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Population Dynamics and Economic Growth in Nigeria

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Abstract:
This study investigated the relationship between population dynamics and economic growth in Nigeria using time-series data spanning from 1970 to 2014. The data were analysed using ordinary least square estimation technique. The result revealed among other that all the core variables (i.e. fertility, mortality and net-migration) of the study are inversely related to economic growth during the investigated period. The study further revealed that gross fixed capital formation (GFCF) and savings are strong drivers of economic growth in Nigeria. Sequel to the findings, the Nigerian government is advised to make direct efforts toward checking the alarming fertility rate in Nigeria. Also efforts should be made to improve the quality of Nigerian labour force through more substantial investment in education and skills acquisition programmes so as to improve productivity in Nigeria.
Keywords: Population, Population dynamics, Economic Growth.

1.0 Introduction:

Nigeria like many other developing countries in the world has put in place countless economic policies in her numerous attempts to better the living standard of her populace in order to enhance sustainable economic growth and development. It is crystal clear that the country is not just blessed with abundant deposit or supply of diverse natural resources (such as bitumen, crude oil, timbers among many others) but also highly favoured in term of human population size. As such, the country is currently the most populous in Africa according to World Bank (2014). For a country with such huge population size, it is imperative to incorporate or consider population variables in any feasible economic development plan. Rutherford (2002) defined economic growth as growth in total output of an economy overtime, studies such as Aidi, Emecheta and Ngwudiobu (2016); Kotani and Kotani (2012); Louzi and Abadi (2011) and Nwosu, Dike and Okwara (2014) to mention but few showed that economic growth is often measured by growth in real gross domestic product (RGDP). While Nigeria's population has been growing steadily, positively and significantly overtime; the trend of economic growth (measure by RGDP) in Nigeria has experienced high rate of fluctuation/volatility. To support this claim, data from World Bank (2014) revealed that RGDP has experienced both positive and negative growth. For instance, the growth rate of RGDP in 1975, 1986 and 1999 were -7.8percent, 11.1percent and -2.6percent respectively.

The relationship between population and economic growth was first noted in 1798 when the famous paper titled "*An essay on the principle of population*" by Thomas Malthus was published (Aidi et al., 2016). In Nigeria, population has been growing rapidly and consistently from time immemorial. For instance, the country's population rose from 16.06 million in 1911 to 30.42 million in 1953; it rose further to 89 million in 1991 and to over 170million in 2014 (World Bank, 2014). This huge population size does not just make development planning difficult for the country but could also pose significant threats to economic growth in general in the country. Aside the huge population size, evidence from World Bank (2014) revealed that rate of fertility in Nigeria remained unacceptably very high. Fertility (births per woman) has been trending between 6.354 (recorded in 1960) and 6.004 (recorded in 2014) which is high compared to advanced countries like USA, Britain or Russia where fertility rate on the average is less than 2 (World Bank, as cited in Aidi et al., 2016).

In the face of high rate of fertility coupled with the declining rate of mortality (perhaps a resultant effect of global improvement in the overall medical/health services), a rise in the age-dependency ratio is not unexpected. To support this is data from the World Bank (2014) which revealed that age-dependency ratio rose from 79percent in 1960 to 83percent in 1970, 86percent in 2000 and about 90percent in 2014. Note that a rise in age-dependency ratio is tantamount to fall in the working population which in the long-run may negatively affect productivity (and economic growth).

In addition to the highlighted problems is the perceived unfavourable trend of migration (i.e. inflow and outflow of people) in the country. Drinkwater, Lotti and Pearlman (2003) asserted that migration may drain away valuable talents since educated and motivated people are in most cases likely to migrate in search of opportunities. The researchers explained further that in 2000, about 10.7percent of highly skilled population (trained in Nigeria) work abroad most especially in Organisation for Economic Cooperation and Development (OECD) countries. Fadahunsi and Rosa (2002) noted that sixty-four percent of Nigerian emigrants (on the average) have attained tertiary level of education. In summary, all these are strong evidence in support of the assertion that many of those (professionals, athletes etc) who could have contributed to the development of Nigeria if engaged might have abandoned the nation and used their skills and intellect to aid the development of other countries.

