Population Age Structure, Saving Rate impacts on Economic Growth: Myanmar Case

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Abstract

This paper is trying to examine the impacts of the dependency rate on per capita GDP growth of Myanmar for the period of 1970-2018. Under VAR model framework, the impacts of population age structure (young and old dependency ratio) and saving rate (% of GDP) on economic growth of Myanmar has been searched. Any short run relationship among variables cannot be shown by Granger causality test. In the long run, VEC model has proved that population age structure and saving rate have negatively and positively on per capita GDP growth of Myanmar economy during study period. But its negative age structure effect is bigger than positive saving rate and therefore, Myanmar saving policy should be associated with age structure change. However, Myanmar has still a population bonus needed to utilize efficiently before it ends so that Myanmar could not face the problem of unemployment, and rural poverty.

Keywords : Myanmar , Dependency Ratio , Saving Rate , Per Capita GDP growth ,Unit Roots , Cointegration , VAR ,

JEL Classification : J10,J11,O40

Introduction

The world population is currently more than 7.8 billion people with its growth rate 1.05% in 2020 under the process of living people lifespan development such as childhood, adulthood-young adulthood and middle adulthood, and old age. The United Nations (UN) World Population Prospects 2019 projected that the world population would be growing to 9.7 billion in 2050 from 7.7 billion in 2019. Among regions, Eastern and Southeastern Asia rate of increase in population (3%) will be second lowest after Europe and Northern America (2%). On the other hand, Sothern Asia and Eastern Asia such as India, Pakistan and China will be the largest contributors to the increases in population. Then again, globally people have lived longer than before. During 1950-

1955, people's longevity on the world average 46.96 years becomes 72.28 years in 2015-2020. For Southeast Asia, people's life expectancy has also increased from 45.72 years during 1950-1955 to 72.46 years during 2015-2020. Commonly, people's longevity has 2 crucial issues such as healthy and aging. Current issues of population addressed by UN has been pointed out by the pros and cons of growing population for sustainable development.[1]

The UN World Population Prospects 2019 highlights that global women are having fewer babies while the world's population is growing older, with persons over age 65 being the fastest-growing age group. Then again UN addressed for global aging issues as "*One in six people (16%) in the world will be over age 65 by 2050, up from one in 11 (9%) in 2019*."[2] (UN ,Ageing 2019) Regions where the share of the population aged 65 years or over is projected to double between 2019 and 2050 include Northern Africa and Western Asia, Central and Southern Asia, Eastern and South-Eastern Asia, and Latin America and the Caribbean. The world population aging highlight 2019 has presented that the people surviving beyond age 65 would be rising with total 702.9 million in 2019 being 1548.9 million in 2050.[3] In 2019, Eastern and Southeastern Asia, Central and Southeastern Asia, and Europe and Northern America regions occupied more than 75% of elderly people. Majority share of aging population of those regions will be the same in 2050 too. Then aging becomes a universal occurrence since it is not only in industrialized countries but also in developing countries. "*It may come as a surprise to some that the ratio of elderly people is rising faster in the developing world than in industrialized countries*" (ILO, 2011).

Asia region is currently taking majority of older people and it has been projected that Asian region will have the same majority share of older people until 2050. In Asia, not only in high income economies like Japan, South Korea and Singapore, but also in upper middle income economies such as Thailand, Malaysia and low middle income economies such as Myanmar, Lao and Cambodia, aging is taking place. Southeast Asia countries including the latecomers like Myanmar, Lao and Cambodia are in their translation period and trying to get out their middle income traps[4]. If countries care facing Aging or depopulation issues, then it will be hindering their saving and facing more financial burden than other capital rich countries. Then earliest population planning especially for aging people will be precautionary policy to maintain current economic situation or to prevent to fall in any worsen situation due to population.

Countries are approaching to the "aging society" as rate of increase in the older is greater than rate of decline of the younger. Accordingly, those countries' scenario of the "population bonus" or the "demographic dividend"[5]will be ended soon. As UNFPA explained, the population bonus or the demographic dividend means that an economy has a favorable situation in which the working-age population (between 15 and 64) is greater than that of the children and the elderly (under 15 and above 65 years of age). An economy has its population bonus when an economy

