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An Empirical Investigation of Malthusian Population Theory in Nigeria

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Abstract

This paper investigates the potency of increasing population on economic development in Nigeria hinging the background of analysis on Malthusian population theory. It is important to emphasize that while Malthus believes that increase in population leads to underdevelopment, other economists like Marx and Engels see it otherwise especially with regards to socialist and capitalist economies. Using the Vector Error Correction (VEC) Mechanism to estimate a time series covering a 31 year period of 1982 – 2012, the study found out that population growth has no significant impact on economic development in Nigeria within the study period – giving credence to the theoretical underpinning. The study recommends among others that the government should embark on enlightening campaigns to intimate the populace on the dangers of overpopulation and its attendant consequences. Also, the continuous benefits of modernization in terms of improved health care services and other social securities should be made available to the populace, the majority whom are poverty stricken. Finally, the pursuit of diversifying the economy should be relentless, so that the channels of stimulating growth and development will not be neglected.

Keywords: Nigeria economy, population growth, economic development, per capita income

INTRODUCTION

The early population growth discourse which was initiated by Thomas Malthus and continued by Karl Marx and Friedrich Engels has led to a lot of controversy. While Malthus posited that population tends to outstrip resources; Marx and Engels believed that the consequences of population growth will be quite different in a capitalist society when compared to those in a socialist society. This led to reformulations in the nineteenth and early twentieth centuries by scholars such as J. S. Mill, Ludwig Brentan, and Emile Durkheim. The reformulation of the early theories by these scholars provided the background for more systematic collection of population data to test aspects of these theories.

Economists are torn between three theories; one that state's that population growth helps a nation's economy by stimulating economic growth and development and another that bases its theory on Robert Malthus' findings that population increase is detrimental to a nation's economy due to a variety of problems caused by the growth. The third school of thought is that population growth does not have any impact on economic growth (Thuku, Gachanja and Almadi, 2013).

Kuznets, Lewis, Meier and other economists have shown that the growth of population has been an important factor in the growth of "developed" countries (Jhingan, 2007). Other proponents of this assertion are Bloom and Freeman (1998), Coale and Hoover (1958), Friedberg and Hunt (1995), Nurkse (1951) and Lewis (1954). However, notable economists such as Malthus (1798), Gerald and Meier (1995) and Martin (2009) believe that population growth has an inverse relationship with economic development.

The high rate of population growth is a growing concern throughout the world and a challenge to countries' economies. The world's population was about a billion in 1800 and rose to 2.5 billion in 1950. In the year 2007 the world's population was 6.7 billion and is projected to rise to 9.2 billion by 2050 with almost all population growth projected to occur in what are now considered less developed regions – Africa, Asia and Latin America (Martin, 2009). Nigeria which is also a developing country is not excluded and has a rapidly growing population. The 1991 census figure puts Nigeria's population at about 89 million people with a growth rate of 2.82 percent and total fertility rate of 5.89 percent as revealed by Post Enumeration Survey (PES). In the 2006 National Population Census, Nigeria had a population of 140,003,542 (NBS, 2010) with a growth rate of 3.02 percent per annum, a population that is capable of doubling itself in less than twenty three years. In addition, the 2009 United Nations estimate of Nigeria's total population stood at 151,030,400 (UN, 2009).

Population is one of the central problems of poverty and sustainable economic development. For example, in the

decade 1990 – 2000, Cameroon, Kenya and Zambia had population growth rates of 2.7, 2.4, and 2.6 per cent per year alongside GDP growth rates of 1.7, 2.1 and 0.5 per cent, respectively hence they experienced negative rates of growth of GDP per capita of -1.0, -0.3, and -2.1 per cent per year (World Bank, 2002). Many less developed countries have rates of growth of population that are nearly as large as their rates of growth of GDP. As a result, their standards of living are barely higher than they were half a century ago. They have made appreciable gains in aggregate income, but most of the gains have been literally consumed by the increasing population leading to poverty and decreasing standard of living.

