in a certain period. Empirical study Aiyar et. al. (2013) who adopted the Solow model from the Neo classical school using its theoretical predictions. His research identified growth slowdown using the criteria for the difference between actual and potential growth. The Hausman study, et al (2005) shows different things by classifying the acceleration of growth using three criteria and using the dummy variable as the dependent variable called the probit model as well as the Jayasooriya (2017) study. The study uses a probit model to link growth slowdown with several variables used as determinants. The results confirm that the Solow model reduces economic growth to capital accumulation, labour, and productivity growth. Malthus's view reveals that the journey and dynamics of human life is an action that aims to maintain the existence of life, especially to develop innovation and mind set towards modern, standardized and quality human resources that can create better productivity (Ashraf and Galor, 2008). Population growth has a positive impact on living standards along with the consistency of labour productivity and income per capita which can encourage the creation of human qualities that are identified with technological advances. Malthus's opinion about the population was then adapted to Robert Solow's growth model which emerged in 1956 by criticizing the Harrod-Domar model which identified the assumption of a fixed proportion of labour and capital as the cause of the balance of growth which in fact balanced the two. The Solow model focuses on a closed economy where output Q is generated by labour factors (L0) and capital (K) with a constant scale of production. In the Neoclassical model of economic growth, it assumes that labour (L) grows at a constant rate of n> 0. And in a sustainable time, the growth rate (Accinelli and Brida, 2015) is defined as follows:

$$n= L/L= (\partial L/\partial t)/L$$

These results indicate that labour force growth grows exponentially and at each initial level L0 at a certain time t the labour force level becomes as follows:

$$L (t)=L_0 e^nt$$

Solow Model Classical Swan states that interest rates, technology, capital depreciation and population growth rates are assumed to be positively constant (Cai, et al., 2014). But their appearance in economic growth varies in different periods of time. The population graph shows an inverted U in a demographic transition which means that the demographic bonus is obtained when the productive age population dominates a population. Solow Swan modelling can also be used to detect short-term effects due to shocks from exogenous variables on economic growth. This Solow analysis was designed with the aim to see the interaction between the growth of the capital stock, the labour force and technological advances in creating output of goods and services in an economy. In the Chai, et al. (2014) it can be concluded that the economy with a low population growth rate has higher capital per capita and economic growth will also be stable if the rate of population growth also experiences stable growth as well. Other results also show that economies with high labour participation rates tend to have high capital per capita. These results indicate that the existence of a demographic transition that supports the emergence of demographic bonuses occurs when population growth decreases while the level of labour participation increases. This opportunity for bonus demography will encourage synergy between sectors which can be reflected in the increase in output productivity in the real sector and increased financial performance through savings and credit in business capital. Several empirical studies related to these domains have found that demographic structures dominated by productive age will improve the performance of the real sector in terms of the contribution of production output and the financial sector from the level of savings (Bloom and Williamson, 1998; Bloom and Canning, 2011). Peng (2006) simulation results show that the decline in labour caused by aging population will reduce the rate of economic growth in China by 2 % every year during the 2020s and 3 % every year during the 2040s. So it can be concluded that the demographic transition will affect economic growth through different routes including total labour supply, labour productivity growth, household consumption structure and the behaviour of savings and investment institutions. Demographic patterns are becoming increasingly diverse across economies such as developing countries, especially in Sub-Saharan Africa and South Asia. Demographic conditions in developing countries are expected to see sustained growth in the proportion of working-age people for decades, even when the working age population is declining in high-income countries and many other developing income countries (Lee 2003; World Bank 2015a; Cruz and Ahmed, 2016). This demographic dynamics can affect economic prosperity in several ways. First, changes in the working age structure of the population have an impact on income and savings growth, by changing the relative number of people in the economy who are able to work. Second, changes in the age structure at the household level can disproportionately benefit poor families, which usually have a larger proportion of child dependency ratios (Harkat and Driouchi, 2017). The