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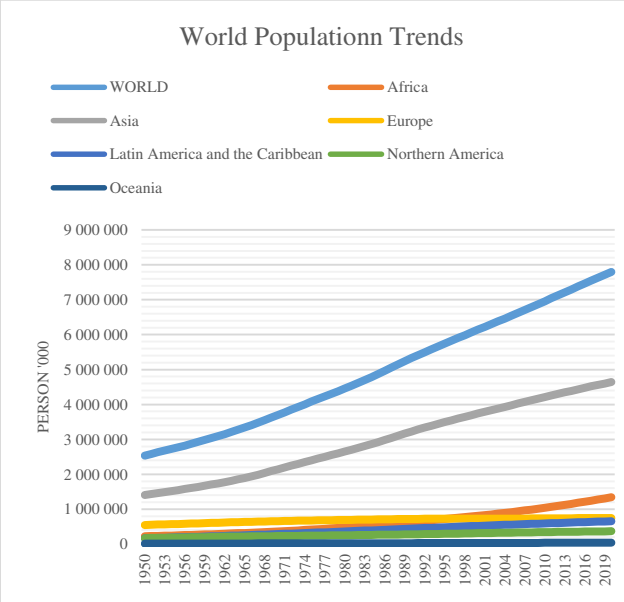
[1]. More inhttps://www.un.org/en/development/desa/population/commission/pdf/48/CPD48ConciseReport.pdf
[2] More in https://www.un.org/en/sections/issues-depth/ageing/
[3]. More in https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Highlights.pdf
[4] . More in https://www.adb.org/adbi/research/middle-income-trap-asia
[5] . More in https://www.unfpa.org/demographic-dividend

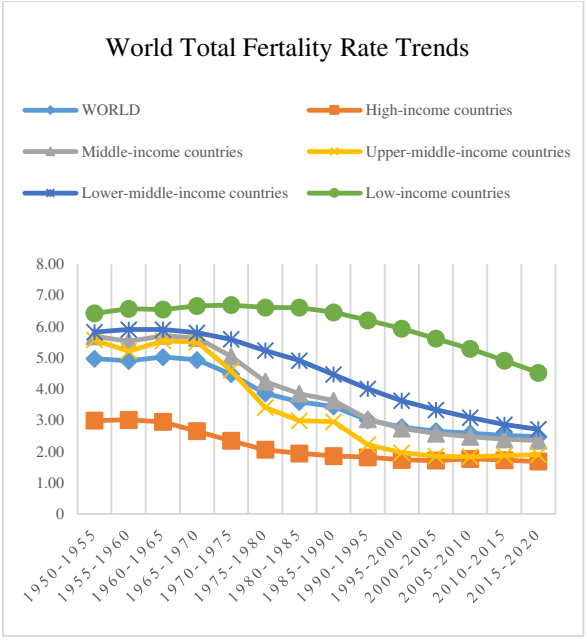
can make the most of its demographic strengths and utilize this succeeding income growth to lift domestic demand and economic growth. In the meantime, some Asian countries have failed to gain from the population bonus. For instance, Indonesia's bonus phase started in the 1970s, but has not fully utilized its blessing. Most of Indonesian people are were under poverty and jobless in the 1990s since job –creating industries failed to create under dictatorships. Similar scenario of unutilized population bonus has applied in Philippines in that the country has highest economic growth rate 7.2% in 2013 while its unemployment rate is around 7% with almost 30% of population being under poverty and few jobs in rural areas (Nikkie, ASIAN Review, 2014). Then it could be learned that two concerns should be noticed especially in the capital scare or developing economies. These are the preparation for preparing aging population and its consequences, and the full utilization of population blessing before it ends.

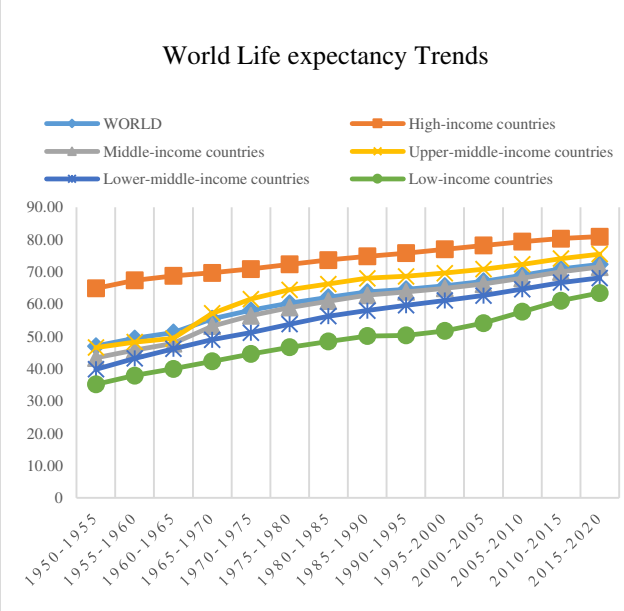
When an aging framework is discussed in this paper, it is followed by World Health Organization (WHO) definition. According to the WHO, "Aged" means "over 65 years old" and the proportion of a society's population that is comprised of persons **age** 65 or older is called the "aging rate". If a society's aging rate exceeds 7%, it is an "aging society". If the rate surpasses 14%, it is an "aged society"; and if the rate is over 21%, it is a "super-aged society".[6]

