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The Effects of Ageing Population Growth Rate on GDP in Kenya

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Abstract: ***Population has been thought to influence economic growth but economist differs on the linkage, and demographic components influencing economic growth. Proponents of demographic transition theory argue that population structure plays a crucial role in influencing economic growth of a country. This study aimed at examining the effects of ageing population on economic growth in Kenya, Using Time-series data for the period 1963 - 2013, this research sheds light by examining the co-integration relationship between GDP growth rates and ageing population growth rates. The findings showed that every unit increase in aging population, reduces GDP by 0.719%. Therefore, to match population and economic parameters sustainably it is recommended that public spending in sectors offering services needed by the ageing population is increased so as to reduce the negative impact it has on economic growth.***

Keywords: Economic Growth, Demography, Ageing Population

1. Introduction

Since independence, the performance of the Kenyan economy has been mixed. In 1963, the Government of Kenya (GOK) identified illiteracy (ignorance), disease, and poverty as the main problems to be addressed in order to achieve sustainable national economic growth. (Republic of Kenya, 1965). To achieve this, there was need to redistribute the national resources as informed by the African socialism philosophy. Therefore the government encouraged private investments, set up many Parastatals and maintained the ones already set up during the colonial time by the British colonialist. In effect, there was expansion of the manufacturing sector and an increase in agricultural production which led to an improved economic growth as shown in figure1.1 below (Goldsworthy, 1975).

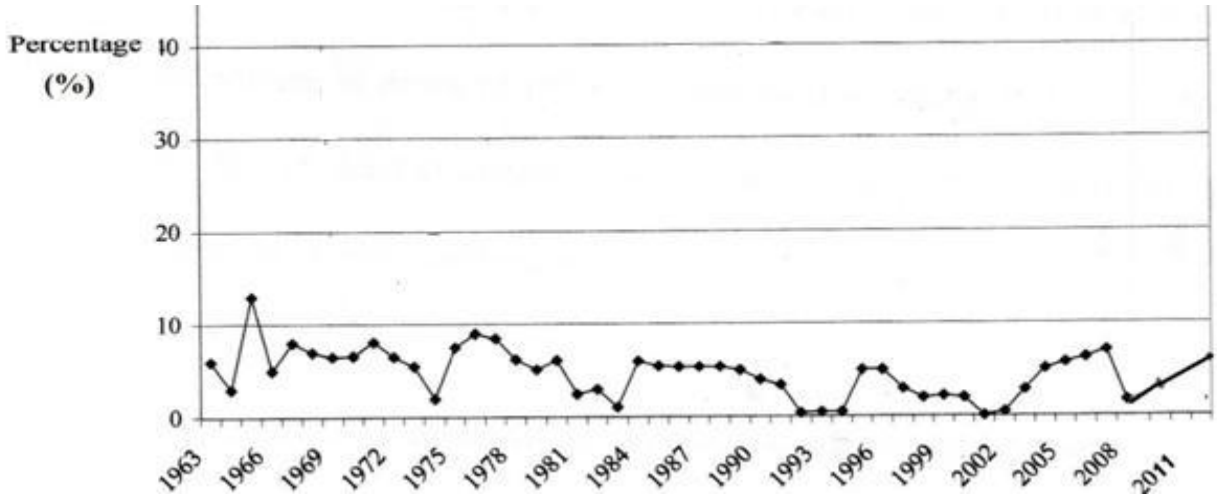

Figure 1.1: Percentage of GDP Growth Rate in Kenya overtime
Source: KNBS, national census reports for various years

From the figure above, there was an average growth rate of 7 percent in 1960s which enabled the county to compete favorably with some of the newly industrialized countries (NICs). A decade later, the GDP growth dropped consistently to 3 percent (Mutui *et.al*, 2013). This was due to inappropriate agricultural policies, inadequate credit and tight government controls on imports and foreign exchange which made Kenya unattractive to investors (Nyamwea*et.al*, 2014). There was a drastic drop from 1991 to 1993 which necessitated adoption of sessional paper no 1 of 1986, The Economic Management for Renewed Growth (EMRG) which forced the government to cut back on spending on its wage bill and payment of foreign debts which had reduced on her capital expenditure.

In addition, Kenya adopted the Breton wood institution's idea of structural adjustment programs (SAPs). This aimed at improving African economy through promoting saving, enhancing efficient use of public scarce resources and restructuring Parastatals to operate efficiently. The SAPs failed to help Kenya for various reasons including corruption among the leaders of the day, one great argument has been on the biased privatization that favored individuals who were close to political power of the time.