While numerous efforts have been made by successive Nigerian governments at one time or the other to address .these problems, not much success has been achieved in this feat. It is against this backlog that this study

is set out to investigate the impact of population dynamics (using fertility, mortality and net-migration as proxies) on economic growth in Nigeria between 1970 and 2014.

2.0 Review of Relevant Literature

It is important to note that the number of available related literature (on the relationship between population or its dynamics and economic growth) are not just relatively scanty (most especially at the domestic/national level), these available studies lack unanimity in both their findings and conclusions. In this study, review of related literature was done under the following two subheadings:

2.1 Review of Domestic Studies

Some of the domestic studies reviewed on the relationship between population and/or its dynamics and economic growth include (but not limited to) the studies of Adewole (2012); Aidi et.al (2016); Odusina (2011); Olabiyi (2014) and Onwuka (2006) among others.

Onwuka (2006) evaluated the impact of growing population on economic growth in Nigeria between 1980 and 2003 using OLS regression model. The study relied on annual time series data for its analysis, among the variables of interest incorporated in the model are GDP growth rate, population, growth rate of population, lagged per capita output, oil production, agricultural output among others. The empirical result showed that negative relationship existed between the core variables (i.e. population growth and economic growth) during the period considered.

Contrary to the findings of the study of Onwuka, Adewole (2012) undertook a research to unravel the relationship between the effects of population on economic growth in Nigeria using an annual time series data covering the period of 1981 to 2007. The researcher chose OLS regression method for analysis, variables included in the model are real gross domestic product (RGDP), population and per capita income (PCI). The researcher found among other things that a strong positive relationship existed between population and economic growth (measured as both RGDP and PCI) during the period considered.

In another important study titled "implications of a rapidly growing Nigerian population", Odusina (2011) reviewed relevant existing literature on Nigerian population paying keen and specific attention to its history, development and growth rate of the population phenomenon over time. The researcher in this review of literature was wary of the potential threats an uncontrolled population growth may pose on the smooth running of the Nigerian economy. The study did however highlight the numerous but failed attempts made by the various Nigerian governments to arrest the situation and why such efforts ended up fruitless. The researcher concluded the study by making some recommendations which include the need for Nigerian government to design an intervention programmes capable of reducing rate of growth of population as well as creating an enabling environment to improve savings, investment, entrepreneurship and technical know-how so as to boost the overall level of productivity in the economy

Nwosu et al. (2014) in an empirical research studied the relationship between population growth and economic growth in Nigeria between 1960 and 2008 using annual time series data. OLS techniques were combined with granger causality test for the study. The core variables included in the model were GDP and population growth. The researchers found among other things that population growth has a significant impact on economic growth during the period under-studied; the researchers also established that a sustainable long-run relationship between economic growth and population growth.

However, Aidi et al (2016) using more recent data investigated the relationship between population growth and economic growth in Nigeria. The researchers employed Granger-Causality technique for the study and found that neither population growth Granger-Cause economic growth nor economic growth Granger-Cause population during the period understudied (i.e. 1970 to 2013). This finding is therefore in stark contrast to that of Nwosu et al (2014).

Similarly, Olabiyi (2014) investigated the effects of population dynamics on economic growth of Nigeria between 1980 and 2010 using the vector auto regressive (VAR) model. The variables of interest are infant mortality rate, fertility rate, trade openness, government expenditure, real gross domestic product and primary school enrolment The study was based on annual time series data drawn on variables of interest within the stated period, The researcher found that as fertility rate continued to decline, economic growth was rising; also the researcher established a positive relationship between infant mortality rate and economic growth.