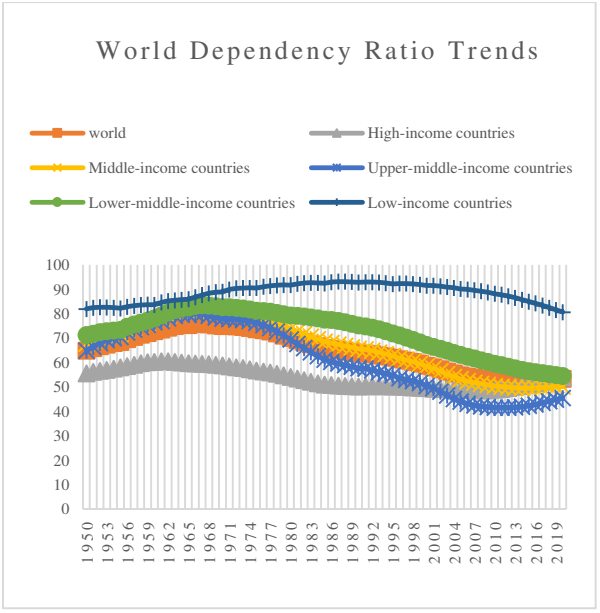
[6] . https://www.un.emb-japan.go.jp/jp/statements/okamura071316.html

Figure 1: World Population, Fertility, Life expectancy and Dependency Trends







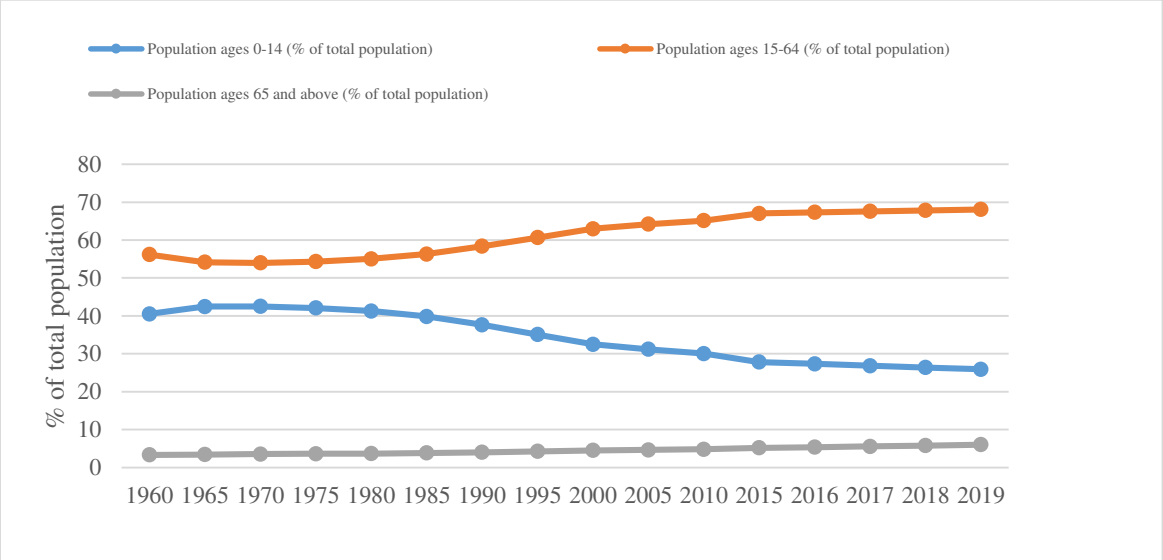


Source: World Population Prospects 2019

Population Structure in Myanmar

In 2019, Myanmar population is 54.34 million people with labour force participation rate being 59% (national estimate) and with population aged between 15 and 64 as a percentage of total population being 68%. However, more than 6 % of aged 65 and older people in total population and around 29.1% of aged 0-14 people in total population are in 2019, although aged 65 and older people is 5% of total population in 2015. Thus, elderly people in Myanmar is growing and it is very close to enter its aging society by the WHO definition (Figure 2).