developmental impact of changing age structures is usually decomposed as a bonus demographic consisting of two decompositions (Lee and Mason 2006). First, it relates to the direct and indirect consequences of increasing the working age of the population. The impact when there is an increase in the age of the productive age population means that the economy will proportionally produce more productive things and increase output. Second, it appears that changes in age structures create space for higher savings and lead to increased investment in human and physical capital (Harkat and Driouchi, 2017). The demographic transition scenario begins with a reduction in mortality followed by a decrease in birth rates in a certain period of time so that the age structure of a population can be arranged. This dynamic in mortality causes a temporary increase in birth, but then birth and population growth will decrease (Lee, 2003). This demographic dynamics can have an impact on the level of per capita income and economic transition. This distinctive pattern of economic and demographic development can be identified through illustrations from Sweden which are referred to as historical prototypes of the transition phase (Sunde and Cervellati, 2014). One important instrument in optimizing the opportunities for bonus demography is through the quality of human resources, which in theoretical concepts is called the human capital theory. In the 1950s it was explained that the components of production factors that could produce output consisted of land, labour, physical capital and skill management (Mincer 1974, Becker and Thomes, 1986). Then in the 1960s, economic thinkers experienced great difficulties in explaining and describing the economic growth that occurred in the United States based on these factors or production components. The Becker study (1964), Schults (2007) and Mincer (1974) have opposed the assumption that the growth of physical capital is an important element in economic success. The basic premise of human capital theory states that people's learning capacity has a value comparable to other resources involved in the production of goods and services (Masson, et al., 2016). In organizational practice, this human capital theory shows an individual who invests in education and training so that it will improve skills that will have an impact on increasing productivity. So that indirectly in the long run will have an impact on the level of income and the welfare of individuals. A knowledge can lead to increased creativity and skills that can be developed through access to education and training services (Grant 1996a, Hatch and Dyer 2004). Several literature studies examine the effect of education on economic growth with cross-country data (Hanushek, et al., 2018). The results show that the level and quality of education have a positive effect on the level of economic growth indirectly. Masson's study, et al. (2016) assumes that human capital (past investment in health and education) will affect the function of aggregate production and economic growth.

3 DATA AND METHODS

3.1 DATA

This study uses secondary data in the form of time series data are sourced from the World Bank in the form of annual data from the years 1980-2016. The quite striking dynamics of the growth of the productive and non-productive population in the period 1981-2010 and the changes in the pyramid shape of the population in 1981, 2001 and 2011 underlie the taking of research years

3.2 METHODS

Several studies support the preparation of this research model specification such as Jayasooriya (2017) and Sundman (2011) to conceptualize the combination of the concepts of economic growth and demography as follows:

$$\frac{GDP}{Cap} = (Mort, Fert, DR, LE, LF, PopGrowth)$$

Transformed into econometric models so that:

$$\frac{GDP}{Cap} = b_0 + b_1 Mort_t + b_2\, Fert_t + b_3\, DR_t, + b_4 LE_t + b_5\, LF_t + b_6 PopGrowth_t + e_t$$

By explaining that it is a development proxy through GDP per capita, LF is the number of labor force; mort is a crude death rate (CDR); fert is a crude birth rate (CBR); DR is the dependency ratio; LE is life expectancy; PopGrowth is population growth and *e* is an error term. Then to find out the demographic effect on the economy in Indonesia, the Generalized Method of Moments (GMM) method is used, which is one of the analyses in the regression used to estimate the parameters in the variable. The GMM method is a strong valuation method for estimators with the principle of selecting estimation parameters in the sample so that the sample properties are equal to or close to the nature of the population which is equal to zero. Special traditional methods such as LS, IV, MLE are very difficult to prove the validity of the estimation so that the solution to overcome it uses Generalized Method of Moment (GMM), this shows that GMM is a method of regression analysis that is general and more detailed in estimating parameters sample (Soderlind, 2002: 95). The GMM method applies the principle of parameter value so that the sample moment value of the sample is almost the same or approaching the population moment value in the hope that the sample estimator value is close to zero (Verbeek, 2004: 151; Greene, 2012: 468). So this is one of the advantages in using the GMM method. In addition, the GMM method can also minimize the problem of heteroscedasticity and residual autorrelation**.** Greene (2012) in his book *Econometrics Analysis* revealed that GMM is the latest method derived from the *Method of*