So also Nwakeze and Omoju (2011) reviewed the relationship between economic growth and savings in Nigeria using secondary (annual time series) data that spanned through 1980 to 2007. The variables incorporated in the model for the study are saving rate, population, real per capita GDP, interest rate, inflation rate and financial depth. The study relied on vector error correction regression model for its analysis. The empirical estimation results revealed that savings and rapid growing population have negative and positive influence on economic respectively in Nigeria.

2.2 Review of Foreign Studies

At the international level, the reviewed studies include that of Bloom Canning and Finlay (2010); Kotani and Kotani (2012); Kothare (1999); Rutger and Jeroen (2011); Ukpolo (2002) among others

Kothare (1999) embarked on a research with a view to establishing the relationship between population growth and economic growth in India. The study covered all provinces in India and covered a period of 1988 to 1998. The researcher employed the combination of descriptive and analytical statistical tools on the data obtained on the variables of interest. The result of the study revealed that population growth has significantly and positively impacted economic growth during the period considered. The researcher explained further that the findings of the study are valid for both the short-run and long-run.

Meanwhile, Ukpolo (2002) empirically measure the economic association between population growth and economic growth in Africa using Johansen Co-integration and Granger-Causality techniques. The study is based on annual time series data collected on the variables of concern from the two selected countries (Nigeria and Coted'ivoire). The estimation results showed that the variables are co-integrated, that is, long-run relationship existed between the variables in Nigeria but not in Coted'ivoire. The results further revealed a negative long-run causal relationship between the two variables of concern in Nigeria (i.e population growth negatively affects economic growth) in the long-run. In Coted'ivoire, the results showed that population growth causes economic growth only in the short-run. This is contrary to the study of Kothare (1999).

In another related study, Bloom, Canning and Finlay (2010) empirically examined the relationship between aging population and economic growth in Asia between 1960 and 2005 relying on both descriptive statistics and fixed (dynamic) panel regression model. The variables used in the study include RGDP per capita, capital stock, average secondary school enrolment, trade openness, life expectancy and dummies (used to proxy regions in Asia). The findings of the study include a negative relationship between aging population and economic growth; a positive relationship between economic growth and capital stock, trade openness and other institutional variables included in the regression model.

Also, Singh, Mittal, Sharma and Smarandache (2010) embarked on an empirical study to identify the determinants of population growth in Rajasthan, India between 1991 and 2001. The study was based on the use of multivariate analysis even though the researchers employed the use of multiple regression analysis to establish the linear relationship between the regressand (population growth) and the regressors (crude birth rate, crude death rate, total fertility, infant mortality rate, female-male ratio, per capita expenditure on medical and public health, education attainment among others). The results revealed among other things that only few of the regressors incorporated in the model namely: total fertility, infant mortality rate and crude death rate have significantly influenced population growth during the period investigated.

Rutger and Jeroen (2011) investigated the impact of population dynamics (age-structure) on economic growth in developing countries from 1997 to 2008. The variables included in the model are asset (wealth) index (used as proxy for district GDP), GDP per capital growth, growth rate of working-age share, urbanisation rate, landlocked, life expectancy, trade openness. The result of the study revealed a robust positive effect of working-age population on growth rate of GDP. Therefore, the researchers recommended the need for government to create conducive investment environment as this will provide more employment that can absorb the growing youth population.

So also, Dao (2012) examined the relationship between population and economic growth in Africa using data that covered selected forty-five (45) African economies. The researcher employed the used of panel data regression analysis for the study, among the variables listed in the model include fertility rate, per capita GDP growth, trade openness, dependency ratio (old and young) among others. The researcher deduced from the findings that the relationship between population growth and per capita GDP growth is linear and negative. The findings further revealed that fertility rates have a negative impact on economic growth and also that old dependency ratio positively affects per capita GDP growth.

