Challenges of Population Dynamics in Nigeria: Implications for Household's Portfolio Choices

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Abstract

This research study attempts to quantify and examine how changes in Population dynamics affect household portfolio choices (expenditure on food, monetary transactions, goods and services and non-cash expenditure) in Nigeria given the fact that Nigeria is going through a demographic transition. Previous efforts to assess impacts of Population growth have ignored the household expenditure responses, which has been far from being definitive on the transmission net effects on household portfolio choices. This study focuses on Nigeria with the aim of overcoming these defects and obtaining reliable information. The study establishes a link between demographic variables and household expenditure components using the Vector Error Correction Methodology. Next, the estimated equations are used to project the pattern of the different components of expenditure income based on three population scenarios generated from different assumptions on changes in fertility. Nonetheless, several counterfactual simulations were examined to enhance our understanding of the effects of Population dynamics on contingent choices.

The results suggest that population dynamics in Nigeria can produce significant effects on the economy via the expenditure profiles of households. The results also suggest that other factors such as real per capita income, ratio of other expenditure categories to total expenditure influence growth of household expenditure components. The results of the study have some important implications for policy:

- Pursuit of prudent macroeconomic policy has significant payoffs, as it avoids further constraints on household's provision of essential social services, such as health services;
- The rate of urbanization in Nigeria affects many categories of household expenditure, and therefore government policy of directing policies that would improve household expenditure on monetary transactions is likely to have significant payoffs in terms of easing the rate of pressure on households.
- The results show how changes in age structure could be extremely relevant to the process of economic growth.

Finally, there must be a sustainable momentum to boost monetary transactions among the people as a means of revitalizing the weakened social pillar. Doing so calls for a population rights approach to development planning that places people at the centre of developmental efforts. This will help in achieving the objectives envisaged for the social charter in the "NEEDS" framework. The determination for an appropriate mix of policies for managing Nigeria's development requires prescriptions that recognize the structural linkages between the sectors. Such prescriptions must uniquely isolate, define and determine the nature and magnitude of the change variables that drive the development process. The necessity of such prescriptions should form the building blocks of national development planning and resource management. This entails reconciling planning with implementation and carrying out regular analysis of the challenges of population dynamics that underpins the NEEDS programme.

Background

In our world today, few issues are as divisive as what is called the "world population problem." These divisions among experts are receiving enormous attention and generating considerable heat. There is a danger that in the confrontation between apocalyptic pessimism, on the one hand, and a dismissive smugness, on the other, a genuine understanding of the nature of the population problem may be lost….

Nigeria's population is about 3% of World population with a population growth rate of about 3.3% annually alongside a poor annual GDP growth rate of 2.4%. These growth rates implies a low per capita income and hence implications for the intertemporal consumption behaviour of the household. This overtime has brought serious pressure on the aggregate demand (domestic absorption). The obvious implication for a non-corresponding economic output to the population growth rate in Nigeria is not only low per capita income, but that the economy has become demand driven and focuses on imported goods and services. The derivative from the above is a tending towards consumption rather than real investment in the private consumption schedule which has been the obvious case in the country. Nonetheless, the current macroeconomic implications of such trends in the country have shown a negative balance of payments over the years, a further depreciation of the exchange rate because of the demand on the foreign exchange, unemployment, a rise in interest/inflation rate, pile of inventories etc.

A more worrisome fact is that the current population growth rate exceeds the GDP growth rate and a further possibility of exacerbating the difficult choice among households between higher consumption now and the investment needed to bring higher consumption in the future exists.[1] According to Marion (pp28-9), developing countries require, on average a fixed capital investment of at least $3 in order to increase annual output by $1. This gives a capital/output ratio of 3:1. At little or no foreign investment/aid and a given capital/output ratio of 3:1, then an annual population growth rate of 1% would require a 3% savings and investment out of national income. Similarly, a 2% population growth rate would require a 6% savings and investment while the current population growth rate of 3.3% would require a 9.9% savings and investment. With the current GDP growth rate of 2.4%, it becomes very clear that the economy is operating at a below optimal level, the minimum of which ought to be 9-10%. Under such circumstances, the evidence that population dynamics tends to play an "accomplice" role in our developmental problems through macroeconomic indicators becomes clearer. This presents a clear problem for household portfolio choices with implications for the economy. Available statistics already indicate a high correlation between household expenditure on monetary transactions-"***CEXMON***" (insignificant) and private investment.

The size and growth of population are associated with the level of consumption; which in turn, is related to national investment and production. Thus if savings and investment (***CEXMON***) are inhibited by increasing population, productivity will obviously fall. Howbeit, the tendency of a complication (not too sure movement) of macroeconomic indicators (jumpy variables) overtime is high, more so when the situation is expected to persist into the near future.

[1]With increasing population, it becomes increasingly difficult to spare available income for savings and investment.

Matching population growth with development is the real object of global and country action towards improved welfare, human development and economic growth.[2] The changing patterns in the size, structure and distribution of population provide useful leads into the persistent shifts in the choice of approaches for managing development. The alternative to market-led approaches profoundly identified in the planning development reveals the importance of population in development. Among the causal factors that indicate the pattern of population change is the pattern of change in fertility rate. Fertility rate differentials among populations and population groups largely influence the nature and magnitude of changes occurring in the size population.

To reduce poverty, the logical and paramount goal of African countries should be to pursue policy objectives of sustainable development. Sustainable development entails the harmonization of population growth with utilization and exploitation of natural resources through redirection and re-orientation of research and development, as well as institutional changes.[3] It is not difficult to find a basis for this fear – in that a large part of the gain in aggregate income is been used simply to support a larger population at the same low per – capita level of income, which is the dismal case for Nigeria. Furthermore, the average national household income in the country has remained below $US40 since 1978 because of rapid increases in household sizes. The proportion of household income spent on feeding varied with national average indicating that about 62.8% of Nigerians spent between 70% and 80% of their income on food. Less than 20% is mostly spent on health and very small proportion spent on community contributions as savings, insurance and for development. Access to socio-economic infrastructure and credit among households indicates that health and water supply, education and energy are the most elusive socio-economic infrastructure among Nigerians growing poor Population. Statistics indicate that access to health is limited to only 39.6% of the 120 million Populations while water supply and education are enjoyed by the privileged 48% and 45% respectively. Nonetheless, 61.5% of the Population of Nigeria does not have access to credit facilities, which altogether, affects negatively on the economy. {Federal Office of Statistics Annual Abstract and National Demographic Health Survey of various years} Nonetheless, Nigeria's rapid population growth and poor economic growth and macroeconomic management in the last two decades has, prompted the following questions:

- Is population growth connected with household portfolio choices?
- Do they reinforce each other?
- If so, what are the critical links?