Moment (MM). Both have the same goal of estimating data that ignores the distribution of its distribution functions and does not require assumptions like other classical tests. But MM and GMM have differences, if MM is used to estimate the data results there are moments whose numbers are the same as the parameters used, while GMM can estimate the data that results in a greater number of moments than the number of parameters. In the GMM method data is used with a certain time span so that behavioural changes can be detected in some very rare variables so that the change is referred to as the *moment* expressed in the parameter θ.

4 RESULTS AND DISCUSSION

In the GMM estimation, there is a unit root test to see the data stationary of each variable. In this test, it will be seen which level the variable will be stationary, whether at level, first different or second different. Table 4.1 shows the unit root test results as follows:

Table 4.1 Root Test Unit (Unit Root Test)

Variable	Level	First Different	Second Different
GDP/Cap	0.9934	0.0036*	0.0000
Fertility	0.1975	0.0092*	0.7207
Mortality	0.0007*	0.0000	0.0000
Dependency Ratio	0.0317*	0.8636	0.0004
Life Expectation	0.0108*	0.5763	0.0001
Labor Force	0.8922	0.0083*	0.0000
Population Rate	0.7318	0.5113	0.0001*

Note: (Stationary). Source: Attachment, processed: 2019*

The results of stationary data are presented in Table 4.1 which shows that each variable has a different level of stationarity data. At the sign (*), the level, columns *first different* and *second different* reflect that the variable data is stationary at different levels according to the sign (*). The level of stationarity of this data is indicated by the probability value in a level smaller than the alpha value of 5% or 10%. The test results show that stationary GDP per capita at the level of *first different* with a probability value of 0.0036. Furthermore, fertility and labour force are significant at the level *first different* with each probability of 0.0092 and 0.0083. Meanwhile, mortality variables, *Dependency Ratio*, and *Life Expectation* are stationary at the level with probability numbers of 0.0007; 0.00317 and 0.0108. Then for population growth variables have stationary data at the level *second different* with a probability number of 0,0001. After identifying the stationary data through the unit root test, the GMM method will then be estimated to see the direction of relations on demographic variables in influencing the Indonesian economy which is proxied from GDP per capita.

Table 4.2 Results of Generalized Method of Momment (GMM)

Variable	Coefficient	Probability	Annotation
dfertility	-10.73555	0.0496	Significant
mortality	-0.022242	0.3048	Not Significant
dlabor_force	-2.385341	0.5846	Not Significant
dpop_growth	14.23970	0.0037	Significant
depend_ratio	-0.266939	0.0000	Significant
life_expec	1.057052	0.0001	Significant