In addition, Kotani and Kotani (2012) embarked on an empirical research to understand the effect of net-migration on population-economic growth relationship in Indonesia between 1993 and 2005 using ordinary least square (OLS) regression techniques on annual time series data obtained on variables listed in the model such as GDP, population growth, lagged value of fertility rate and net migration. The study revealed that lagged fertility does not affect the economic growth in the two-variable regression; however, the study further revealed a significant negative relationship between population growth and economic growth upon the inclusion of net-migration as a variable in the model. The researcher therefore concluded that net-migration is a key determinant of economic growth.

Akintunde et al (2013) examined the relationship between population dynamics and economic growth in sub-Saharan African from 1975 to 2005 using five year average. The researchers employed the use of both pooled OLS and dynamic panel techniques on data obtained from thirty-five (35) countries in the sub-Saharan countries. Among the variables listed in the model include gross capital formation (as a percentage of GDP), gross domestic product per capital, primary school enrolment, mortality rate, fertility rate among others. The empirical research

result revealed that total fertility rate has a negative impact on economic growth while life expectancy at birth was found to have a positive relationship with economic growth during the considered period. The researchers concluded that for economic growth and development to be achieved in studied economies, population growth must be properly addressed.

Sequel to the reviewed literature, it is imperative to note that:

i. Most of the studies (such as Adewole, 2012; Aidi et al., 2016; Nwosu et al., 2014; Onwuka, 2006 among others) reviewed focussed majorly on the either the impact of population or population growth on economic growth in Nigeria. These studies conspicuously disregarded or failed to incorporate demographic variables (such as fertility rate, mortality rate, net-migration etc) that are responsible for changes in population.
ii. To the best knowledge of the researchers, the work of Olabiyi (2014) is the only domestic study that examined the relationship between population dynamics and economic growth between 1980 and 2010. This study is not just limited in scope, it omitted a vital variable (net-migration) found to be statistically significant by Odusina (2011), Kotani and Kotani (2012) among others in the understanding of population-growth nexus.
iii. There is also absence of consensus in the literature (in term of the relationship between population dynamics and economic growth). For instance, the studies of Rutger and Jeroen (2011), Akintunde et al. (2013) and Olabiyi (2014) showed conflicting/contradicting results.
iv. Lastly, the only Nigerian study (Olabiyi, 2014) relied on the use of Vector autoregression (VAR) model which according to Gujarati and Porter (2009) is less suitable for strong policy analysis because its emphasis is majorly on forecasting. Gujarati and Porter explained further that the use of VAR especially when annual data of limited time period (as observed in this study) is involved may lead to the problem of micro-numerosity.

Without mincing words, this study is set is to fill the gaps highlighted above.

3.0 Data and Research Methodology/Model

3.1 Data

This study seeks to establish the relationship between population dynamics (captured using fertility rate, mortality rate and net-migration) and economic growth (using real gross domestic product-RGDP as a proxy) using time-series data ranging from 1970 to 2014. The core variables are fertility rate, mortality rate (using life expectancy rate as proxy) and net-migration; the control variables incorporated in this study are trade openness (measured as total trade divided by gross domestic product-GDP), government expenditure, savings while gross fixed capital formation (GFCF) was included as structural variable. Data for variables including real gross domestic product, fertility rate, mortality rate, net-migration, trade openness were obtained from World Bank (2014) while those of savings, gross fixed capital formation and government expenditure were obtained from the Central Bank of Nigeria Statistical Bulletin (CBN, 2014).