These are questions that need answers. The solutions to these problems are complex, which is why effective responses have not been forthcoming on a wide scale.
However, as the per capita income slides downward, due to high population growth rate, huge proportions of Nigerian citizens also slide into vicious misery and death because; on the other hand the economy is not growing rapidly to accommodate the needs of the increasing population. This situation further deepens the vicious circle of poverty, whereby the average productivity is low and there is difficulty in producing enough consumption goods {let alone investment goods} to satisfy the basic needs of the population. The imminent consequence of unabated population growth unmatched by economic output and investments in infrastructure

[2]The puzzling phenomenal difference in levels of welfare and development among the populations of countries are largely explained by the divergence in the nature and magnitude of the dynamics of populations.
[3]Nonetheless, few developmental problems evoke as much pessimism as does the rapid increase in population in poor countries.

include macroeconomic disorientation, the deepening of poverty and deprivation, illiteracy and loss of human capital, increased disease burden, urban infrastructure collapse, and disease recrudescence; which incidentally is the case for Nigeria. This in turn, leads to dislocation of families and increase vulnerability to vice and civil strife leading to conflicts apart from the consequences of persistent economic slide of the country. This is the crux of the present research, where population change is treated rather as exogenous and focuses on examining the consequences of population dynamics on household choices, and its multiplier effects on the economy in the near future giving the ongoing demographic transition in the country.

The population explosion that has been experienced in the last two decades in Nigeria is in sharp contrast with the history of the presently rich industrialized nations when they were in early phases of their development. There are several reasons why population growth in Nigeria and other developing countries raises so much concern today than it was in today's developed countries in their periods of economic transformation.

- Population growth in Nigeria is much more rapid – in Europe and Japan in the nineteenth century, population growth seldom exceeded 1 percent a year.
- Compared with Europe, Japan and North America in their periods of fastest population growth, income in Nigeria is still lower, human and physical capital are less built up, and political and social institutions are less well established.

Visions of impending doom have been increasingly aired in recent years, often presenting the population problem as a "bomb" that has been planted and is about to "go off." These catastrophic images have encouraged a tendency to search for emergency solutions, which treat the people involved not as reasonable beings, allies facing a common problem, but as impulsive and uncontrolled sources of great social harm, in need of strong discipline.

Such views have received serious attention in public discussions, not just in sensational headlines in the popular press, but also in seriously argued and widely read books. One of the most influential examples was Paul Ehrlich's"The Population Bomb" the first three sections of which were headed "Too Many People," "Too Little Food," and "A Dying Planet. A more recent example of a chilling diagnosis of imminent calamity is Garrett Hardin's Living within Limits.[4] If the propensity to foresee impending disaster from overpopulation is strong in some circles, so is the tendency, in others, to dismiss all worries about population size. Just as alarmism builds on the recognition of a real problem and then magnifies it, complacency may also start off from a reasonable belief about the history of population problems and fail to see how they may have changed by now. It is often pointed out, for example, that the world has coped well enough with fast increases in population in the past, even though alarmists had expected otherwise. Malthus anticipated terrible disasters resulting from population growth and a consequent imbalance in "the proportion between the natural increase of population and food." For at a time when there were fewer than a billion people, he was quite convinced that "the period when the numbers of men surpass their means of subsistence has long since arrived." However, since Malthus first published his famous Essay on Population in 1798, the world population has grown nearly six times larger, while food output and consumption per person are considerably higher now, and there has been an unprecedented increase both in life expectancies and in general living standards. The fact that Malthus was mistaken in his diagnosis as well as his prognosis two hundred years ago does not, however, indicate that

[4]The arguments on which these pessimistic visions are based deserve serious scrutiny.

contemporary fears about population growth must be similarly erroneous.[5] Whatever may be the proper response to alarmism about the future, complacency based on past success is no response at all.

However, this study intends to provide information on the nature of the Nigerian population growth; its probable impact on standards of living for the populace, and its policy implications for government and the international community. Instead of generalizing on adverse Economy wide repercussions of population growth, analysis was based on Micro-units {Households} because decisions at that level are made in response to signals provided by the larger system. Micro decisions are assumed to maximize not only individual but social welfare, unless there are substantial market failures.

Objective of the Study

The study's main objective is to determine the relationship between population dynamics and household portfolio choices:

*To project, the different components of households' portfolio choices contingent on Population dynamics between 2004 – 2020

Hypothesis
*Household portfolio choice management does not depend on Population pressures.

Limitations of Previous Studies

- The work by the Economic Commission for Africa on "Demographic changes and consumption patterns" (1977) ignored the effects of different age structures on consumption patterns as well as the impact on categories of household expenditure. Other studies have also used a change variable that does not hold true for all economies and therefore making such results suspect.
- Empirical studies on the partial effects has been more successful in yielding insights into particular links between population and development, but by its nature has been far from definitive on the net effects of rapid population growth on choices.
- There is a big gap in literature concerning the quantitative relationship between Population dynamics and expenditure pattern of households in Nigeria.

Nonetheless, more recent research, however, has pointed out that it is not sufficient to take into account simply the growth in population when attempting to evaluate the role-played by demography, as demographic effects are significantly more complex. Kelley and Schmidt [1995] show that the composition of population growth is an important factor. For example, if population growth occurs mainly through mortality declines that affect infants and children disproportionately (as is well known to be the case in high mortality populations), the effect on age structure will be different than if population growth occurs due to migration, which generally selects for working age people. These changes in age structure can be extremely relevant to the process of economic growth. Bloom and Williamson (1998) further explore the role of a changing age structure, evaluating the impact of demographic transitions on economic growth.

[5]The increase in the world population has vastly accelerated over the last century.