Figure 2: Age population (% of total population) in Myanmar



Source: WDI (July 1, 2020 update)

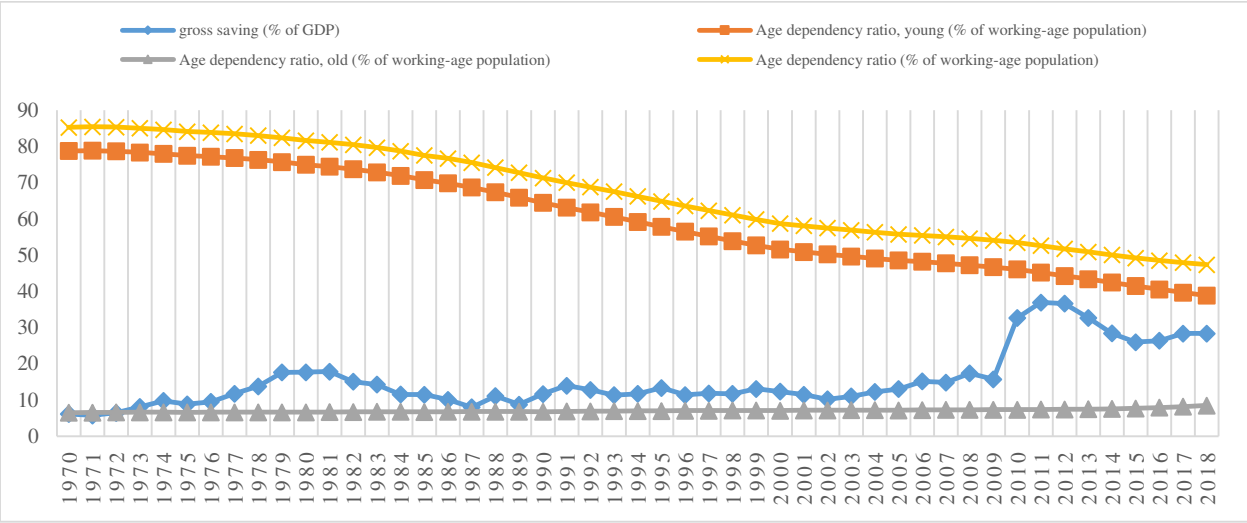
As usual of a developing country, 69.1% of total population is living in rural area and the rest is urban population, while the country's unemployment rate shown as a percentage of total labour force is only 1.5% in 2019 according to the ILO estimate. However, the ILO estimates that youth unemployment rate which shown as a percentage of total labour force age between 15 and 24 is 4.0% in 2019. At the same time, Myanmar workers going and working abroad in 2019 is more than 300,000 people with their top destinations being Thailand and Malaysia.[7] In the 2017 updated data, the poverty headcount ratio at national poverty lines in Myanmar is 24.8%.

Myanmar population in 1960 was only 21.7 million and urban population was 19% of total population with aged 65 and above being 3% of total population. Life expectancy was only 42 years and fertility rate was 6% at that time. Over the years, fertility rate is gradually decreasing and it becomes 2% in 2019 although infant mortality rate (per 1000 live births) is also reducing from 118 in 1970 to 36 in 2019. As a result, population growth rate in Myanmar is 0.6% in 2019 from 2.16% in 1960. Moreover, old age dependency ratio is gradually growing and young age dependency ratio is declining. (Figure 3).Therefore, it can be forecasted that labour force participation may reduce in near future. The country will be facing the problem of fiscal burden if

[7] https://www.mmtimes.com/news/myanmar-migrant-workers-2019-exceed-300000.html

she were not paying much attention for enough saving or capital accumulation for the sake of older people.