3.2 Research Methodology/Model

This study is guided by the popular neo-classical growth theory. This is because the neoclassical growth theory is believed to offer a comprehensive and rigorous treatment of population and income as vital variables in the analysis of growth in any economy (Currais as cited in Akintunde et al, 2013). Neoclassical economists are of the belief that population growth is correlated to technological advancement and positive economic outcomes. The neoclassical growth theory holds that growth in total productivity or output can be achieved either via increase in saving or reduction in the rate of growth of population. According to Grabrowski and Shields (1996), a slowly growing population will require less saving and investment for capital widening thus making more saving and investment available for capital deepening. The aggregate production function of the traditional neoclassical growth theory is stated as follows:

$$Y = Af(L, K) \quad \text{.....1}$$

where:

Y is the output/gross domestic product (GDP)
L is the amount of Labour
K is capital stock and
A is productivity factor (i.e. exogenously determined level of technology).

This study employed an augmented neoclassical growth model in which vector of variables used as proxies for population dynamics (i.e. factors that exert changes in population) as well as vector of all other variables that can influence economic growth are incorporated as demographic factor (A) and control variable (Z) respectively while labour is dropped from the model since there is no reliable data or proxy for labour in Nigeria for the period under consideration. Note again that GFCF and RGDP are used as proxies for capital stock and economic growth respectively. Thus, equation 1 is re-specified as follows:

$$RGDP = f(A, GFCF, Z) \quad \text{.....2}$$

The demographic factor (A) and control variable (Z) are thus defined as equation 3 and 4 below:

$$A = f(FERT, MORT, NETMGR) \quad \text{.....3}$$

$$Z = f(, SAVINGS, GOVEX, OT) \quad \text{.....4}$$

where:
MORT = total mortality rate (using life expectancy at birth as its proxy)
FERT = total fertility rate
NETMGR = net-migration (defined as immigration minus emigration)
SAVINGS = total saving
GOVEX = government expenditure
OT = openness to trade.

The focus of this study is to determine the relationship between population dynamics and economic growth in Nigeria between 1970 and 2014. Putting equation 3 and 4 into equation 2 will lead us to the functional form of our model expressed as follows:

$$RGDP = f(FERT, MORT, NETMGR, GFCF, SAVINGS, OT, GOVEX) \quad \text{.....5}$$

Gujarati and Porter (2009) recommended the use of log-linear (i.e. log-log) model in measuring growth rate of any economic variable. Following this recommendation (since none of our variables is expressed in percentage form), equation 5 is expressed in log form as follows:

$$LGRGDP = f(LGFERT, LGMORT, LGNETMGR, LGGFCF, LGSAVINGS, LGOT, LGGOVEX) \quad \text{.....6}$$

The econometric form of equation 6 is expressed as equation 7 below (note that all variables are as earlier defined):

$$LGRGDP_t = \beta_0 + \beta_1 LGFERT_t + \beta_2 LGMORT_t + \beta_3 LGNETMGR_t + \beta_4 LGGFCF_t + \beta_5 LGSAVINGS_t + \beta_6 LGOT_t + \beta_7 LGGOVEX_t + \mu_t \quad \text{.....7}$$

To establish the link between the regrassand and regressors, the above (equation 7) was estimated using Ordinary Least Square (OLS) technique.

4.0 Results and Interpretation

4.1 Stationarity Test

As a prerequisite to avoiding spurious regression, stationarity test was conducted for all the variables utilised for analysis. This test is expected to help determine whether or not the mean value as well as variance of these variables do not vary over time. The popular Augmented Dickey-Fuller (ADF) test was employed in this study. The null hypothesis is stated as follows:

$H_o: \delta = 0 \; or \; \rho = 1$ (i.e. the variables are non-stationary)

Decision Rule

At the more conventional 5% level of significance, the null hypothesis will be rejected if the ADF statistics is negative and greater than the Mackinnon critical value (i.e. if the ADF statistics is more negative than the Mackinnon critical value at 5% level of significance).