Population Size and Structures in Nigeria: Current and Future Trends

The total population of Nigeria in 1991 was 88,992,220 of which 44,529,608 or 50.04% were males and 44, 462, 612 or 49.96% were female. The population distribution by age and sex shows that the male population exceeds the female in all age groups except for the age groups 15-34 where females outnumber males. The unequal distribution of males and females influence their dynamic roles and rate of participation in the total labor force of Nigeria .The average population density of Nigeria as recorded in the 1991 census was 96 persons per square kilometer. The most densely populated states are Lagos (1712 persons per square Kilometer), Anambra (534 persons per square Kilometer), Imo (458 persons per square Kilometer), and Akwa Ibom (389 persons per square Kilometer). Nigeria's population is predominantly rural with about 36.3 percent living in the urban areas and 63.7 percent living in rural areas. The national inter-censal growth rate between 1963 and 1991was estimated at between 3.3% and 2.8%. Rapid population growth affect Nigeria's natural and human resources. The spiral distribution of males and females is the result of natural population increase and migration. Although the female population exceeds the male population in the rural areas, the reverse is the case in the urban areas. In general the number of males was almost equaled by the number of females. Nigeria's population is young with a median age of 16.9 years for males and 17.9 years for females. The national dependency ratio is 88.9 dependent persons per 100 working age per sons. Three out of every four homeless person are males. More than eighty household heads are males. However, percentage female-headed households are unemployed. More than two thirds of females are married by age 24, while only one in five males would have married at that age.[6] This ranges between 6.0 for high fertility rate to 2.5 for low fertility rate. The differentials vary from state to state and generally influence the size of population from year to year. Nigeria's population has been growing at the rate of 2.8% per annum and precipitates and its pattern of sex and age distribution show that economic and social well being can only be sustained by huge investments in the relevant sectors that support the provision of diverse welfare services. The population is growing and development demands that huge capital investments be made to provide water resources, environmental sanitation in the cities. The growth in urban population has precipitated serious demand pressure on public services and has degraded the available facilities.

Household unit and Household expenditure

The household can be defined as a socio-economic unit, consisting of individuals who live together, where as family only comprises that part of the household members related in kinship, with the exclusion of domestic helps, guests, boarders, etc.

The household expenditure rather than the individual or family income has been adopted as the unit of analysis because of the following:

- This is based on the proposition that this measure is a better proxy for permanent income than income.
- It has been observed that that data on total expenditure as obtained from household survey are in general more accurate than those on income.
- The use of income data requires the taxation information in order to derive the disposable income, data that are not generally available from household surveys.

[6]The key determinant of Nigeria's population is fertility rate differentials.

- The standard of living can be better measured by expenditure rather than by income. It is likely that expenditure by the very low-income classes may exceed their income level, with negative savings, so as to maintain their subsistence living.

Review of related works

Is rapid population growth good or bad for economic performance? This question has stubbornly resisted a satisfying theoretical or empirical resolution. Some theories suggest that more rapid population growth should be bad for economic performance because with a larger population each worker will have less productive factors, both non-accumulated and accumulated, to work with. Other theories suggest that greater population growth will lead to greater productivity either by inducing innovation, producing innovation, or through creating greater economies of scale, specialization or agglomeration (Boserup, 1981, Simon, 1992, Kremer, 1993). Robert Cassen's (1994) recent summary of the state of the art in research on population and development, states nicely the conventional wisdom of contrasting negative factor accumulation effects versus possibly positive productivity effects: What about the effect of population on per capita income? Here simple economics suggests that the effect is probably negative. Unless population exerts a strong positive influence on capital formation-and the suggestion that it does is a minority opinion-the more people there are, and the less capital there is per person; as a result even though total output may be larger with a bigger population, output per person is smaller. There are however, three arguments against this: larger population may generate economies of scale; they may induce favorable technological change; and when population is growing, the average age of the labor force will be younger, which may have beneficial productivity effects. **The fact that the different theories predict a different causal mechanism shows that there is a gap yet to be filled with empirical evidence across countries.**

Between 1950 and 1995, the world's population grew from 2.5 billion to 5.7 billion people, and is expected to grow by another 4 billion people over the next 50 years. There has been a long-standing debate on the effects that such population growth can have on economic development and growth of countries. This debate is generally couched in the distinctions made by ‘population optimists' and by ‘population pessimists'. Population optimists believe that increases in population increase the incentives for the invention of new technologies and the diffusion of existing ones [Boserup 1981]. They also point out that larger populations allow for economies of scale both in production and in consumption [Kuznets 1966, Simon 1977]. Population pessimists, on the other hand, believe that the burden placed on the resources of an economy by an increasing population is a hindrance to economic development. The original ‘Malthusian' perspective focused on agricultural resource constraints, while later economic models were based on the capital to labour ratio: increases in population meant that there was less capital per person, thereby reducing the productivity of labor, such as in the neoclassical model discussed above.

Empirical studies, which have used cross-country data to try and evaluate these claims, have, however, found little evidence to support either argument. Once the effects of initial income, education, and other determinants of growth are taken into account, population growth is found to have a negligible effect on growth of GDP [Bloom and Freeman 1986]. This gave rise to the "population neutralist" or "revisionist" perspective, which held that demography was not a significant factor in the economic growth process. This view was in part responsible for the tenuous position population variables have recently occupied in studies of economic growth.

More recent research, however, has pointed out that it is not sufficient to take into account simply the growth in population when attempting to evaluate the role-played by demography, as demographic effects are significantly more complex. Kelley and Schmidt [1995] show that the composition of population growth is an important factor. For example, if population growth occurs mainly through mortality declines that affect infants and children disproportionately (as is well known to be the case in high mortality populations), the effect on age structure will be different than if population growth occurs due to migration, which generally selects for working age people. These changes in age structure can be extremely relevant to the process of economic growth. Bloom and Williamson (1998) further explores the role of a changing age structure, evaluating the impact of demographic transitions on economic growth.

While the historical literature on the role of demography in the growth process dates back many decades, its role in the current debate has been peripheral. Current work on the impact of demographic changes on economic growth, however, shows that demography might in fact play a significant role (Bloom and Williamson, 1998). Integrating fertility and mortality with capital accumulation in a process of economic growth has the potential to explain very large differences in observed outcomes.

Demography is also linked to the accumulation of both physical capital and human capital (i.e. health and education). Evidence from developing countries has shown that lower fertility has a direct effect on human capital, as smaller families are more likely to educate their children. Health and nutrition status is also higher, as large families tend to be poorer and hence less able to fulfill basic needs. More recently, economists have pointed to the indirect effects of a changing demography: as life expectancy increases, individuals are expected to save more for their old age, thereby increasing the accumulation of physical capital in the economy (Mason (1997), Bloom and Canning (1999)). Furthermore, as couples have fewer children to care for them in their old age, they will invest, instead, in assets that can provide financial returns, thereby accelerating capital accumulation. The reverse arrows, that link capital to demography, have been focused on particularly in the case of education. As educational attainment increases, especially for women, it has been found to decrease infant mortality rates, as more educated mothers can better care for their children.[7]

Demographic factors have been used to explain the growth of government expenditure. Goffman and Mahar (1971) found the age structure of the population to be an important factor explaining growth of public expenditures in developing countries. Tait and Heller (1982) and Heller and Diamond (1990) analyzed growth of different categories of government expenditures and found demographic variables to be significant in explaining growth in some categories of government expenditures. The Heller and Diamond (1990) study, based on pooled data for developing countries, found the proportion of the population over 65years to be significant in explaining growth in the share of social security expenditures in GDP, and the proportion of population aged 14 and under to be significant in explaining growth in the share of education expenditures. Tung (1984), using an econometric demographic model for Taiwan, noted that a reduction in population increased per-capita income. Then, using an economic demographic model for Ethiopia, Kidane (1991) found that a lower fertility rate increased per capita GDP.