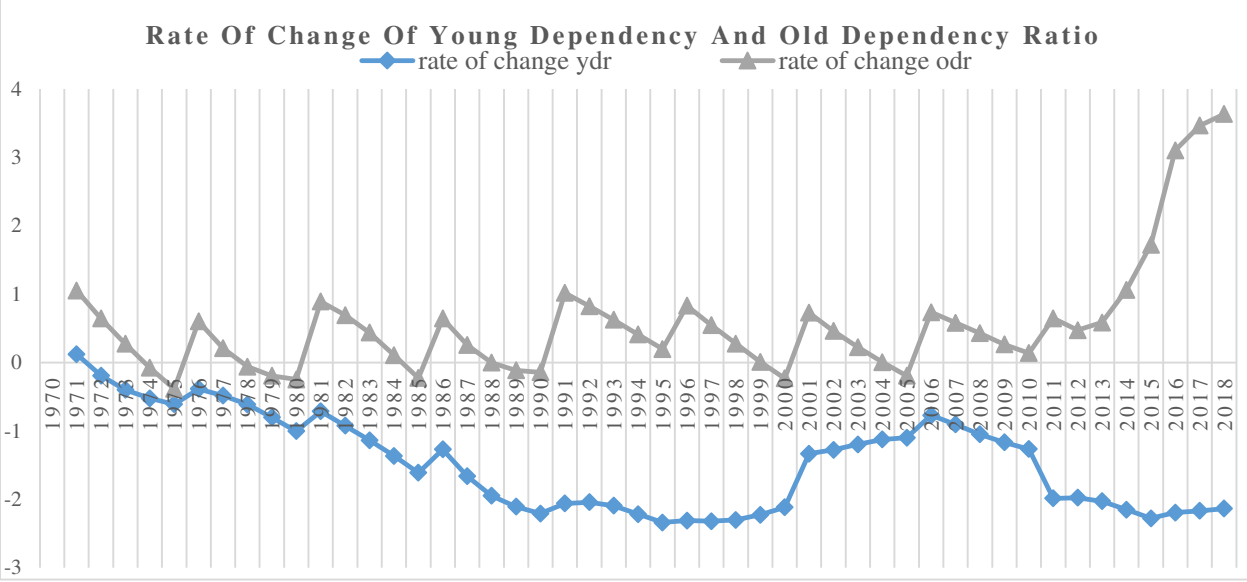
Figure 3: Dependency Ratio (% in 15-64 Years) and Saving (% of GDP) In Myanmar



Source: WDI and https://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx

Since a decade ago, Myanmar's rate of change of old dependency ratio is faster than rate of change of young dependency ratio, and subsequently it can be inferred that the country is close by aging (Figure 4).

Figure 4: Rate of Change of Old Dependency Ratio vs. Young Dependency Ratio in Myanmar



Source: WDI and https://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx

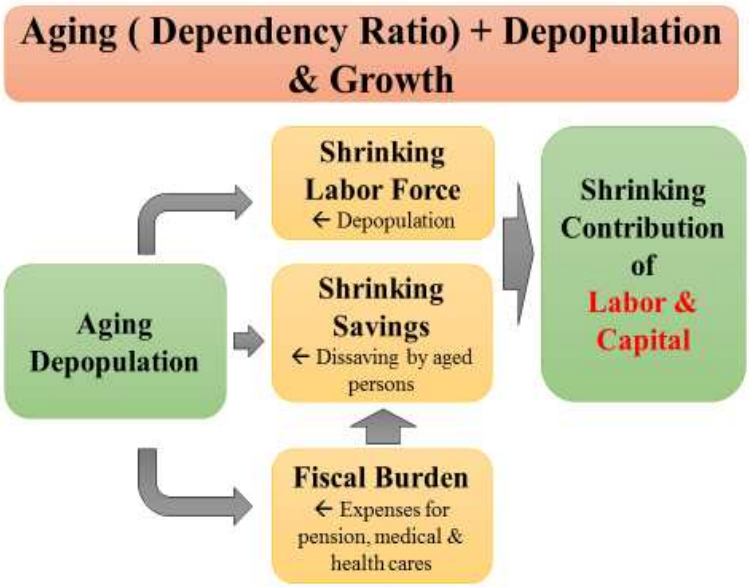
The purpose of this paper is to examine the impacts of the dependency rate on per capita GDP growth of Myanmar.

Contribution and Limitation of this paper

No scholar researches for scientific study of the effects of age dependency ratio on economic growth of Myanmar have been found before. Basically this study emphasizes that the impacts of population age structure (young and old dependency ratio) on economic growth of Myanmar 1970-2018 has been searched. But the other aspects of consideration such as labor productivity, capital productivity, technological change, life expectancy, migration and human resources which might have affected significantly economic growth are not concerned on this paper. Thus it might be worth of doing further researches.