Nigeria's average growth rate of per capita income between 1982 and 2012 stood at 1.15% which is less than half the growth rate of population of 2.49%. There has also been a striking feature of Nigeria's economy which has gone unnoticed. Since 1981, the Nigerian economy has not grown: the GDP per capita in 1981 was more than that of 2002 and almost the same with that of 2006. This brings in a sharp contrast when compared with peer countries like Indonesia and Pakistan. In 1980, Nigeria's GDP per capita was slightly higher than that of Indonesia and Pakistan (Bloom, Finlay, Humair, Mason, Olaniyan and Soyibo, 2010). Since then, Nigeria's economy has stagnated, while Pakistan, and especially Indonesia, has grown considerably. Indonesia's income per person is now roughly twice Nigeria's. Nigeria's economy in general has performed similar to Sub-Saharan Africa as a whole. Meanwhile, East Asia in particular and the rest of the world have zoomed ahead.

Part of the problems with the Nigerian economy has been demographic. Since independence, Nigeria has struggled against very high fertility rates and relatively low (or declining) mortality rates resulting in a high ratio of children in the population. Only since the 1980s did fertility rates began to decline, albeit very slowly and averaging 6.09% till date. In 2007, Nigeria's fertility rate was higher than in Sub-Saharan Africa as a whole and was more than twice the world average fertility rate (UN, 2007).

Hence, in this time of increasing population growth in Nigeria (put at about 3.2% annually), great concern is raised about poverty alleviation, sustainable growth and development. The paper is structured into 5 sections. Section 1 gives the background of the Nigerian population changes in line with sustainable economic development and poverty alleviation. Section 2 deals with literature review comprising theoretical framework and empirical review while section 3 covers the methodology. Section 4 focuses on data analysis and interpretation while the conclusion and recommendation is done in section 5.

PURPOSE OF THE STUDY

The impact of fundamental demographic processes on economic growth and sustainable development has often been neglected when building strategies for poverty alleviation in Nigeria. It has been widely acknowledged that population growth leads to economic development in developed countries. However, this is not a basis to conclude for Less Developed Countries (LDCs) since the conditions prevailing in these countries are quite different. In some poor countries of the world, Malthus prediction seems to be accurate (this can be confirmed from the work of Dao, 2012). There, agricultural methods are fairly traditional, so that food production increases only slowly while population tends to increase at more rapid rates. The result becomes subsistence living with population held in check by low life expectancies and periodic famines.

The question with respect to Nigeria therefore is: does an increase in population lead to an increase in standard of living or otherwise population trap? This study thus sets out to achieve the following basic objectives: examining the effect of increasing population on economic development; assessing the predictive power of population growth on future development trends, and establishing how well the fitted model predicts the outcome of sample observations. In doing this, the study will be significant in that it will attract attention to the issue of bringing into perspective population growth fundamentals into policies of poverty alleviation and sustainable development. It will contribute to literature by being contemporary for updating data up to the period of 2012, it also used variables which are core variables of population growth, then it applied a robust econometric analytical tool that has optimal qualities and applicable to long term analysis.

LITERATURE REVIEW

Theoretical Framework

There had been discussions on the issue of population, its growth, desirability, and consequently its effects. Malthus was the first to integrate the ideas into a systematic line of thought as he was able to fuse the growth of population to its effects. Malthus did not subscribe to the views of early economists like Godwin, Cantillon, and Smith (Bhatia, 2006) who believed that population growth will either be counter balanced by a corresponding increase in means of subsistence or reason would help people to check population growth.

Instead, Malthus took the position that there was a natural phenomenon which triggered population in a geometric progression and food supply in arithmetic progression. The crux of Malthus thesis is summarised thus: Sex instinct is a powerful instinct in humans which if left unchecked (or unless checked through moral restraint) leads to high rate of procreation. Also, the means of subsistence that is, food supply obtained from agribusiness cannot increase that fast. Therefore, so long as population and subsistence conformed to their geometric and arithmetic progressions, population was guaranteed to surpass the means of subsistence. Finally, unless population growth was slowed down through 'preventive checks,' 'positive checks' then become inevitable.