Once these linkages are incorporated into the system it is easier to explain the wide discrepancies in income that are observed, as an exogenous change in any one of the factors

[7]It also increases the opportunity cost of children, thereby reducing fertility rates.

will affect each of the other factors and will get multiplied as it works through the system. For example, the introduction of a family planning program may bring down fertility rates. This may increase income, which could, in turn, increase education levels perhaps further lowering fertility rates. The linkages can thereby set in place a virtuous spiral of economic development. Of course, the reverse may also be true. Economies may be trapped in a downward spiral of low growth and high fertility and mortality if endogenous growth only occurs after a critical level of income has been achieved.

Thus viewing demography as part of the larger economic system enables us to explain why some countries have been so much more successful than others at generating economic growth. Yingfang [1994] Maintains that the quality of economic growth (QEC hereafter) cannot be ensured, nor can economic efficiency be improved, nor can economy grow rapidly, without adequate attention being paid to the effect of population. In particular, the study of and solution to these issues are in the immediate interest of developing countries, especially densely populated, low-income nations and impoverished areas. This article attempts to conduct an initial analysis of QEC and the double effect of population and to recommend corresponding policies." Also**,** Robert [1994] reports the results of a collaborative effort to compare the forecasts of the Second India Study, undertaken in the 1960s, to examine how India would cope with demands for more food, land, water, jobs, schooling, and energy as its population doubled by the year 2000, with actual developments.[8] "The evidence that has emerged in India over the 20 years since the Second India Study was carried out suggests that rapid demographic transition, poverty alleviation, and development can occur simultaneously even in poor and populous countries. But unsustainable spirals of population growth, environmental degradation, and impoverishment are also possible. India's population growth has made it harder to reduce underemployment and poverty, raise educational levels and environmental quality, or provide adequate infrastructure and basic services, and will continue to do so until the population stabilizes in the next century.[9] Bakshi, Gurdip S.; Chen, Zhiwu [1994] tested how demographic changes affect capital markets. The life-cycle investment hypothesis states that at an early stage an investor allocates more wealth in housing and then switches to financial assets at a later stage. Consequently, the stock market should rise but the housing market should decline with the average age, a prediction supported in the post-1945 period [in the United States]. The second hypothesis that an investor's risk aversion increases with age is tested by estimating the resulting Euler equation and supported in the post-1945 period. A rise in average age is found to predict a rise in risk premiums." Kamala (1994) examined the close linkages between rapid population growth, environmental degradation and poverty. He discusses the world experience of development efforts, particularly India's efforts in poverty alleviation since 1947, the differences between Gandhi and Nehru with regard to development strategies, and the country's overall failure to contain, let alone eradicate poverty. He further argues that sustainable development, population and alleviation of poverty are intricately interlinked and are not merely matters of economic planning and technological achievements.

The study by Eke (1966) is a simple statistical approach that attempted at estimating the de jure population of Nigeria for the period of 1952 to 1965. The aim of Eke's paper was to point out the inadequacy of official Nigeria census statistics, the general intellectual confusion, and the diseconomies inherent in a political approach to census taking. In a related

[8]The focus is on the relationships among demographic change, economic growth, environmental stress, and government policy.

[9]The key determinants of success lie in the social framework, including the system of social norms, and economic arrangements.

study, Olusanya (1966), tried to analyze the consequence of rapid population growth in Nigeria by drawing some lessons from the Maurtian experience.[10]

The study by Tung (1984) can be regarded as one of the most comprehensive studies on the relationship between population growth and economic development. This model, which utilized time-series data from Taiwan, comprised about one hundred and fifteen equations and identities. The results obtained from the simulation showed that in the short-run, a reduced rate of population growth would bring about a higher rate of per capital income. However, it must be noted here that these result did not consider the impact of migration especially, from the rural area to the urban areas.

Other works on population development nexus based on other methodologies rather than stochastic approach include Frejka (1975); Farooq, (1975), Hawkins and Cuca (1975); Adepoju (1976), Ukaegbu (1988) and Makinwa – Adebusoye (1991). Of all these studies, only the last three are devoted specifically to Nigeria. While Adepoju (1976), was an attempt to analyze the population dynamics in relation to the manpower and employment situation in English – speaking West African countries which include Gambia, Ghana, Liberia, Nigeria and Sierra – Leone; Ukaegbu (1988), aimed at examining the utilization of human resources in a Malthusian gloomy environment. To Adepoju (1976), the high rate of population growth with the resulting young age structure, the rapidity of urban growth and high urban concentration resulting primarily from massive migration from village and small towns, have posed considerable problem for accelerated economic development more so in view of the slow rate of economic growth in some of the countries. Ukaegbu (1988), however, observed that the Malthusian condition experienced by many Nigerians cannot be explained by population growth alone. Other factor such as under-utilization of human resources, lopsided protection and distribution mechanisms, economic conditions, the illegal exportation of food, corruption and mismanagement of revenue constitute force that simultaneously limit the national capacity to produce more resources for the growing population. Makinwa – Adebusoye (1991), analyzed the adolescent reproductive behaviour in Nigeria using five cities which are Enugu, Kaduna, Jos, Onitsha and Zaria as a case study. The findings indicated that the lives of a large segment of Nigerian's youth may be in jeopardy in many ways from early unguarded sexual relation resulting in unwanted pregnancies, disruption of education and illegally induced abortions.

In all the foregoing studies, no attempt is made to analyze the impact of population changes, especially demographic behaviour on household portfolio choices and the resultant implications in the Economy.