Theoretical Framework of Effects of Aging and Depopulation on economic Growth

Though population growth has some of debate on economic growth of an economy, it cannot absolutely deny that population does not have a positive effect on economic growth. Population on economic growth has been mainly emphasized by not only classical economists but neo-classical economists also. However, the classical economists viewed that an increase in population would turn down economic growth due to limited resources, while neoclassical economists invented effective labour and per capital output would grow at the rate of technology progress. Therefore, generally it can be said that population is essential for economic growth. One of very well-known classical economists, T.R. Malthus (1826), perceived "Malthusian Traps" in which an increase in population would turn down standard of living of people due to limited resources, and thus technological progress would be needed indeed for higher living standard. Bloom et al. (2008) showed that population aging was not significantly hampering economic performance in Asia for 1960-2005 after analyzing effects of age structure on economic growth in their convergence model framework. Kosai et al. (1998) searched and projected for coexistence of sustained economic growth and declined population in Japan between 1950- 2025. They suggested that negative effects of declining population on economic growth can be avoided by efficient utilization of resources. Elgin &Tumen (2012) also checked and found out the long run coexistence of declining population and sustained economic growth for developed countries.



Source: The author's description

Growing older people shrinks the labour force of economies with dissaving by aged persons and increasing fiscal burdens for aged persons. As a result, an aging economy will face the shrinking contribution of labour and capital share in economic growth as well. "*Productivity is the main challenge of a country with an aging population*" (World Bank, 2016).

Researchers are kept in eye on searching the significant effects of age dependency on economic growth especially for those advanced countries which are under aging society and for those developing countries which are increasing old age dependency ratio. Uddin et al. (2016) have tested the relationship among the dependency ratio, savings rate and real GDP and presented the long run relationship of aforementioned variables in Australia during 1971-2014 .Scholars found the different perspectives on the effect of age dependency (young and old age dependency) on saving in their empirical researches. The impacts of age dependency had a significantly negative effect on saving rate (Leff, 1969; Shumaker & Clark 1992; Kelley & Schmidt, 1996; Higgins 1998; Ahmad 2002; and Salman & Zaib, 2012) and confirmed that old age dependency had a significant negative impact on domestic saving (Leff, 1969; Higgins, 1998; Kelley & Schmidt, 1996; and Ahmad, 2002). However, several studies could not prove the significant relationship link between age dependency and saving (Demery & Duck, 2003; and Hyung, 2013). On the other hand, many scholars have examined the impacts of dependency ratio on economic growth. A significant long run effect of dependency ration on economic growth has been proved (Park & Shin, 2011; Uddin et al., 2016; Sayema et al., 2019).

Empirics

This section presents the effects of population age structure (young dependency and old dependency ratio) and saving on economic growth in Myanmar under the aforementioned theoretical framework. The description of the data for key variables and methodologies for a VAR

model estimation, and the estimation outcomes with its interpretation are presented in this section. VAR model estimation has been applied by many scholars and researchers. Among them, Huishand et al. (2018) have also applied VAR model for checking the aging population on consumption and economic growth of urban people in Beijing . Brendan & Sek (2016) have used VAR framework and tested cointegration of the relationship between population ageing and economic growth for Asia such as India, Japan, Korea, Malaysia, Philippines, Singapore and Thailand. Ahmad (2002) has also applied VAR model and cointegration test for his work of searching relationship between age structure on household saving rate in Pakistan.

Data for Key Variables

This study chooses three key variables from the aforementioned theoretical framework. The variable of economic growth (y) is expressed as a logarithm of per capita real GDP, and dependency ratio (DR) variable are yearly time series data retrieved from World Development Indicators (WDI) published by the World Bank. Saving variable (SR) which is shown as a percentage of GDP is also yearly data retrieved from UNCTAD data source published by United Nations Conference on Trade and Development.

Firstly, the study organizes the abovementioned variables for a VAR model estimation method to examine the impacts of population age structure on economic growth during 1970-2018 based on the theoretical framework in previous section with holding key hypothesis for our analysis. The first one is that the upturning dependency ratio will end up with down turning per capita GDP, while the second hypothesis is that increasing saving rate will encourage the enhancement of per capita GDP.

Methodologies for a VAR model estimation

In order to check the aforementioned two hypotheses, the following VAR estimation framework has been established;

$$y_t = a_0 + a_1 DR_t + a_2 SR_{t+} + {}^{\varepsilon}t$$

The study applies data-stationary test since time series estimation may give spurious results if a variable follows a random walk. Henceforward, in the first stage, the study conducts unit root tests for checking the existence of random walk in time series data. There are several methods of unit roots tests such as the augmented Dickey–Fuller (ADF) test (Dickey and Fuller, 1979), the Kwiatkowski et al. KPSS (1992), the Ng and Perron (2001) and the Phillips- Perron test (PP test). All unit roots tests have some problem such as “PP test is based on an asymptotic theory, i.e. it is designed to test the unit roots in long time series although PP test power is very low (in case of short time series less than 25 years). Compared to the ADF test, this fact should increase the power of tests and improve test results (Arltova & Fedorava, 2016: pp. 54). Thus this study chooses the PP (2001) test for checking unit roots of our time series data.