Fortunately, in most parts of the world, Malthus' predictions have been proved false for two main reasons are paramount; first, Malthus underestimated the importance of technological change, which has increased productivity in agriculture at a geometric rate rather than an arithmetic rate, and a rate far higher than the rate at which the demand for food has been growing in most 'advanced' countries. Secondly, he underestimated the extent of voluntary restrictions of population growth. As a result, population has grown more slowly than has the production of food (and most other consumables) in 'developed' countries. For them, living standards have been rising rather than falling.

Even though Thomas Malthus was termed a pessimist, his population theory has evoked a lot of interest both positively and negatively. Fiercer on the discourse concerning his theory in recent times is the relative effect of population growth on developed and underdeveloped countries. Most researches (as earlier stated) have proved population growth as significant to development in developed countries. However, most underdeveloped countries have been experiencing rapid population growth and poverty simultaneously. This has spurred the interest of this research to investigate the relationship between population growth and economic development in Nigeria with a view to establishing the direction of impact.

Trend in Population Growth and Economic Development in Nigeria

It is worthy to note that,

> *"for the more advanced industrialised countries, Malthusian pressures are not a problem today. However, for many poor countries, where people subsist on what they grow for themselves, the tendency for the growth in population to outstrip the growth in the food supply makes Malthusian pressures a current threat* (Lipsey and Chrystal, 2004)."

Even though Adam Smith wrote (cited in Jhingan, 2007), "the annual labour of every nation is the fund which originally supply it with all the necessaries and conveniences of life," Thomas Malthus observed the inalienable effects of population growth to living standards early in the nineteenth century. He emphasized two relationships about rates of increase. First, food production increases in arithmetic progression (e.g. 100, 200, 300, 400, 500, i.e. 100 units per period). Second, population tends to increase in a geometric progression (e.g. 100, 200, 400, 800, 1600 i.e. 100% per period). As a result, Malthus argued that population will always outstrip the growth in food supply.

Around a quarter of Nigeria's population still lives at bare subsistence level and more than two-thirds (69%) live on an income that is below 9.7% of per capita income (NBS, 2012). Does this give credence to the Malthusian postulation? The figure below shows the growth rate of population and per capita income within the period of 1982 – 2012.

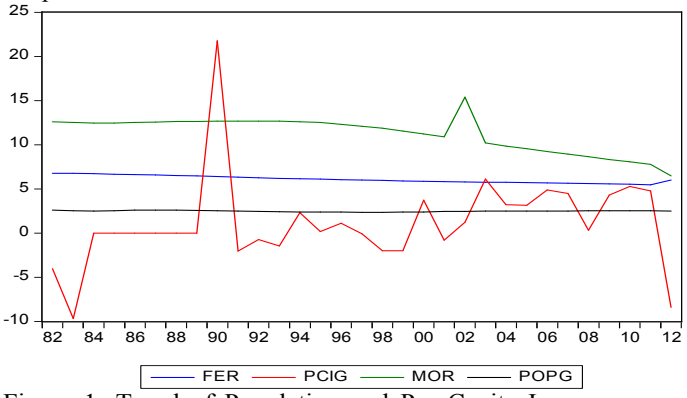

Figure 1: Trend of Population and Per Capita Income Growth in Nigeria
Source: Authors' Computation from Eviews 7

Population growth (POPG) averaged 2.49% while Per Capita Income Growth (PCIG) averaged 1.15% within the study period. The trend of PCIG in Nigeria is discouraging. Nigeria recorded no growth in PCI between 1984 and 1989 with negative growth rates between 1991 and 1993, and 1997 and 1999. The highest growth recorded between 2000 and 2012 was 6.11% in 2003. On the other hand, the highest growth rate in population was 2.62% in 1987 and 1988, and has never been higher till date with the population growth rate estimated to be 2.51% in 2012. The difference between the PCI in 1982 and 2012 is barely above ₦900

and the difference in population within the same time period is approximately 89 million. This shows that the population has increased rapidly with little or no change in the income per head among its citizens. This portends a serious problem, because implicitly the Nigeria economy has not grown within this period despite the huge increases in GDP figures. This swell in population is attributed to a constant fertility rate with declining mortality rate as depicted in the graph.