Conceptual Framework for present study

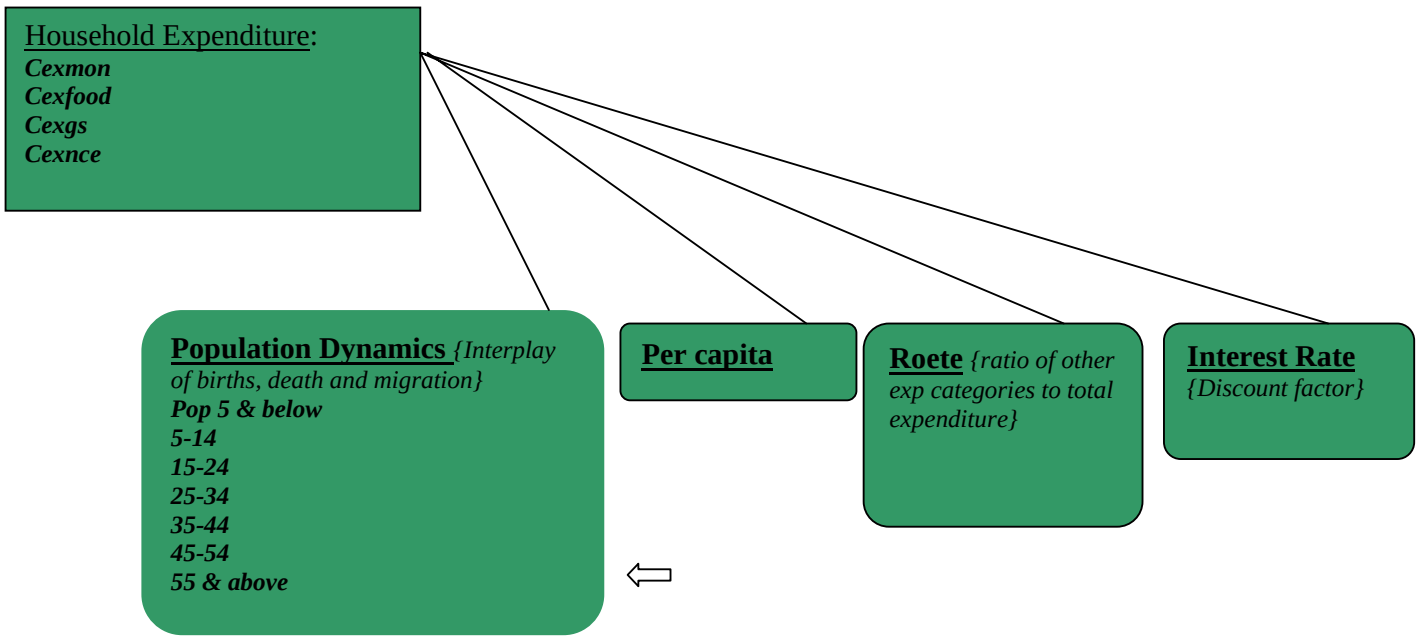
One of the significant issues of demographic aspects of economic development is that Population changes through its effects on Population size, age structure and Population distribution affects the level of demand for consumption goods as well as its patterns. These changes of consumption pattern and level in turn will affect overall and sectoral economic development. Knowledge of the effects of demographic elements of households' patterns of consumption expenditure is important for many aspects associated with policy and economic analysis.

[10]The paper concluded that "although, it is too early to say categorically that Nigeria is over-populated, the probable future growth of the population will stain our efforts at economic development".

Within this context, it is the objective of the present study to present the conceptual framework and, most important of all, to illustrate quantitatively the nature of the relationship between Population dynamics and household demand changes and its patterns alongside implications for Economic growth. At this point, it should be noted that while total household expenditure on income, plays a key role in determining the demand level and its pattern, one should also keep in view that the consumption level as well as the patterns of expenditure as such are also determined to a large extent by the household size and age composition. As indicated in Kleiman's study based on the U.S. data for the period of 1850-1960, "economies of scale in the consumption of food amount to as much as 40 percent of the relative change in household size." In their cross section study based on data for the years of 1950 – 67 for fourteen O.E.C.D countries, Parks and Barten also conclude "the age structure contributes significantly to an explanation of observed differences among countries in the estimated threshold parameters of the linear expenditure demand model". Also, Kirori and Ali {1998} showed that the various age structures forecast compositions in Kenya impacted significantly on the various components of Government's expenditure.

The basic premise of the analysis is that expenditure of households on food, monetary transaction, non-cash expenditure and other goods and services is contingent on population dynamics. There is no doubt that macroeconomic variables exert considerable impact on the living standards of the people as they respond to economic realities confronting them.

This model building approach in which population changes are specified as exogenous is very particularly relevant to policy impact analysis:
It is easy to access the consequences of population changes on expenditure pattern and secondly, it could serve a useful intervention measure via private consumption on growth indicators. Within this exogenised population change framework, the responsiveness of changes of economic conditions to changes in population can therefore be modeled. But since economic policies are not responsive directly to demographic changes, the critical issue in the modeling effort is to attempt to capture first, the effects of demographic changes on the immediate economic parameter to which it is susceptible and that is private consumption.
Figure 1 below describes the entire framework



3.1 Methodology Overview

The **base case; optimal case; and pessimistic case** was determined for the dependent variable with demographic projections, showing changes in the population using alternative scenarios of fertility rates which precipitate new expenditure values under alternative fertility rate scenarios in Nigeria. The specification shown below was used to estimate equations for four components of disposable income expenditure categories: food, {**CEXFOOD**} monetary transaction {**CEXMONTRAN**}, non-cash expenditure {**CEXNCE**} and other goods and services {**CEXOGAS**}. The equations would serve as a basis for projecting disposable income expenditure. Projected expenditures of the disposable income {**YD**} and financial wealth of private agents {**WELT**} that make up private consumption using population dynamics was fed into a macro model of the Nigerian economy for simulation purposes.

Private consumption for subsequent years was the sum total of the estimated disposable income expenditure categories, which is {CEXFOOD + CEXMONTRAN + CEXNCE + CEXOGAS} in addition to the estimated total real financial wealth of private agents.