Source: Attachment, processed: 2018

Table 4.2 shows the results of data analysis using the GMM method to see how much influence and direction of the relationship between demographic profile variables affect GDP per capita. The results of the analysis from Table 4.2 show that fertility (baby birth rate), population level, dependency load rate and life expectancy have a significant influence on Indonesia's GDP per capita. Fertility has a probability value of 0.0496 smaller than the alpha value of 5% with a coefficient of -10.73555. This means that when there is an increase in the level of a unit of one then it will increase GDP per capita by 10.73555 and vice versa, when there is an increase in one unit it will reduce GDP per capita by 10.7355. Meanwhile, in the variable population level gives a positive significant effect with a probability value of 0.0037 with a coefficient of 14.2397. This result means that if the population level increases it will increase GDP per capita by 14.2397 and vice versa if the population level falls then it will reduce GDP per capita by 14.2397. In addition, the dependency ratio also has a significant negative effect with a probability value of 0.0000 and a coefficient of 0.26693. This means that when there is an increase in the dependency load rate, it will reduce GDP per capita by 0.26693 and vice versa. Meanwhile the life expectancy variable gives a significant positive effect on GDP per capita with a probability value of 0.0001 and a coefficient of 1.0570. This result means that when there is an increase in life expectancy it will increase GDP per capita by 1.0570 and vice versa. While the variables of mortality and the number of labour force does not have a significant effect on Indonesia's GDP per capita. The above results imply that demographic variables have a major contribution in the future in creating sustainable development in Indonesia. Development is one of the important elements for the progress of a country especially for developing countries like Indonesia. As knowledge develops, high-world institutions examine various alternatives to respond to the problem of development in the world so that a concept called sustainable development emerges. This concept was first coined by the world commission in 1987 that sustainable development is development that meets current needs without reducing future capabilities and needs. The concept of sustainable development plays three important components in development, namely society, environment and economy. One of the main components that become the subject and object of development is the component of society. In this case, the population is all individuals who shade a certain area and carry out various activities in it. The concept of sustainable development is also one of the focuses of development in Indonesia given that Indonesia is a developing country that is included in the classification of middle to lower income countries. According to a survey

conducted by the CIA World Factbook (2017), Indonesia is the fourth largest population in the world or around 265 million people, of which nearly 3.51 % of the world's population is in Indonesia. This condition indicates that the population component has a great opportunity to improve the development of a country if management can do it well and optimally. The age structure of the Indonesian population from year to year has experienced good development. This is indicated by a decrease in mortality and birth rates and a decrease in the burden of dependency rate (BPS, 2017). This result indicates that the age structure of the population which is dominated by the productive age population provides a great opportunity to create and optimize Indonesia's development performance. Indonesia is currently reforming the social protection system through the Master Plan for the Acceleration and Expansion of Indonesian Poverty Reduction (MP3KI). One of the targets is related to population issues in Indonesia, especially regarding community social security covering the quality of the population. Programs such as scholarship assistance for poor students and other conditional cash transfers are among the government policy instruments. This policy has become a comprehensive policy in the long term to improve the quality of the population and support the existence of demographic bonuses in Indonesia (OECD, 2013). In addition, to minimize the increasing burden of dependence especially on the elderly population, social security policies in the form of pensions are also a policy that is considered to have a contribution in development. The need for reform is driven by a variety of factors, such as an aging population, the weakening support of families and the growing middle class. So that in response to this phenomenon, the government tried to implement it in the form of a social protection system in the form of universal social insurance. This demographic transition occurs due to a decrease in fertility rates and increased life expectancy causing a rapidly aging population in Indonesia, such as in most Southeast Asian and Chinese countries (OECD, 2012b). The percentage of the population aged 65 years and over is projected to almost triple from 5.6% in 2010 to 14.9% in 2040. The old age dependency ratio will follow the same trend, up almost three times from 8.2 % to 22.2% compared to the same period (OECD, 2013). This condition results in an increase in the burden of dependency ratio, especially for non-productive age population aged 65 years and over. So that the policy response to the phenomenon of this aging population can begin several years before the emergence of an increase in the population of this old age. Changes in age structure are also expected to make Indonesia's demographic bonuses able to change and contribute to Indonesia's development in the future. Many developing countries are currently experiencing significant demographic transitions. This demographic transition is related to a decrease in mortality rates especially in child mortality, and a decrease in fertility rates which simultaneously produce changes in population growth and age structure (Lewis, 2018). Several studies carried out in the last few years have shown that changes in the age structure of the population and the concentration of population distribution within the spatial environment support economic growth in a region. The population grew at a rate of around 1,9 % per year from 1960-2007 while the working age population (population aged between 15 and 64 years) grew by around 2,2 % per year during that period. The ratio of the working age population to the total population was around 56.7 in 1960. This ratio declined to around 54,5 in 1971 when it began to increase. In 2007, the working age population had reached around 66,5 % of the total population (Lewis, 2018). The ratio of the working age population to the total population is expected to continue to increase for the next 10-15 years (Adioetomo, 2007). This condition will encourage an increase in demographic bonuses where the population will be dominated by productive age people who can encourage national productivity and development. One form of contribution that has occurred due to changes in age structure has pushed GDP per capita to grow from 1,6 million rupiah to 8.7 million rupiah during the study period (constant 2000). Various efforts have been made to maintain and stabilize population conditions so that it is expected to help contribute to development in Indonesia. Based on the latest data from the World Bank in 2017, Indonesia's total population has been recorded at around 265 million and around 68.7% of the population are productive age. This condition is favourable and provides an opportunity for Indonesia to utilize the existing bonus demographic conditions as development assets. It is noted that Indonesia's fertility and dependency ratio in the past 5 years has decreased (BPS, 2016; Worldbank, 2017). This condition confirms that the fertility rate in Indonesia is increasingly showing a declining trend. In addition, the decline in birth rates was accompanied by a decrease in the dependency ratio. This shows that the productive age population increasingly dominates the age structure of the Indonesian population. The results of the analysis are supported by various phenomena and reports on Indonesian population that have been studied in recent years. Fertility rates and dependency ratios do show a downward trend in recent years (BPS, 2015). Meanwhile, Indonesia's GDP per capita experienced a trend that tends to increase and shows a fairly good number amid the global economic turmoil that has hit for almost the past decade. In this study, the proxies of community welfare are measured by GDP per capita which reflects the income and population of Indonesia. Logically, when this down fertility rate will directly affect the rate of dependency burden. When birth decreases, it will reduce the number of non-productive age population aged 0-15 years. So this will reduce the number of dependency loads. This decrease in the burden of dependency will have a significant effect on per capita income. When the burden of dependency figure decreases, it will reduce the burden that must be borne by the productive age population and