Stationarity Test Result for Variables in the Model

Variable	Mackinnon Critical Value at Level	ADF Statistics at Level	Mackinnon Critical Value after 1st difference	ADF Statistics after first difference	Order of Intergration
LGRGDP	-3.518090	-0.268842	-1.948886	-4.802649	I(1)
LGFERT	-1.949097	-3.052678	-	-	I(0)
LGMORT	-3.548490	-4.992661	-	-	I(0)
LGNETMGR	-3.533083	-1.978151	-1.949856	-5.268769	I(1)
LGGFCF	-3.518090	-1.745822	-1.948886	-6.422329	I(1)
LGSAVINGS	-3.520787	-2.780040	-2.933158	-4.500531	I(1)
LGOT	-3.518090	-2.295989	-1.948886	-8.086440	I(1)
LGGOVEX	-3.518090	-2.230057	-2.933158	-7.965206	I(1)

Source: Author's computation (see appendix A)

The above revealed that variables such as LGFERT and LGMORT are stationary at level while LGRGDP, LGNETMGR, LGGFCF, LGSAVINGS, LGOT and LGGOVEX are observed to be stationary after first differencing at 5percent level of significance.

4.2 Test of Cointegration

The conventional econometrics wisdom has it that when the dependent variable shares same order of integration (i.e. integrated of order one) with at least one of the explanatory variables in the model, it is enough suspicion to suspect co-integration. As such, co-integration test to determine whether this shared order of integration is a mere

coincidence or an evidence of long-run relationship between these variables becomes essential. Since the unit root test result for the variables listed in the model of this study revealed that the dependent variable (LGRGDP) is of same order of integration with at least one of the associated explanatory variables. The table below contains the result of the co-integration tests conducted using the Johansen Co-integration Test which is more appropriate particularly when there are more than one explanatory variable in the equation having same order of integration as the dependent variable (Gujarati & Porter, 2009).

Decision Rule: the null hypothesis is to be rejected when the P-value is less than 5% (i.e. reject H_o: if P-value < 0.05).

Summary of Johansen Cointegration Test Results for the Model (i.e. Equation 7)

Number of Cointegrating Equation(s)	Trace Statistics	Critical Value at 5%	P-Value
NONE*	315.1156	159.5297	0.0000
AT MOST 3	69.81398	69.81889	0.0500
AT MOST 4	39.42924	47.85613	0.2436
AT MOST 7	1.675752	3.841466	0.1955

Source: Author's computation (see appendix B)

Considering the above table, at "None", the null hypothesis (H_o) that "there is no co-integrating equation" will be rejected since the P-value of 0.000 is less than 0.05 while those of at most 4 and 7 that "there is at least four and seven co-integrating equations" cannot be rejected since the P-value of 0.2436 and 0.1955 are both greater than 0.05 (i.e. there is co-integration). The establishment of co-integration (as observed from above) suggests the existence of a long-run relationship between the dependent variable (RGDP) and the explanatory variables. Thus, the need to estimate error correction model (ECM) which will reveal the short-run adjustments of the co-integrated variables towards their equilibrium values become mandatory. The ECM is a short-run model that explains how the long-run error of a model is corrected in the short-run. Gujarati & Porter (2009) explained that ECM provides the medium for the reconciliation of the short-run behaviour of an economic variable with its long-run behaviour. The ECM result (see appendix C for details) revealed a negative and statistically significant coefficient (-0.678884). This simply implies that about 68percent of the short-run disequilibrium between the dependent variable and independent variables will be taken care of within the space of one year.

4.3 Regression Result and Interpretation

Following the explanation of Gujarati and Porter (2009), since the co-integration test result established the existence of long-run relationship between the dependent and independent variables of this study, the estimation of our model (equation 7) will not produce a spurious but a consistent and reliable result. We present the result of the regression as follows:

Summary of result for the estimated Model (Equation 7) of the Study

Dependent Variable: LGRGDP

Variable	Coefficient	Std Error	t-Stat at 5%	Prob.
CONSTANT	-2.663497	4.720846	-0.564199	0.5761
LGFERT	-9.168787	1.783358	-5.141305	0.0000
LGMORT	-14.00505	2.154012	-6.501845	0.0000
LGNETMGR	-0.058045	0.024085	-2.410006	0.0169
LGGFCF	0.022945	0.002788	8.229936	0.0000
LGSAVINGS	-0.245425	0.099906	-2.456557	0.0190
LGOT	0.098566	0.073026	1.349745	0.1855
LGGOVEX	0.034545	0.056895	0.607167	0.5476