The general specifications of the disposable income expenditure equations for households are:

CEXFOOD $= f\{Pop, Int, Roete, Pcy\}$

CEXMONTRAN $= f\{Pop, Int, Roete, Pcy\}$

CEXNCE $= f\{Pop, Int, Roete, Pcy\}$

CEXOGAS $= f\{Pop, Int, Roete, Pcy\}$

Where

Exp = expenditure categories {CEXFOOD, CEXMONTRAN, CEXNCE and CEXOGAS}

Pop = population variables {AVPOP*5* and below, AVPOP*5-14*, AVPOP15-24, AVPOP25-34, AVPOP35-44, AVPOP45-54, AVPOP1*5-55*, AVPOP*60* and above and AVPOP}

Int = interest rate

Roete = ratio of other exp categories to total exp

Pcy = per-capita income

Yd = disposable income

Cp = private consumption

Welt = private wealth of individuals

Rlenr = long-term interest rate

3.2 Estimation Techniques

The Augmented Dickey-Fuller was used to test for stationarity. Evidence of non-stationarity series required differencing to attain stationarity. This is to avoid the problem of spurious correlation, or inconsistent regression that plagues Econometric estimation when some or all of the individual series are non-stationary. The existence of a linear combination between the endogenous variables suggests a long-run relationship. The Johansen Juselius approach for Co integration was used. It is a particularly useful approach in unrestricted (non – normalized) equations that are consistent with long – run equilibrium but may be characterized by considerable short –run dynamics. The Pair-Wise Granger causality test was applied.

Diagnostic checks such as autocorrelation, heteroscedasticity, Swartz-criterion, Hanna-Quinn tests, normality and re-specification tests were utilized. Sensitivity to parameterization would also be checked for model congruency.

Presentation and Data Analysis

4.1 Analysis of household expenditure

The nexus of challenges to Nigeria's sustainable development links population, household expenditure and economic growth together. The connection is indeed very complex. Nevertheless, proper understanding of how they interact is fundamental, to the development of any sustainable economic policy in the country. Population is both the producer and consumer of social and economic goods and services. Poor economic growth, which does not match the pace of increase in population numbers, puts more pressure on the limited capacity of governments to provide for basic socio-economic needs.

Table 1 disaggregates household expenditure into four categories. They are expenditure on goods and services (CEXOGAS), expenditure on monetary transactions (CEXMON), expenditure on food (CEXFOOD) and non-cash expenditure (CEXNCE).

Table 1: Household portfolio choices (Millions of Naira)

Year	CEXFOOD	CEXMON	CEXNCE	CEXOGAS
1980				
1981	60,089	5,274	31,250	25,340
1982	55,119	7,592	34,804	23,605
1983	50,954	7,020	32,125	21,862
1984	44,022	3,868	31,769	24,778
1985	48,750	5,379	32,305	23,179
1986	45,686	5,569	27,935	18,122
1987	49,368	2,700	17,908	17,654
1988	48,072	5,324	20,834	22,693
1989	36,228	6,655	24,816	26,999
1990	48,562	6,479	25,401	29,402
1991	60,395	4,443	26,317	20,682
1992	50,632	4,441	26,329	21,353
1993	74,550	3,751	20,716	25,350
1994	73,128	3,676	23,003	22,464
1995	80,445	4,047	21,212	22,619
1996	100,283	5,045	15,761	23,039
1997	71,214	3,585	12,203	18,598
1998	85,682	4,317	22,640	11,653
1999	97,059	4,884	11,874	28,870
2000	110,397	554	11,521	34,800
2001	133,537	671	18,384	21,738
2002	157,801	793	16,859	17,538

Source: Computed from Federal office of Statistics- Household surveys of various years