automatically the burden will change to increase the welfare of the productive age population. For almost 4.5 decades or ranging from 1970-2015, the population share of GDP in Indonesia ranged from 21%. During the same period, the productive age population was replaced by employment opportunities, its share increased to 23% so that the working population had a considerable impact on the development and economy of Indonesia. The demographic bonus created by the booming productive age population contributes to the dynamics of the labour market and economic growth. In 2010, Indonesia's population reached 234 million with an annual population growth rate of 1.2 %. Indonesia as a developing country is in the second demographic transition wave which is indicated by lower levels of fertility and death and increased life expectancy and quality of the population through various aspects (BPS, 2012; Bappenas, 2013 and UNFPA, 2014). The transition of Indonesia's demographics is also confirmed by the increase in the working age population accompanied by a decrease in the burden of dependence especially on residents aged 0-14 years. This condition is a confirmation of declining fertility coupled with an increase in the working age population. In addition, the existence of a better quality of life is also driven by increasing life expectancy. This situation signals that Indonesia will get a demographic bonus and capture an opportunity for a decline in population levels and an increasing share of the population of productive working age population (aged 15-64 years). Ananta, *et al.*(2015) show that rapid demographic changes in Indonesia require strategic policy adjustments. Various efforts have been made to encourage policies in controlling population growth so as not to impact the decline in welfare and so on. The existence of a demographic transition reflected in the dynamics of the age structure in the Indonesian population shows that the community will be prepared for behavioural change towards a higher level and an increasing demand for people to think more democratically. The dynamics of the age structure of the population is also one of the main factors that will lead to lower potential savings as a result of changes in people's behaviour (OECD, 2012). The Lindh and Malmberg (1999) study shows that age as part of the income and consumption variable has a large effect on GDP growth rates. This is because the dynamics of the age structure will bring changes to the behaviour pattern so that it can directly influence a person's income and consumption patterns. The study of Anderson (2001) and Bloom and Finlay (2008) also observed changes in population from age structures to economic growth. The results of the analysis show that population dynamics that occur in age structures that are dominated by productive age population will have a positive impact on economic growth as a result of increased productivity. The fertility rate and age structure of the population are mutually sustainable with a dependency load ratio. It is noted that Indonesia's dependency ratio has decreased along with a decrease in fertility or birth rates and the distribution of the age structure of the population well. In addition to impacting on welfare or GDP per capita, the dependency ratio of the population of old age and young age has a significant impact on government spending and macroeconomic conditions (Nazamudin, 2010). First, government spending will increase for social security, health and welfare especially for the elderly. So to pay for this it will have an impact on increasing government spending and will have an effect on public spending on social security. The existence of this so that harmony occurs in the fiscal sector, the government will increase the tax rate of the working age population. This will indirectly have an impact on reducing savings and reducing growth capacity especially in banking development. The second thing that is the impact of government spending, when the government does not interfere in social security financing, will reduce consumption and savings of the productive age population. This happens as a result of the transfer of the consumption and savings functions of the productive age population which turns into a burden on the age of the elderly. The load dependency ratio combined with a decrease in fertility rates will also have an impact on women's labour force participation. When participation in women's employment increases, more women will be included in the labour market. This if synchronized will have an impact on the level of fertility so that it will reduce the burden of dependency ratio. In addition, the high participation of female workers will also increase productivity and result in increased income as a result of increasing national output. Most developing countries in Asia such as Indonesia, which is in the midst of a demographic path that is dominated by working-age population, will bring positive changes to development. However this must also be synchronized with controls on fertility levels, because the age structure must also be well controlled so that it can achieve a demographic bonus on an on-going basis. Other analysis results also show that in the long run, life expectancies that reflect the quality of the population also have a positive impact on development and welfare through the variable GDP per capita in Indonesia. The life expectancy of the population is closely related to quality of life which is reflected in health conditions and living standards. In OECD countries, improvements in living standards, health care and nutrition have become important instruments in helping to improve the quality and life expectancy of people (Navaneetham and Dharmalingam, 2014). To maintain and stabilize the quality and life expectancy of the population, it is necessary to synchronize social service policies and other development policies (Nazamudin, 2010). In reality, Indonesia has not yet optimized the investment of human resources, especially in terms of education and health. Government expenditures for public investment are directly related to the improvement of relatively smaller human qualities (Diyoke, et al, 2018). This condition is indicated by the ratio of government expenditure as a form of public investment in the education and health