EMPIRICAL REVIEW

Thuku, Gachanja, and Almadi (2013) examined the impact of population change on economic growth in Kenya. The study employed Vector Auto Regression estimation technique and used annual time series data for the period 1963 to 2009. The results indicated population growth and economic growths are both positively correlated and that an increase in population will impact positively on economic growth in the country. The study concludes that in Kenya inadequate government policies, rather than population growth is responsible for the woes including, famines that besiege the nation.

Adewole (2012) investigated the effect of population on economic development in Nigeria 1981 to 2007 based on a quantitative assessment. The study used trend analysis of the study with the scope spanning between 1981 and 2007. The study adopted ordinary least square method of analysis in examining the time series properties using the Phillips-Perron (PP) non-parametric unit root test. The study revealed that population growth has positive and significant impact on economic sustainability proxied as Real Gross Domestic Product (RGDP) and Per Capita Income (PCI). The study concludes that population growth has brought about a vast increase in food requirement.

Dao (2012) carried out a research on population and economic growth in 43 developing countries. He applied the least-squares estimation technique in a multivariate linear regression. Based on data from the World Bank he found that the growth rate of per capita GDP is linearly dependent upon population growth, both the young and old dependency ratios, and the mortality rate. He concludes that the effect of population growth on per capita GDP growth is linear and everywhere negative.

Bloom and Freeman (1998) examined the prospects for economic growth in Nigeria based on a demographic perspective. Using a cross-country growth model, their principal conclusion is that Nigeria has a substantial demographic opportunity on the horizon, and even though features of Nigeria's economy make capitalizing on this opportunity challenging, Nigeria does have policy options available that can allow it to harness its demographic transition into indefinite sustained growth.

Klasen and Lawson (2007) investigated the impact of population growth on economic growth and poverty reduction in Uganda. The paper examines the link between population and per capita economic growth, and poverty, using panel data, they found both theoretical considerations and strong empirical evidence suggesting that the currently high population growth puts a considerable break on per capita growth prospects in Uganda. In addition measures to assist households with alternative ways to smooth consumption over the life-cycle would clearly assist in reducing fertility.

Oramah (2006) examined the effects of population growth in Nigeria. He discussed the use of double time growth analysis in the explanation of the need for population control in Nigeria and the potential danger that might emanate from the continuous neglect of environmental issues presented by environmentalists and population demographers in Nigeria and the world at large. His recommendations were that Cue should be taken from China and other countries like Russia, Hungary etc.

Thirlwal (1973**)** investigated the relationship between population growth and economic development with special reference to developing economies. The study found out that the relationship between population growth and economic development is a complex one, particularly concerning what the cause is and what the effect is. Rapid population growth lowers per capita income growth in least developed countries (LDCs), yet there are many ways in which population growth may be a stimulus to progress, and there are many rational reasons why families in developing countries choose to have many children. The study concluded that complexity of the subject is compounded by the fact that, economic development is a multidimensional concept.

Simon (1977) investigated the long run benefits of population growth. Whereas population growth has a negative effect on living standards in the short run due to diminishing returns and the temporary burden it poses on society, it has positive effects on living standards in the long run due to knowledge advances and economies of scale. Employing a simulation model, the study found out that in the long run (after 30 to 100 years) and when compared to constant-size population, moderate population growth improves standards of livings both in more developed and in less developed countries. In the long run, a growing population tends to advance

knowledge, which, in turn, increases productivity and output at a higher rate than that of population growth. The long run benefits of population growth that links to economic development of poor countries are on the positive balance, contrary to conventional wisdom.