Graph of Expenditures of Household

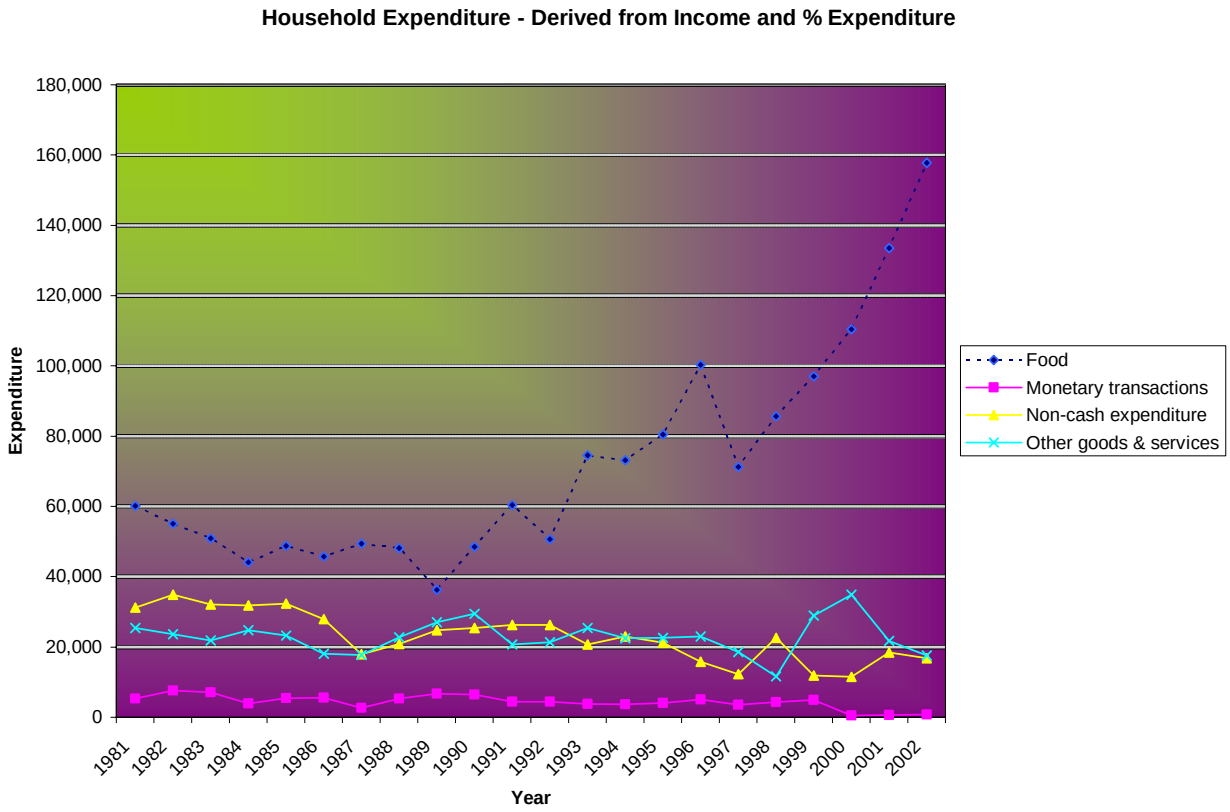


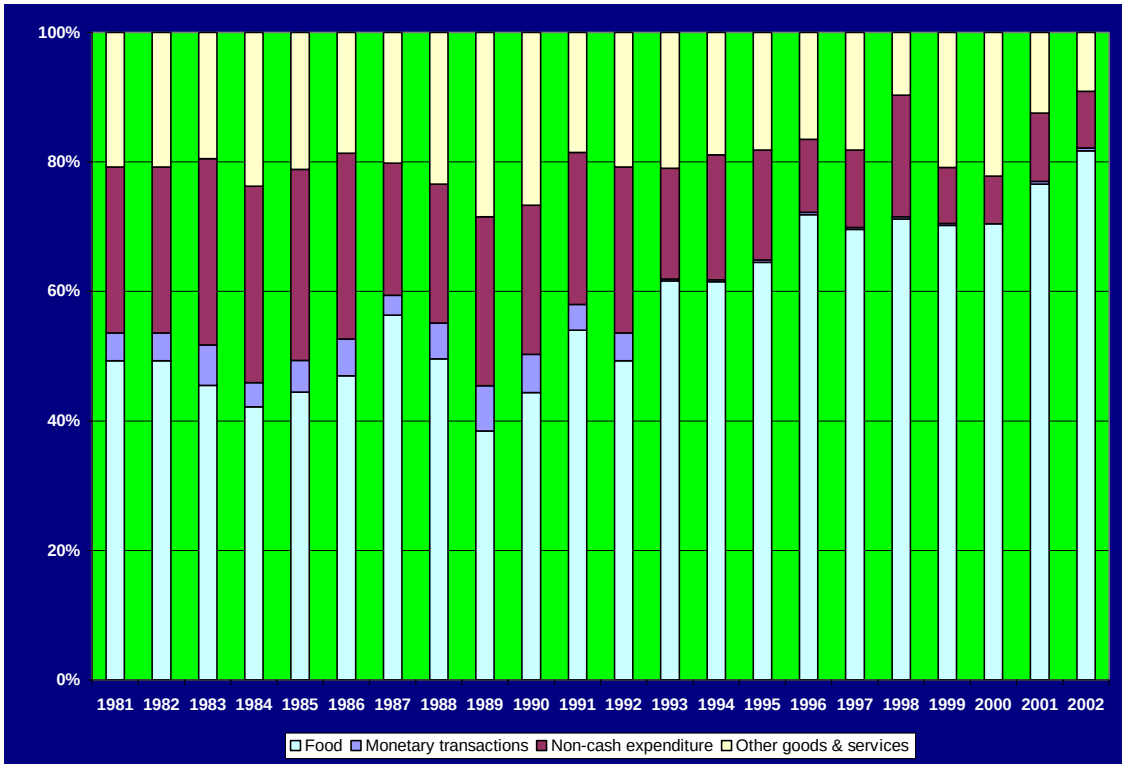
Table 2 shows the shares of the Table 1 expenditures in total household expenditure spending (%).

Year	CEXFOOD	CEXMON	CEXNCE	CEXOGAS
1980				
1981	49	4	26	21
1982	46	6	29	19
1983	46	6	29	20
1984	42	4	30	24
1985	44	5	29	21
1986	47	6	29	19
1987	56	3	21	20
1988	50	5	21	23
1989	38	7	26	29
1990	44	6	23	27
1991	54	4	24	18
1992	49	4	26	21
1993	60	3	17	20
1994	60	3	19	18
1995	63	3	17	18
1996	70	4	11	16
1997	67	3	12	18
1998	69	3	18	9
1999	68	3	8	20

2000	70	0	7	22
2001	70	0	11	12
2002	82	0	9	9

Source: Derived from Table 1

% of Household's Total Income expenditure- {Average of urban/Rural}



4.2 Equation Specification

The specification shown below is used to estimate equations for four expenditure categories: goods and services (CEXOGAS), expenditure on monetary transactions (CEXMON), expenditure on food (CEXFOOD) and non-cash expenditure (CEXNCE). The equations serve as a basis for projecting household expenditure.

The general specification of the expenditure equation is:
Expenditure = f (Pop, Pcy, Int, Roete)

Where

Exp = expenditure categories {CEXFOOD, CEXMONTRAN, CEXNCE and CEXOGAS}

Pop = population variables {AVPOP*5* and below, AVPOP*5-14*, AVPOP15-24, AVPOP25-34, AVPOP35-44, AVPOP45-54, AVPOP1*5-55*, AVPOP*60* and above}

Int = interest rate

Roete = ratio of other exp categories to total exp

Pcy = per-capita income

Yd = disposable income

Cp = private consumption
Welt = private wealth of individuals
Rlenr = long-term interest rate

The equations are estimated in log-linear form. The sampling period used for used for most of the equations is 1980 - 2000 and a lagged dependent variable introduced on the hand right side in each of the five equations to test for serial dependence. The signs of the right-hand side variables are expected to vary. The interest rate is expected to have a negative sign for cexfood, cexnce, cexogas while cexmontran and rwelt would have a positive sign; ratio of other expenditure categories to total expenditure would likely have a negative sign, while population variables would have a positive sign for all expenditure categories of the disposable income and a negative sign for rwelt and lastly, per-capita income would have a positive sign against all endogenous variables. The per-capita variable in the model increases expenditure from the demand side, thus measuring how elastic income of households are, just as an increase in any of the specified age bracket raises aggregate demand schedule of households and vice-versa.

4.3 Equation results

Table 3: Household expenditure on goods and services

Variables	**LnCEXOGAS**	**LnCEXOGAS**	**LnCEXOGAS**
Constant term	**2.56 {1.341}**	**-5.3 {4.031}**	**7.02 {2.143}**
LnCEXOGAS (-1)			**0.326 {1.531}**
LnAVPOP5	**-0.876 {-2.169}**		**-0.183 {-1.786}**
LnAVP6-11		**0.321 {-3.021}**	**-0.573 {2.113}**
LnAVP18-24	**1.783 {2.391}**		**3.060 {-3.184}**
LnAVP25-34			**2.523 {1.340}**
LnAVP35-44			**1.784 {-2.727}**
LnAVP45-54	**1.987 {2.241}**		**1.534 {-3.43}**
LnAVP55-64		**0.308 {7.753}**	
LnAVP65-74			**-0.354 {3.213}**
LnAbove75	**0.112**	**-0.345 {5.907}**	
LnInt	**-1.456 {6.32}**		**-2.213 {0.231}**
LnRoete			**-3.098 {-2.564}**
LnPcy			**1.987 {--2.341}**
R^2	**0.789**	**0.565**	**0.875**