Apart from the issues discussed, the consistently poor growth performance was also attributed to high population growth, external shocks, and internal structural problems, including the drought of the 1980s, low commodity prices, world recession, bad weather, and poor infrastructure. The poor growth performance failed to keep pace with the population growth and it led to deterioration in the overall welfare of the Kenyan population (KPSA, 2013). This raised concerns among Kenyans. In 2002, Economic Recovery Strategy (ERS) was established to address the issue. As a result, GDP growth improved from 0.5 percent in 2002 to

7.1 percent in 2007. In 2008, the government of Kenya launched Vision 2030 and its Medium Term Plan (MTP) to provide continuity by consolidating the gains made under the ERS. The goal was to transform Kenya into a newly industrialized middle-income country by 2030 (Muthui *et.al*, 2013).

After reaching a growth rate of 7.1 percent in 2007, there was a drastic fall to 1.7 percent in 2008. The possible reasons for the decline was the domestic and external shocks in the economy, including post-election violence, high food and fuel prices, drought, and the global financial crisis (KDHS, 2009). Since then the Kenyan economy started recovering, in 2009 it improved to 2.9 percent. In 2012 the annual growth of 4.6 per cent in GDP was realized, this was slightly higher than 4.4 percent of 2011 (KIPPRA, 2013).

In light of the above, population checks plays a crucial role in the attainment of a sustainable economic growth. According to Song (2013), the researchers need to look at the demographic components that underlie the overall population growth including the change in structure of the workforce. Bloom and freeman (1998) asserts that population dynamics matter in determination of economic growth but not through population growth rate. Rather, age distribution is the mechanism which demographic variables affect economic growth.

Therefore, this research shed more light to the existing literature by examining the impact of total population growth rate, working age population growth rate, young population growth rate and the ageing population growth rate on the GDP in Kenya.

Statement of the problem

Economic growth performance is attributed to high population growth among other factors. In Kenya the poor economic growth performance has led to deterioration in the overall welfare of the Kenyan population (KPSA, 2013). Demographic transition theory and Multhusian theory strongly associates economic growth and development to population of a country. For this reason economic policies influences the demographic policies of every county but the linkage between population growth and economic growth is complex. Accordingto Song (2013) the researchers need to look at the demographic components that underlie the overall population growth including the change in structure therefore this study focused on the effects of ageing population on economic growth in Kenya

2. Chapter Two

The linkage between demographic factors and economic growth has been debated for long. Thirlwall (1994) commented that, "the relationship between population growth and economic development is a complex one and the historical evidence is ambiguous, particularly concerning what cause is and what effect is".

Demographic Transition Theory

The change in age structure is best explained in the context of demographic transition theory which even though was advanced by Warren Thompson in 1929 it still remains relevant to economist today. The theory states that all societies experience modernization progress from a pre-modern regime of high fertility and high mortality rates to a post modern one which both fertility and mortality rates are low. The theory characterizes population depending on the combination of birth rates and death rates.

Demographic change causes a Change in the household consumption and saving behavior, and a shift in public expenditure. A high number of young population may shift public expenditures towards education and food production while old population forces the government to spend more on pension schemes, health and social security. VerbičandSpruk (2014) suggested that the public pension expenditure in the long term is worrying because the lower fertility rate and the higher life expectancy also affects on public pension via the higher old-age dependency ratio.

Alteration of consumption and saving behavior is described in the Leff's dependency hypothesis, Leff (1969) presents an inverse relationship between dependency ratios and saving rates because their expense paid for consumption rather than production. Therefore, the demographic change has an influence on aggregate saving because the high ratio of dependents to the working age population leads to lower aggregate saving. The saving is the important role on smoothing consumption in the future as proposed by life cycle hypothesis theory.

Modigliani (1988) in the life cycle hypothesis theory held that individual decides on consumption and saving. To smooth consumption over their life, the individual needs to save more, which depends on current income and their age and it also affects lower consumption in current period. The decision of whether and how much to save depends on their consumption and their dependency burden. The impact of a larger young and ageing population reduces the saving since it raises the dependency burden.

Despite the overwhelming concepts in literature supporting reduction of population to increase economic growth, some economists believe in the population driven economic growth. High widens the product market by boosting consumption this leads to expansion of the need to produce more goods to meet the market demand, as a result, firm's increases its production by employing more labour and capital leading to higher national output. High population size creates variety of labour which in effect lowers the cost of production. In addition, high population creates pressure on scarce resources, in an attempt to solve the problem, individuals are forced to be more creative and innovative which acts to improve output. It's therefore worth noting that population have both detrimental and beneficial effects on economic growth. Scholars from different countries have found population growth to either positively or negatively influence economic growth.