METHODOLOGY

Model Specification

Based on the theoretical underpinning of the work of Malthus which takes into cognizance population growth and economic development; this paper seeks to empirically examine the effect of increasing population (high fertility and declining mortality) on per capita income. The Vector Error Correction (VEC) Mechanism is used to analyse data gotten from Nigerian Statistics (World Bank Estimates) and CBN statistical bulletin covering a time span of 1982 – 2012. This is done under the framework of the Vector Auto-Regressive (VAR) Model. The time period is adopted because it spans through the oil boom, the economic crisis as well as the structural adjustment and post structural adjustment periods, and the global economic recession – within which population stimulants have undergone different rhythms. The Unit root test and granger causality are also employed as augmenting analysis. The model to be estimated is specified below;

$PCIG = \alpha_0 + \alpha_1 POPG + \alpha_2 FER + \alpha_3 MOR + \mu$ (i)

Where; PCIG = Per Capita Income Growth

POPG = Population Growth

FER = Fertility Rate (Total Births per Woman)

MOR = Mortality Rate (per 1,000 Live Births)

$\alpha_0 - \alpha_3$ = Parameters to be Estimated

μ = Error Term

Justification of Variables

PCIG is chosen as the endogenous variable and as the proxy for economic development. Economic development is best measured by standard of living (level of welfare attained by individuals) in a country. In turn income per capita is the best index for measuring differences in the standard of living in different countries – hence, its inclusion as the dependent variable in the model.

The essence of this research is to measure the impact of "population growth" on economic development. Thus there is no better proxy for population growth other than its figures. Therefore POPG is the core explanatory variable of this research.

Economic variables are characterised by a system of joint interdependency, and as such there is need to specify other variables that are contributory either to trends in the core explanatory variable or the dependent variable. Population growth has its own stimulants chiefly amongst which are FER and MOR. Thus, they are specified in the model as explanatory variables for the purpose of unbiasedness.

Based on a plethora of empirical analysis and the Malthusian theoretical stipulations we expect population growth to be negatively related to economic development. Therefore, the individual coefficients of the parameter estimates, POPG and FER are expected to have a negative relationship with PCIG while MOR is in the reverse order. To this effect, $\alpha_1, \alpha_2 < 0$ and $\alpha_3 > 0$.

DATA ANALYSIS

Data Presentation

The table below shows the mean of the variables (PCIG, POPG, FER and MOR), their standard deviation (which is the divergence of a variable from its mean), the median, maximum and minimum values and other descriptive statistics.

Table 1: Descriptive Statistics

	PCIG	MOR	FER	POPG
Mean	1.151613	11.25097	6.089032	2.493871
Median	0.000000	12.30000	6.000000	2.510000
Maximum	21.75000	15.40000	6.770000	2.620000
Minimum	-9.660000	6.500000	5.490000	2.350000
Std. Dev.	5.229706	1.999786	0.405523	0.079736
Skewness	1.593714	-0.614127	0.270354	-0.308584
Kurtosis	9.423761	2.743646	1.795908	2.095601
Jarque-Bera	66.42319	2.033505	2.250343	1.548495
Probability	0.000000	0.361768	0.324597	0.461051
Sum	35.70000	348.7800	188.7600	77.31000
Sum Sq. Dev.	820.4948	119.9743	4.933471	0.190735
Observations	31	31	31	31

Source: Authors' Computation from Eviews7

Note: PCIG and POPG are expressed in growth rate, FER is measured by total births per woman and MOR is per 1,000 live births

Deductions made from table 1 above show that the mean (or average values) for the variables PCIG, MOR, FER and POPG for the period 1982 – 2012 were 1.15, 11.25, 6.09 and 2.49 respectively. The maximum value for PCIG is 21.75% and was recorded in year 1990 while the minimum value is -9.66% recorded in 1983. MOR has its maximum value to be 15.40 in 2002 with its corresponding minimum value as 6.50 in 2012. 6.77 in 1982 and 5.49 in 2011 were the maximum and minimum values respectively for FER. In 1997 POPG

recorded its lowest rate of 2.35% while its highest rate was 2.62 duplicate in 1987 and 1988. The estimated standard deviation of the parameter estimates are 5.23, 2.00, 0.41 and 0.08 for PCIG, MOR, FER and POPG while the median of the same parameters are 0.00, 12.30, 6.00 and 2.51.

The Jarque-Bera test of normality is conducted to determine if the data being analysed using OLS technique conforms to the conditions of normality i.e. having a mean of 0 and constant variance. The JB test of normality is based on OLS residuals – using skewness and kurtosis (under normality, S = 0 and K =3). It is used to determine the joint hypothesis that S and K are 0 and 3 respectively. Skewness is the measure of asymmetry of a probability distribution about its mean while kurtosis is the measure of tallness or flatness of the slope.