sector which is still relatively low at 3.8% of Indonesia's GDP. Unlike Malaysia, this spends around 8.1% of GDP for public investment in the education and health sectors and Thailand at 4,6% of GDP. In recent years, development has been driven on infrastructure both in the form of education, health and road infrastructure. These programs are expected to be able to help access and service to the community so that in addition to increasing economic development, it can also have an impact on human development which will affect the quality of human resources in the future. Ideally, development in physical form such as education and health cannot be felt directly in the near future. These developments will tend to be responded to in the long term to achieve the expected results. In 2010, life expectancy is estimated at around 70,8% and will increase in 2045-2050, estimated at around 74%. So that the longer the life expectancy, it will require a better quality of education and good health services. This will encourage policies and programs to optimize life expectancy. Human capital is one of the instruments of development so that the sustainability and sustainability of the quality of human life contribute greatly to development which will involve the education and health sectors to work more optimally. Empirical studies conducted by Jayasooriya (2017) with the support of the Solow model explain that the role of human capital as a component of production has a large influence on output so that it will have an impact on national economic growth. In addition, the dynamics of demographic profiles such as the dependency ratio and life expectancy also play a significant role in the economic slowdown in Asian countries. This empirical study is in line with this research which shows the results that the role of human capital for the future of the economy is very important. This condition is indicated by the results of the analysis of this study which confirms that population growth, fertility rates, dependency burden and life expectancy contribute significantly to GDP per capita. This result gives the meaning that the four variables have synchronization in contributing to future economic development. Life expectancy is identical to the quality of human resources, especially related to education and health so that they can meet the future conditions. Other empirical studies also support the results of this study in each variable. In the Ogunleye study, et al., (2018) found that population growth had a positive and significant influence on Nigeria's economic growth, while negative fertility was significant and for economic growth in Nigeria. In addition, the results of the analysis in this study related to the demographic transition supported by Sundman (2011) which describes the results on life expectancy and dependency ratios have a significant impact on economic growth which is proxied through per capita GDP. In addition, in the theoretical context, this study also confirms the existence of the role of human capital theory and the Solow Swan growth model. In the theory of human capital Becker (1964), Schults (1961) and Mincer (1974) who oppose the assumption that physical capital becomes an important component in driving production which will have an impact on economic success. In fact, physical capital will not be able to operate optimally if there is no role for human capital (Masson, et al., 2016) through knowledge, technology, health and skills. In this case, Becker's theory (1964) supports this study that the role of productive age population as outlined in the opportunity for bonus demographics will have a significant impact on national productivity and output. Based on the Indonesian empirical phenomenon in the Indonesian population pyramid, it shows that the dominance of the productive age population (15-64 years) will bring opportunities to Indonesia's demographic bonus in the next few years. But this must also be balanced with the quality of the population so that it can contribute to development.