3. Research Methodology

Model Specification

The study uses growth regression equations derived from Solow's growth mode(1956) which explains the long run

behaviour of economic growth Bloom and Canning (1999).Theoretically, the Solow-Swan growth model establishes the linkage between population growth and economic growth (Barro and Sala-i-Martin, 2004). The model takes the following form.

$$Y = K^{\alpha} (LA)^{1-\alpha} \quad (3.1)$$

Where Y is the total output, K is the amount of capital employed. L shows the amount of employed labour (equivalent to the population size due to assumption of full employment). A is the labour augmenting technology and α is the capital share of final output.Equation (3.1) can be linearized and be specified as follows

$$Y_t = \alpha K_t + (1-\alpha)((LA)_t \quad (3.1.2)$$

Assuming technology and capital is kept constant for the sake of this study and specifying equation (3.1.2) to become equation (3.1.3) as follows

$$lgdp_t = \beta_0 + \beta_1 lapg_t + \mu_t \quad (3.1.3)$$

Where
$lapg_t$is the natural logarithm of aging population
$\mu_t$is the white noise
β_0, and β_1, are the long-run coefficients that show the relationship between the respective explanatory variable and the dependent variable.

The study applied VECM model whose general form is as follows

$$\Delta y_t = \Pi y_{t-1} + \Gamma_1 \Delta y_{t-1} + \ldots\ldots\ldots + \Gamma_{p-1} \Delta y_{t-p+1} + \mu_t \ldots\ldots 3.1.4$$

Where
$y_t$is vector of the variables in the model
$\Pi\ y_{t-1}$is a product of two matrices α and β containing adjustment parameters and long-run coefficients respectively
$\Gamma_i$is a matrix representing the lagged differences of VECM model.
Δ is the differencing operator, specifically first difference.

Inserting equation (3.1.3) in the regression model (3.1.4) the final model specification stage The lagged differences disappear from the general formula since this study revealed 1 lag for co-integration.

4. Results and Discussion

Nature of Variable
The researcher before formal steps of analysis needs to display descriptive characteristics such as mean of variable observations at level and after transformation. This enables the researcher anticipate what is expected of the formal test results on each of the variables. A visual plot of the data is usually the first step in the analysis of any time series (Damodar, 2004). The following are the visual plots of the variables at level (a) and at first-difference (b)

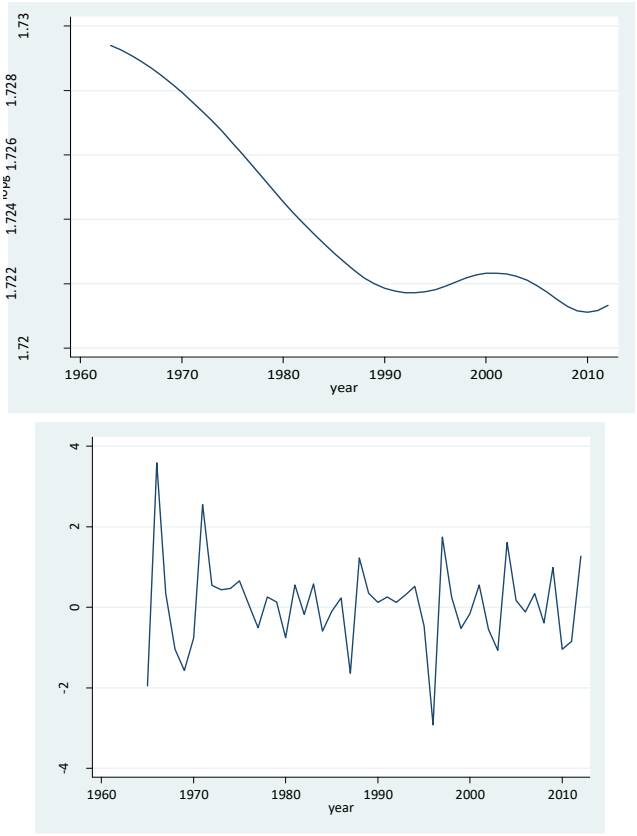

Figure 4.4: Plots for Ageing Population Growth at Level (a) and at First Difference (b)
Source: KNBS, national census reports for various years

Population growth for old people with age 64years and above has declined all the years in the period covered in this study. However the growth sustained and shortly rose in the years around 1995 to 2002 after which the fall continues to the current period. Finally the visual plots of the total population at level and after transforming it into first difference as shown below

Model Output

Long-run relationship
The VECM showed that there exists a long-run relationship between GDP and ageing population. It is indicated from the analysis that in the absence of all variables under consideration GDP will grow at 48.8%. , ageing population growth, it was negative and significant (coef. = -0.719, p = 0.000 < 0.05). Thus, the researcher rejects the null hypothesis and it is accepted that, ageing population growth has a negative and significant effect on economic growth. Also, for each per cent unit increase in ageing population growth, there is 0.719 % decline in GDP growth. The effect of ageing population growth is shown by an absolute z-test value of 8.20 which implies that the effect of ageing population growth surpasses that of the error by over 8 times. This makes sense when the researcher attributes this group to their high household consumption behavior which reduces savings and investment.