If K < 3, then it is platykurtic (flat or short tailed); if K > 3, then it is leptokurtic (slim or long tailed) and if K = 3, then it is mesokurtic (normal distribution). Hence, from the table above: PCIG is positively skewed and leptokurtic; FER is positively skewed and platykurtic while MOR and POPG are negatively skewed and platykurtic. This shows that the data have violated the normality assumption of OLS. This is further substantiated by the high probability values of the statistics, which have reported above 5% level of significance. This therefore has set the basis for further tests.

RESULT AND DISCUSSION

The unit root is used to examine the stationarity of the data series since the data is time series, the ADF test is employed. It is important because it enhances validity of results and is also a prerequisite to the VECM. The result of the stationarity test is presented below:

Table 1: Stationarity Test

Variable	ADF Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Prob.	Order of Integration
FER	-1.807848	-2.650145	-1.953381	-1.609798	0.0677	I(2)
MOR	-5.920286	-4.356068	-3.595026	-3.233456	0.0003	I(2)
PCIG	-6.260738	-3.711457	-2.981038	-2.629906	0.0000	I(2)
POPG	-3.618515	-3.689194	-2.971853	-2.625121	0.0118	I(2)

Source: Authors' Computation from Eviews7.

The result of the unit root test shows that all the variables are stationary at 2nd difference. For PCIG and MOR, the ADF test statistic is greater (using absolute values) than the critical values at all significant levels while for POPG the ADF test statistic is greater than at 5% and 10% critical values. The ADF statistic for FER is greater than the 10% critical value.

The second objective of this research paper is to examine the prediction power of population growth on future development trends. Granger causality tested the direction of causation between population growth and economic development. The result of the granger causality test is explained below.

Table 2: Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
POPG does not Granger Cause FER	29	0.87420	0.4301
FER does not Granger Cause POPG		19.2595	1.E-05

Source: *Authors' Computation from Eviews7*

The result reveals that there is no causality between population growth and economic development. Rather, the result shows the dominance of FER in predicting future population growth trends but not vice versa. This is established from the probability which indicates a value of less than 5% to nullify the hypothesis that FER does not granger cause POPG. The result clearly portends that POPG does not granger cause PCIG nor FER. Thus, there is no mutually reinforcing bilateral causality between population growth and economic development.

Effect of Population Growth on Economic Development in Nigeria

The VAR model is used to estimate the long run and short run dynamics of the data series. The Johansen Cointegration and the Vector Error Correction Method are used as augmenting analysis. The Johansen cointegration is analysed via the Trace statistic and Maximum Eigen value. The decision rule is that if either is greater than the 5% critical value, we reject the null hypothesis of no cointegration among the variables. Their respective results are shown below.

Table 3: Cointegration Test

Null Hypothesis	Trace Statistic	0.05 Critical Value	Null Hypothesis	Max-Eigen Statistic	0.05 Critical Value
r = 0*	76.85	47.86	r = 0*	29.51	27.58
r ≤ 1*	47.34	29.80	r ≤ 1*	26.86	21.13
r ≤ 2*	20.48	15.49	r ≤ 2*	17.67	14.26
r ≤ 3	2.81	3.84	r ≤ 3	2.81	3.84

Source: *Authors' Computation from Eviews7*

*Note: r represents number of cointegrating vectors. Trace statistic and Max-Eigen statistic indicates 3 cointegrating equations each. * denotes rejection of the hypothesis at the 0.05 level*

The Trace test and Max-Eigen value test indicates 3 cointegrating equations each. The trace statistic and the Max-Eigen statistic are greater than their respective critical values for all the cointegrating equations. Thus, the null hypothesis of no cointegrating equation is rejected. This implies that even though the series of the variables are stationary at 2nd difference, their linear combinations are cointegrated. This further means that there exists a long run relationship among the variables at 5% significance level.