Lags length is selected by automatic selection. Phillips-Perron Unit root test shows that THREE-time series are I (1). Then the test is conducted on the null hypothesis that a level and/or a first difference of time series data have a unit root, by including “intercept” and “intercept&

Trend" in the test equation. Table 1 reports that, for a first difference of time series data, the null hypothesis of a unit root is rejected at 99 percent significant level in all three variables on any test equations. The study thus uses the first difference series of time series data for a VAR model estimation.

Table 1: Phillips- Perron Unit Root Test

	Variables	Level				First Difference			
		Test Statistics	Critical Values			Test Statistics	Critical Values		
			1%	5%	10%		1%	5%	10%
Intercept	DR	-0.866	-3.574	-2.924	-2.600	-3.623***	-3.578	-2.925	-2.601
	SR	-1.138	-3.574	-2.924	-2.600	-5.852***	-3.578	-2.925	-2.601
	Y	0.442	-3.574	-2.924	-2.600	-9.858***	-3.578	-2.925	-2.601
Intercept & Trend	DR	-1.838	-4.161	-3.506	-3.183	-4.270***	-4.166	-3.509	-3.184
	SR	-1.835	-4.161	-3.506	-3.183	-5.785***	-4.166	-3.509	-3.184
	Y	-1.486	-4.161	-3.506	-3.183	-9.611***	-4.166	-3.509	-3.184

*MacKinnon (1996) one-sided p-values.

Note: The test of the unit root test is carried out at the 5% level of significance. DR, SR and Y refers to dependency ratio and savings rate, and log per capita GDP respectively. Lags length is selected by automatic selection. Phillips-Perron Unit root test shows that THREE-time series are I (1).

*** Indicates rejection of null hypothesis at 99% level of significance

Sources: Author´s elaboration using World Development Indicator (World Bank) and UNCTAD Stat.

As all three variables are stationary at first difference, the study checks their Cointegration and applies an error correction model in order to investigate both short-run and long-run relationships among the variables. As the model contains one cointegrating vector, the long-run equation showing the results of the VEC model is summarized as presented in equation (1). Table 2 presents the summary of Johansen–Juselius cointegration test.

Table 2: Cointegration Test

Hypothesized	Trace test			Max-Eigen test		
No. of CE(s)	test Statistic	5% Critical Value	Prob.**	test Statistic	5% Critical Value	Prob.**
r = 0 *	36.79169	29.79707	0.0066	27.85627	21.13162	0.0049
r<=1	8.935421	15.49471	0.3714	8.767876	14.2646	0.306
r<=2	0.167544	3.841466	0.6823	0.167544	3.841466	0.6823

Note: both tests indicate 1 cointegrating eqn(s) at the 0.05 level. * denotes rejection of the hypothesis at the 0.05 level. **MacKinnon-Haug-Michelis (1999) p-values.

VEC model Results

$$\Delta Y_t = 8.7739 - 0.051\, DR_{t-1} + 0.0322\, SR_{t-1} \quad \text{---------equation (1)}$$

$$\begin{aligned} &\textit{Std error} && (-0.0034) && (-0.00439) \\ &t-\textit{statistics} && [\,14.7899] && [-7.3397] \end{aligned}$$

R^2 = 70.55% (Adj R^2 = 67.74%)

The results show that the estimated parameters of the cointegrating vector are significant in respect of both sign and 5% confidence level, which accommodates the long-run relationship established by the Johansen–Juselius cointegration test. The percentage of total variation in the dependent variable that is described in the model is 70.55%. The coefficient of the dependency ratio (0.051) and savings rate (0.0322) in the cointegrating equation are statistically significant and have the expected negative and positive sign, respectively. From these results, we can infer that in the long run, a 1% decrease in the ratio of dependency ratio leads to an increase of 0.051% in per capita real GDP. On the other hand, an increase of 1% in the ratio of savings rate leads to an increase of 0.032% per capita real GDP.

The short run causal effects derived by Granger causality test among the variables are presented in Table 3. The result cannot reject the null hypotheses except revert causation of per capita GDP to dependency ratio.