5 CONCLUSSION

The results of the GMM analysis show that demographic profiles that have significant influence and contribution to Indonesia's economic development through economic growth variables include fertility, population growth, dependency ratio and life expectancy. Demographic bonuses are an opportunity to improve performance in a country's economic development. In the long run, the components of the new population will see its contribution to improving welfare and economic development. This can happen if the role can be optimized so that it will have a significant impact on development. Fertility control through education and modernizing the community mind set about population. This does not only include the issue of control over the quantity of the population, but furthermore this population education will help increase knowledge about the importance of the quality of the population for development. To increase life expectancy, one of them is by improving human quality. One effort can be made through increasing government spending that can be allocated to public investment such as the education and health sectors which in the long term will contribute positively to improving human quality. In addition, fertility control can also be done to maintain stability in population growth and the burden of dependency. So that we can see from the fact that the condition of the Indonesian population which is dominated by the productive age population and the dependency load rate which increasingly shows a downward trend, it is necessary to maintain an increase in the birth rate. One policy that can be applied can be through increasing female labour participation through the creation of female employment opportunities. This is done so that women are more preoccupied with working and creating productivity so that it is expected to reduce the birth rate.

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REFERENCES

[1] Accinelli, Elvio and Brida, Juan G. 2007. Population growth and the Solow-Swan model. International Journal of Ecological Economics & Statistics (IJEES) Summer 2007, Vol. 8, No. S07; Int. J. Ecol. Econ. Stat.; 54-63 ISSN 0973-1385 (Print), ISSN 0973-7537 (Online) Copyright © 2007 IJEES, CESER

[2] Aiyar, S., Romain A. Duval, Damien Puy, Yiqun Wu and Longmei Zhang. 2013. Growth Slowdowns and the Middle-Income Trap. IMF Working Papers No. 13/71 International Monetary Fund

[3] Ananta, Aris., Arifin, Evi. N., Handayani, Nur.B., Pramono, Agus. 2015. Demography of Indonesia's Ethnicity. December 2015. DOI: 10.1355/9789814519885

[4] Ashraf, Q., & Galor, O. 2008. Malthusian Population Dynamics : Theory and Evidence

[5] Badan Pembangunan dan Perencanaan Nasional. 2017. www.bappenas.go.id

[6] Badan Perencanaan dan Pembangunan Nasional. 2013. www.bappenas.go.id

[7] Badan Pusat Statistik. 2010. www.bps.go.id

[8] Badan Pusat Statistik. 2012. www.bps.go.id

[9] Badan Pusat Statistik. 2016. www.bps.go.id

[10] Badan Pusat Statistik. 2017. Keadaan Angkatan Kerja di Indonesia Agustus 2017 Labor Force Situation In Indonesia August 2017. Issn. 0126-647x No. Publikasi/Publication Number: 04120.1704 www.bps.go.id

[11] Bank Indonesia. 2011. www.bi.go.id

[12] Bloom, D. E., & Canning, D. 2011. Demographics and Development Policy, (66).