Diagnostic Tests
Diagnostic checking is important at this stage to be able to confirm the model adequacy. Tests for residual autocorrelation, normality, and stability will be treated in

this model. We will start with a discussion of the properties of residual autocorrelations of the estimated VECM.

Test for Residual Autocorrelations

Multi-co linearity, regression of two or more non stationary time series and the serial correlation may easily play out and have the same effect of on coefficients. They cause an easy rejection of null hypothesis and lead to alternatively accepting a relationship between variables even though it does not really occur (Lutkepohl, 2005). The results in table 4.8 show that the probabilities for two lags are larger than the critical value at 5% significance level. The researcher will therefore not reject the null hypothesis of no autocorrelations in the underlying model.

Table: LM Test Results for Residual Autocorrelations

	lag	chi2	dfProb> chi2
1	18.7174	25	0.81047
2	21.7386	25	0.65079
H0: no autocorrelation at lag order			

Test for Stability

The unit cycle modulus method on VECM unlike in the stable VAR model imposes K-r moduli on the cycle and r moduli inside the cycle for stable VECM. The moduli inside the cycle should not be too close to the circumference of the unit cycle. K is the number of variables in the model while r stands for co-integration rank.

Table 4.10: Stability Test by Unit Cycle Modulus Method

Eigen-value stability condition	
Eigen-value	Modulus
1	1
1	1
1	1
1	1
.2256304	.2256304

Source: analysis data by the author

The results of table 4.10 and that of figure 4.2 show that the model coefficients are stable. The less than unit modulus is far inside the cycle.

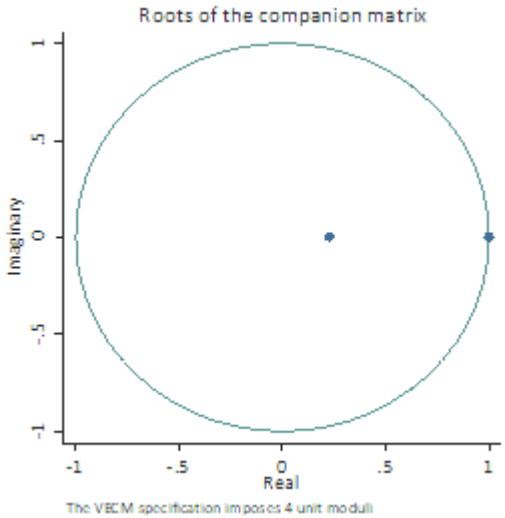

Figure 4.6: Unit Cycle Roots of Companion Matrix

4.7 Discussion of Empirical Findings

The general purpose of this study was to assess the effect of ageing population on economic growth in Kenya. The study made inference on the research hypotheses that there is no significant relationship between ageing population growth on GDP growth. The study used a time series data which was found to be integrated once and co-integrated. Therefore VECM model was applied for inferences.

Research findingsrevealed that ageing population growth has a negative and significant effect on GDP growth as shown by coeff.= -0.719 (p-value = 0.000 which is less than $\alpha = 0.05$) hence the null hypothesis is rejected. In line with the results, Klasen & Lawson (2007) infer that population growth especially the young and old age type is detrimental to the improvement of the economy.

5. Summary of Findings, Conclusions and Recommendations

5.1 Summary

The hypotheses that were tested were that ageing population growths have no effect on GDP growth. The study used time series data collected annually and applied Johansen's co-integration method and VECM model to conduct the inferential analysis. The data for all the series were integrated of order one. The research findings revealed that a negative significant effect of ageing population growth on GDP growth in the long-run. In the short-run old population growth plays a role in correcting any disequilibrium by increasing. Granger causality does not show the direction of effect that come from this variable.

5.2 Conclusion

Demography is one of the major drivers of economic growth, it determines the market for products, level of technical skills and labour supply in an economy. Depending on how population is managed, it can either be beneficial or detrimental to economic growth. From the study, it is concluded that old population may drag economic growth if not checked, It is therefore important for the government of Kenya, demographers and economist to come up with sound economic policies which may reduce the negative impact of the ageing population while harnessing the available labour force by providing enough capital and training to the working population so as to realize sustainable development.

5.3 Recommendations of the Study

In light of the aforementioned findings, there is need for the government to increase direct taxes for the working to meet its future demands, strengthening the already existing pension schemes, increasing long term expenditure on health care (especially for dealing with the old age related ailments). Another way is helping the old age population to retire into less tasking businesses like small scale farming

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