R-Squared	0.974191
Adjusted R-squared	0.969173
Durbin-Watson Stat.	2.304705
F-stat.	194.1234
Prob (F-statistics)	0.000000

Source: Author's computation using eviews 7(see appendix D)

Constant

The constant or intercept term explains or predicts the value of the dependent variable (LGRGDP) where the value of all explanatory variables is zero. The coefficient of this intercept term (-2.663497) is negative and statistically insignificant (considering the t-statistics and P-value) therefore no strong economic meaning can be deduced from it.

Fertility

The result revealed that the coefficient of this variable (-9.168787) is negative and statistically significant (looking at the t-statistics of -5.141305(greater than 2 in absolute term) and its corresponding P-value of 0.0000 (which is less than 0.05). This however implies that a percent increase in fertility will on the average reduce economic growth by approximately 9.2% holding all other variables constant. This result agrees with the findings of Akintunde et al (2013), Dao (2012) and Singh et al (2010).

Mortality

Rate of mortality (using life expectancy at birth as its proxy) is found to be statistically significant and negatively related to the dependent variable (LGRGDP). The coefficient, t-statistics and P-value are -14.00505, -6.501845 and 0.0000 respectively. From the result, one can explain that a percentage rise in mortality rate is expected on the average to reduce LGRGDP by about 14% while keeping all other variables constant. This supports the findings of Akintunde et al (2013), Olabiyi (2014) and Rutger & Jeroen (2011).

Net-migration

This result agrees particularly with the study of Kotani & Kotani (2012). The coefficient, t-statistics and P-value of -0.058045, -2.410006 and 0.0169 respectively revealed that net-migration is a statistically significant variable in the analysis of economic growth. Also it is vital to note that the negative coefficient (as revealed) explains that the variable is inversely related to economic growth in Nigeria. Thus, as net-migration increases by one percent, LGRGDP is expected to reduce by 0.06% on the average holding all other variables fixed.

Gross Fixed Capital Formation

This is used as a proxy for capital stock, the sign of the coefficient (0.022945) shows that it is positively related to the dependent variable (LGRGDP). The t-statistics (8.229936) as well as P-value (0.0000) show that the variable is statistically significant in the model. Thus, one percent increase in LGGFCF will on the average trigger approximately 0.02 percent rise in the dependent variable (LGRGDP).

Savings

The coefficient of this variable as obvious in the above table is -0.245425; the t-statistics and P-value are -2.456557 and 0.0190 respectively. Since (based on both the t-statistics and P-value) this variable is statistically significant, a percentage rise in savings is expected to decrease the dependent variable (LGRGDP) by about 2.5percent (on the average) holding all other variables unchanged/fixed. This is in line with the findings of Nwakeze and Omoju (2011).

Openness to Trade

The coefficient (0.098566) of this variable carries a positive sign thus depicting a positive relationship between openness to trade and the dependent variable (LGRGDP). This implies that Nigeria economy would have been reaping economic benefits from the removal of trade barriers but for the t-statistics (1.349745) as well as the P-value (0.1855) that show that the variable is statistically insignificant therefore such conclusion will be rash.

Government Expenditure

The coefficient of government expenditure (0.034545) revealed positive relationship with economic growth (LGRGDP) meanwhile since the t-statistics and P-value of 0.607167 and 0.5476show that the variable is statistically insignificant such conclusion cannot be reached.