Table 3: Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
D(SR) does not Granger Cause D(DR)	47	0.42866	0.5161
D(DR) does not Granger Cause D(SR)		1.40494	0.2423
D(Y) does not Granger Cause D(DR)	47	7.11544	0.0107**
D(DR) does not Granger Cause D(Y)		0.03715	0.848
D(Y) does not Granger Cause D(SR)	47	0.83651	0.3654
D(SR) does not Granger Cause D(Y)		0.67091	0.4172

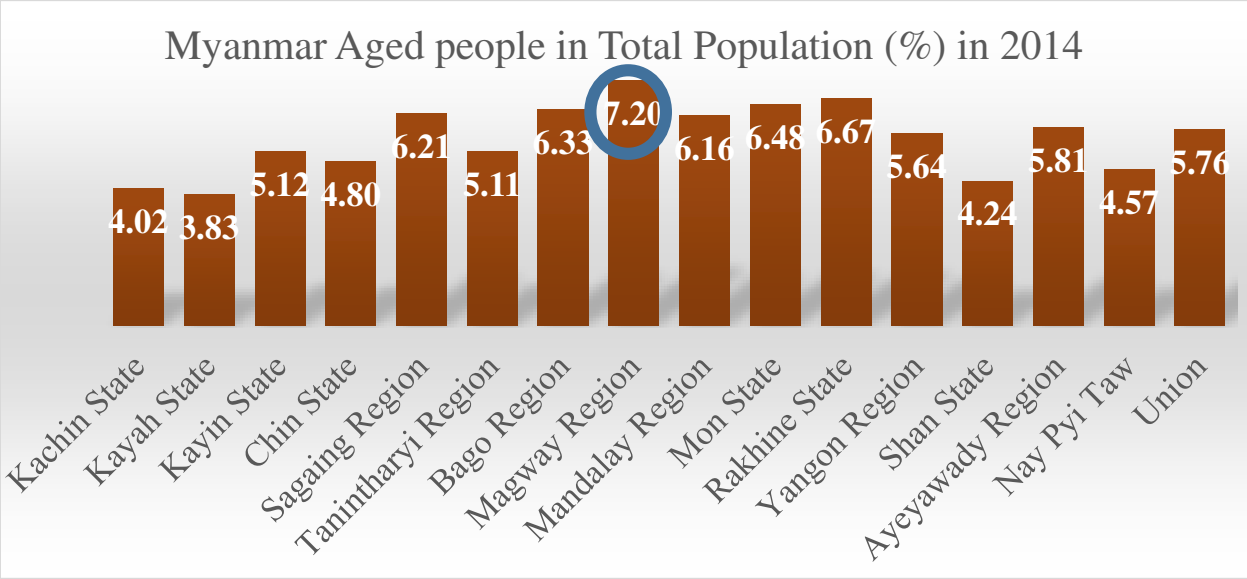
** 5% significance level (Rejection of Null hypothesis)

The result can be interpreted as no short run causality of dependency ratio on per capita GDP and of saving rate on per capita GDP. However, our TWO hypotheses can be accepted in the long run as presented in equation (1).

Conclusion and Discussion

This paper tried to investigate the effects of dependency ratio (old and young dependency ratio) on economic growth of Myanmar, as increasing dependency ratio will lessen per capita GDP growth while boosting on domestic saving will foster per capita GDP growth. We could not find out short run causality among variables, but could find significant negative and positive impacts of dependency ratio and saving rate on per capita GDP in the long run. However, effects of saving on per capita GDP is less than the effect of dependency ratio on per capita GDP. It might be because growth rate of old dependency ratio has been faster since a decade ago. Therefore, older people cannot make saving and it is shrinking structure. Accordingly, domestic saving might not compensate for increasing fiscal burden for pre-working and post-working population groups in the long run if domestic saving is not boosted more than current level.

Figure 5: Myanmar Aged People in Total Population



Source: Central Statistical Organization, Government of Myanmar. http://mmsis.gov.mm/statHtml/statHtml.do

Figure 5 presents the aged population as a percentage of total population of States and Regions in Myanmar in 2014. In 2014, Magway Region had the aged population with the age 65 and over by more than 7% out of total population. Thus the region is already in an "aging society". Mon State and Rakhine State are about to enter into aging society at that time. Therefore, population planning should be prepared in order to cure rapid growing of old age and declining of young dependency ratio.

Most importantly, Myanmar needs to utilize its population blessing that will be ended whereas Myanmar will enter into aging society soon. The experiences of Indonesia and Philippines cases told us that if population bonus were not fully utilized, the problem of poverty and unemployment which deteriorated country's economic growth would be faced.

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