[13] Bloom, David E and JGWilliamson. 1998. Demographic transitions and economic miracles in emerging Asia perspective. World economic Bank Economic Review ,12 (3): 419–56

[14] Cai, D., Ye, H., & Gu, L. 2014. A Generalized Solow-Swan Model.

[15] Cai, H., Y. Chen and L. Zhou. 2010. "Income and Consumption Inequality in Urban China: 1992–2003". Economic Development and Cultural Change 58(3): 385-413

[16] CIA World Factbook. 2017.

[17] Diyoke, Kenneth O., Yusuf, Abubakar and Demirbas , Erkan. 2018. Government Expenditure and Economic Growth in Lower Middle Income Countries in Sub-Saharan Africa: An Empirical Investigation. Asian Journal of Economics, Business and Accounting 5(4): 1-11, 2017; Article no.AJEBA.38552 ISSN: 2456-639X

[18] Eichengreen, Barry, Dwight Perkins and Kwanho Shin. 2013. Growth Slowdowns Redux: New Evidence on the Middle Income Trap. NBER Working Paper No. 18673

[19] Hausmann, Ricardo, Lant Pritchett and Dani Rodrik. 2005. Growth accelerations. Journal of Economic Growth, 10 303–329

[20] Hayes, Adrian dan Setyonaluri, Diahhadi. 2015. Taking Advantage of The Demographic Dividend in Indonesia: A Brief Introduction to Theory and Practice. The views expressed in this discussion paper are those of the author(s) and do not reflect the views of UNFPA or the Government of Indonesia

[21] Jayasooriya, S. P. 2017. Growth Slowdowns, Middle-Income Trap, and Demographic Profile in South Asia, (736).

[22] Malthus, T. R. 1798: An Essay on the Principle of Population. J. Johnson, in St. Paul's Church-Yard, London, UK.

[23] Navaneetham, Kannan and Dharmalingam, A. 2014. Age Structural Transitions, Demographic Dividend and Millennium Development Goals in South Asia: Opportunities and Challenges. International Population Conference to be held in Marrakech, Morocco

[24] Nazamudin, 2010. Demographic Changes in Indonesia and the Demand for a New Social Policy. Journal of Policy Science, 2010. ISSN 1881-6703. vol. 5., pp.X-X

[25] OECD. 2012b. www.oecd.org

[26] OECD. 2013. www.oecd.org

[27] OECD. 2014. www.oecd.org

[28] Olamide, O. Olusogo., Owolabi , Oluwarotimi A., and Mubarak, Muazu. 2018. Population Growth and Economic Growth in Nigeria: An Appraisal. International Journal of Management, Accounting and Economics Vol. 5, No. 5, May, 2018 ISSN 2383-2126 (Online)

[29] Peng, Xizhe. 2006. Demographic Factors in China's Economic Growth. Resurgent China pp 52-71

[30] Phani, B., & Koduru, K. 2016. Effect of Population Growth Rate on Economic Development in India Background

[31] Solow RM .1956. A contribution to the theory of economic growth. The Quarterly Journal of Economics 70(1):65–94

[32] Sundman. Marie L. 2011. The Effects of the Demographic Transition on Economic GrowthImplications for Japan. Jonkopping International Business School. Jonkopping University

[33] UNFPA. 2014. Indonesia on the Threshold of Population Ageing. UNFPA Indonesia Monograph Series: No.1

[34] World Bank Policy Research Working Paper No. 6290.

[35] Worldbank. 2017. www.worldbank.org

[36] Worldbank. 2017. www.worldbank.org