Long Run Model

PCIG = 1.00 – 5.39POPG + 1.53FER + 0.19MOR
(12.71) (3.79) (0.71)

Source: *Authors' Computation from Eviews7*
Note: Standard Error in parenthesis

Based on a priori expectation, the coefficient of POPG and FER are expected to be negative while the coefficient of MOR is expected to be positive. From the result, the coefficient of POPG and MOR corresponds with a priori expectation while the coefficient of FER does not. Also from the model estimate, the coefficients of POPG, FER and MOR are statistically insignificant (that is, $^1/_2 b_i$ < S.E.). This implies that there are other factors beyond these identified variables that determine PCIG. The result further reveals that in the long run, a unit change in POPG will cause PCIG to decrease by 5.39 of that unit change. Conversely, a unit change in FER and MOR will cause PCIG to increase by 1.53 and 0.19 respectively of that unit change. This confirms that population growth in the period of study has had adverse effect on per capita income, poverty and sustainable development.

The Short Run Model

Table 4: Vector Error Correction Model

Variable	Coefficient	Standard Error	T statistics
ECM	-1.30	0.25	-5.18
D(PCIG(-2))	-0.01	0.15	-0.07
D(POPG(-2))	-1.22	47.41	-0.03
D(FER(-2))	-89.39	93.28	-0.96
D(MOR(-2))	0.13	0.77	0.18
C	-4.24	4.23	-1.00
R^2 = 0.59, Adjusted R^2 = 0.45, F statistics = 4.20, $F_{0.05}$ = 2.052			

Source: *Authors' Computation from Eviews7*

The table above shows the short run estimates of the VAR model. From the result, the coefficients of POPG, FER and MOR display signs that meet a priori expectation. In line with the long run model, all the parameter estimates are statistically insignificant (that is, $^1/_2 b_i$ < S.E.).

The R^2 (0.59) shows a moderate and positive relationship between the variables. It further shows that 59% of the variations in PCIG are accounted for by POPG, FER and MOR. The R^2 is substantiated by the adjusted R^2 (0.45) which shows that 45% of the variations in PCIG are accounted for by the independent variables. This further reveals that the additional explanatory variables have theoretical relevance to the data series. More so, the F statistics buttresses the overall goodness of fit of the model. Since the F calculated (4.20) is greater than the F tabulated (2.052) – we conclude that the independent variables (POPG, FER and MOR) have joint influence on PCIG. Thus, the overall predictive power of the econometric model is statistically significant.

However, the coefficient of the error correction term is statistically significant with the expected sign and a magnitude of -1.30. This magnitude indicates that if there is any deviation, the long run equilibrium is adjusted moderately where about 130% of the disequilibrium may be removed in each period. This shows that the speed of adjustment to where PCIG will equilibrate even when there is initial disequilibrium is at the rate of 130%.

The result also reveals that in the short run, a unit change in POPG in the previous year will lead to a 1.22 decrease in PCIG. Similarly, a unit change in FER in the previous year will cause PCIG to decrease by 89.39. Conversely, a unit change in MOR in the previous year will increase PCIG by 0.13.

FINDINGS OF THE RESEARCH

Based on a priori expectation, FER and POPG are expected to have a negative relationship with PCIG while MOR is expected to be positive. The result of the empirical analysis table 5 shows that the coefficients of two of the explanatory variables are correctly signed, POPG having a negative sign and MOR having a positive sign. However, the coefficient of FER is incorrectly signed. This mismatch could be explained by the decision which explains that population growth has no impact on economic development in Nigeria. This is because the higher the fertility rate, the higher the increase in population which inhibits the means of subsistence per head giving credence to the fears expressed in the Malthusian theory. Similarly, mortality rate proves circumstantial in increasing the standard of living of citizens acting as positive checks according to Malthusian postulation.

The granger causality result contradicts a priori expectation and findings from researches conducted in other countries. It shows that population growth does not have any causal impact on economic development. The population has been increasing rapidly, however

there is little or no change in the economic welfare of the citizens. Rather an increase in economic development leads to an increase in fertility which spurs population growth and which in turn is detrimental to the former. It can therefore be seen that the time series of FER and PCIG are useful in forecasting future information on POPG and not vice versa.