Coefficient of Determination (or R Squared)

From the result, it is obvious that R-squared which is a measure of goodness fit is 0.974191 (i.e. 97%). The R-squared explains the percentage of variability in the dependent variable that is influenced by the explanatory variables. In this model, about 97 percent of the variability in RGDP is explained by the explanatory variables (LGFERT, LGMORT, LGSAVINGS etc) listed in the model.

F-Statistics (F-test)

The F-statistics or F-test through its probability value tells us whether the overall model is statistically significant. The values of F-stat as well as that of its probability value (i.e Prob of F-stat) from the table are 194.1234 and 0.00000 respectively. This implies that the model is statistically significant (since the Prob. of t-stat is less than 5%).

5.0 Summary of Findings, Conclusion and Recommendation

5.1 Summary of Findings

This study investigated the impact of population dynamics on economic growth in Nigeria between 1970 and 2014 using fertility, mortality and net-migration as proxies for population dynamics. It was observed that all the core variables (i.e. proxies for population dynamics) were statistically significant. Therefore, it suits to say that fertility, mortality and net-migration are strong drivers of economic growth in Nigeria. From the regression results, fertility rate was observed to be a negative driver of economic growth. This can be explained from the point view of the population pessimist's view that claimed that with the rate of fertility expanding, more mouths will have to be fed thus leaving little or nothing to be saved. This will lead to fall in investment and in turn productivity. Similarly, mortality was observed to be a negative driver of economic growth. This is in line with the belief of the classical

economists in the sense that a rise in mortality they claimed will reduce population/labour force and in turn productivity. As for net-migration (which is also inversely related to economic growth), the result of our finding supports the arguments of Fadahunsi and Rosa (2002) and Drinkwater et., al. (2003) that migration can result in loss of manpower and valuable talents. Note that savings and gross fixed capital formation were also found to be statistically significant, negatively and positively related to economic growth respectively.

5.2 Conclusion and Recommendations

With the failure of previous attempts by the Nigerian government to checkmate the rapidly growing population as well as its associated socio-economic predicaments in the country as noted by Adewole (2012) and Odusina (2011). In this study, the researchers made an attempt to establish the relationship between population dynamics and economic growth in Nigeria. Among what can be deduced from these findings are: that fertility rate in Nigeria is still unacceptably high relative to many other nations; that the Nigerian economy has not maximised benefits from international trade and cooperation; that Nigeria as a nation has been unable to take advantage of the huge population size to expand labour force and productivity and that the huge population is characterised by high level of poverty and unemployment (overwhelming among the youth).

From the findings, it suffices to conclude that the Nigerian government should not just stop at curtailing rate of fertility and mortality in the country, efforts should be made to ensure that the growing populace are engaged in productive activities. Although the attention of the researcher focused principally on the behaviour of the afore-mentioned core variables of the study, the researcher cannot keep mum as to the surprise sign (negative) with which savings appeared in the model (equation 7) of the study. The only explanation that can be adduced to this rarely behaviour is that savings are not directed towards productive purpose in Nigeria. In addition, one can explain that as savings continue to grow people may put less effort toward production thus reducing the overall total output in Nigeria. Sequel to the findings of this study, the following policies were suggested:

1. The Nigerian government should embark on sensitisation crusades/programmes to enlighten the Nigerian populace on the need to check fertility rate.
2. Policies capable of directly curtailing rate of fertility should also be formulated and at the same time efforts should be made to ensure compliance.
3. The government should put in place more economically friendly policies to attract more of both domestic and foreign investors. This will go a long way in creating more employment opportunities as well as stimulating productivity.
4. The government as well as private sector should thrive harder to invest in education and skill acquisition programmes. This will improve the quality of labour which will in turn positively exert productivity.
5. The Nigeria government should also invest more in the area of infrastructural facilities as this will create the much needed enabling environment for various economic activities.
6. Finally, it is crystal clear that the Nigerian government still needs to spend more to ensure healthiness and reduce mortality in the country noting that only a healthy labour force can contribute meaningfully towards output expansion.

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