The adjusted R^2 shows a weak relationship between the dependent and independent variables with 55% of the variations unaccounted for. This implies that POPG, FER and MOR can only explain 45% of the changes in PCIG in the Nigerian economy and thus there are other key macroeconomic variables that are core stimulants to economic development. The F statistic lays emphasis on the strength of the explanatory variables in predicting the outcome of economic development. One can therefore say that from the F statistic, the additional explanatory variables namely FER and MOR have theoretical relevance to the data series.

CONCLUSION AND RECOMMENDATION

The major findings of this research allow us to conclude that Population Growth has no significant impact on Economic Development in Nigeria. This is in line with the works of Dao (2012) and Thirwal (1973). In other words, the Malthusian population theory is relevant when applied to the Nigeria economy. Therefore, if we posit that population growth is detrimental to economic development it is tantamount to averring that overpopulation and poverty are correlated which portends danger. This combination is associated with increased vices, disease and death. This could be attributed to so many reasons chief amongst which is economic backwardness that basically depicts the inadequacy of social welfare programmes, infrastructure or the wherewithal to support the existing population. Also communal and religious laws further influences population growth contradicting the axiom of *moral restraint* as enunciated by Malthus. The effect of population on the economy in Nigeria is much more than the food problems enunciated by Malthus. Some of these consequences are congestion, high dependency ratio and mounting social problems, emigration, higher unemployment and/or underemployment, inequality including the current acts of insurgency and terrorism. Thus appropriate measures should be taken to curb this growing menace which may become endemic in the Nigerian economy resulting in pervasive poverty, and portends danger to sustainable development.
The following recommendations are hereby made:

Constitutionally, a family should consist of one man, one wife, and four children. However, rarely is this binding duty carried out by most Nigerians. The government should therefore embark on enlightening campaigns to intimate the populace on the dangers of over population and the need to have healthy family that can be adequately catered for.

Also, family planning exercises should be encouraged by the government to help curb increasing fertility rate in Nigeria. Furthermore, a high mortality rate has grave consequences on the development of the Nigerian economy. Thus, the continuous benefits of western modernization in terms of improved health care services should be made available to the populace.

Per Capita Income grows when aggregate national income grows faster than population. Efforts should be made by government to expand the infrastructure base thereby creating favourable environment for employment creation. Finally, the pursuit of diversifying the economy should be relentless, so that the channels of stimulating growth, poverty alleviation and sustainable development will not be curtailed.

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APPENDIX

Data on Variables

1982	2.60	- 4.02	6.77	12.6
1983	2.53	- 9.66	6.75	12.54
1984	2.52	0	6.72	12.45
1985	2.55	0	6.68	12.45
1986	2.60	0	6.64	12.52
1987	2.62	0	6.59	12.57
1988	2.62	0	6.53	12.63
1989	2.59	0	6.46	12.63
1990	2.54	21.75	6.40	12.66
1991	2.50	- 2.02	6.33	12.67
1992	2.46	- 0.73	6.27	12.70
1993	2.43	- 1.46	6.21	12.68
1994	2.40	2.32	6.15	12.61
1995	2.38	0.18	6.10	12.53
1996	2.37	1.11	6.05	12.30
1997	2.35	- 0.09	6.00	12.09
1998	2.36	- 2.00	5.96	11.89
1999	2.37	- 2.00	5.92	11.56
2000	2.40	3.72	5.88	11.25
2001	2.44	- 0.80	5.85	10.90
2002	2.47	1.22	5.81	15.40
2003	2.49	6.11	5.77	10.21
2004	2.50	3.24	5.74	9.87
2005	2.51	3.13	5.70	9.55
2006	2.51	4.89	5.67	9.24
2007	2.52	4.50	5.63	8.93
2008	2.53	0.32	5.60	8.63
2009	2.54	4.31	5.56	8.34
2010	2.55	5.30	5.53	8.08
2011	2.55	4.77	5.49	7.80
2012	2.51	- 8.39	6.00	6.50

Source: Computed from CBN Statistical Bulletin and World Bank Estimates (Nigeria Statistics

Note: PCIG is computed from GDP at 1990 constant basic prices