In general, estimation of this equation using a lagged dependent variable improves the result, looking at the information criteria and R^2 statistics. The results suggest that this expenditure category increases as people become older. This is so because old people tend to consume higher than the young. The estimated elasticities indicate that other factors remaining constant, one percentage increase in the ratio of other expenditure categories results in about a three percentage real decline in the spending on goods and services This could be attributed to the fact that as other expenditure categories such as payment of house rents, school fees, etc, become due the demand for goods and services would decline or at least be postponed. And a one percent increase in real interest rate increases household expenditure on goods and services by about two percent (probably due to wealth effects). The age bracket of ***18 to 24 and 25 to 34*** show a strong influence on this expenditure pattern of the household. This becomes obvious given the exorbitant demand of the people within this age bracket. It is within this age bracket that most people begin to increase their demand for goods and services as they settle down into married life, and experience has shown that demand for goods and services by people within this age bracket, is more than 8 times the demand by the older segment of the population (i.e., people above the age of 65). The estimated equation seems to support the above view. The results further suggest that people above the age of 45 do form a significant part of household total demand for goods and services. Hence the ageing component of the population is still important in determining the aggregate expenditure of the household on goods and services, despite the higher expenditure by the younger generation or age groups. Members of the household below the age of 5 do not seem to have any positive influence on the household demand for goods and services.

As the per-capita income increases, the household expenditure on goods and services increases. More specifically, one can say that household expenditure on goods and services is income elastic.

Table 4: Household expenditure on monetary transactions

Variables	**LnCEXMON**	**LnCEXMON**	**LnCEXMON**
Constant term	**-4.8** **{5.97}**	**2.65** **{-6.462}**	**3.12** **{2.198}**
LnCEXMON (-1)	**0.696** **{-2.098}**		**0.391** **{6.310}**
LnAVPOP5	**1.473** **{3.121}**	**1.836** **{2.407}**	**2.563** **{0.231}**
LnAVP6-11	**1.789** **{-3.432}**		**0.361** **{2.09}**
LnAVP18-24		**-1.869** **{-5.241}**	**-1.805** **{3.139}**
LnAVP25-34		**-1.672**	**-2.634** **{0.563}**
LnAVP35-44			**-3.654** **{-1.784}**
LnAVP45-54			**1.972** **{-1.919}**
LnAVP55-64	**1.337** **{1.239}**		
LnAVP65-74			**-2.348** **{5.218}**
LnAbove75			
LnInt		**1.973** **{0.671}**	**3.389** **{0.764}**
			-1.953

LnRoete			**{-2.31}**
LnPcy			**2.786** **{-1.221}**
R^2	**0.542**	**0.613**	**0.861**

In general, estimation of this equation using a lagged dependent variable improves the result, looking at the information criteria and R^2 statistics. The results suggest that expenditure on this category decreases as population dynamics spreads. The estimated elasticities indicate that other factors remaining constant, a one percentage increase in the interest rate results in over a three percentage real growth in the spending on monetary transactions (this could still be attributed to wealth effect); a one percent increase in household per capita income increases expenditure on monetary transactions by almost three percent; while a one percent rise in the ratio of other expenditures to the total expenditure, causes the household expenditure on monetary transactions to fall by almost two per cent. The results also indicate that as population of people within the age bracket of 18 to 75 begin to increase their expenditure on monetary transactions increases, households have less to invest. Thus a negative relationship between population dynamics and monetary transactions becomes clearer especially at the middle ages when people involve themselves more and more on financial transactions. Moreover, people who are in the middle age brackets find it relatively easier to borrow money to spend than the younger segment of the population. The life cycle hypothesis predicts that at middle ages people would involve themselves in a lot of monetary transactions as they pay off accumulated debts at the start of life and begin to acquire financial assets such as shares, bonds, as well as other real estates in order to provide for the age of retirement. Also people within this age group spend money on the payment of school fees of their children and other forms of children-related expenditure. All these help to explain increases in monetary transactions in Nigeria as the population spreads. We also found from the estimated equation that the past expenditure of the household on monetary transactions does have a significant positive elasticity on the current expenditure. This agrees with the relative income hypothesis that predicts that immediate past expenditure has some significant positive effect on the current spending of the household.

Table 5: Household expenditure on food

Variables	**LnCEXFOOD**	**LnCEXFOOD**	**LnCEXFOOD**
Constant term	**-0.452** **{3.11}**	**1.231** **{0.716}**	**1.338** **{0.227}**
LnCEXFOOD (-1)	**1.705** **{9.932}**	**1.842** **{-1.49}**	**2.653** **{0.573}**
LnAVPOP5	**1.032** **{7.231}**		**0.867** **{2.509}**
LnAVP6-11		**1.467** **{2.117}**	
LnAVP18-24			**1.987** **{3.103}**
LnAVP25-34	**0.459** **{4,481}**	**1.936** **{-6.341}**	**2.532** **{0.541}**
LnAVP35-44		**1.876** **{1.872}**	**2.337**
LnAVP45-54	**1.876** **{-3.315}**		**1.357** **{0.657}**
			1.875

LnAVP55-64			**{1.219}**
LnAVP65-74			
LnAbove75	**-1.814 {4.512}**	**1.980 {-0.432}**	
LnInt			
LnRoete			**-2.883 {4.381}**
LnPcy	**1.983 {0.897}**	**1.992 {0.841}**	**2.234 {0.284}**
R^2	**0.501**	**0.764**	**0.982**

In general, estimation of this equation using a lagged dependent variable improved the result. The results suggest that all the exogenous variables have a positive relationship with the endogenous variable except the interest rate. One would therefore be safe to infer that as the interest rate increases, forward-looking households would reduce the current spending on food in order to invest their money so as to earn a high interest income that would guarantee them higher future consumption. The results indicate in general terms that households would be more inclined to spending on food subsequently unless there is a shift in policy. Results show that those between the ages of 18 to 64 drive this expenditure pattern as their corresponding elasticity coefficients are greater than unity . This pattern of household expenditure on food explains the high incidence of poverty and high level of under-development in Nigeria. Development theorists like Ragnar Nurkse, Rosenstein Rodan[11], etc predict that high consumption expenditure on food in most LDCs is an indication of under development. This result however, confirms the high level of underdevelopment and poor standard of living of the Nigerian populace. We also found that immediate past food expenditure does have a positive, though not a significant, influence in the current expenditure.

Table 6: Household expenditure non-cash expenditure

Variables	**LnCEXNCE**	**LnCEXNCE**	**LnCEXNCE**
Constant term	**1.032 {-4.351}**	**0.756 {4.423}**	**0.865 {1.784}**
LnCEXNCE (-1)	**0.234 {0.761}**	**0.345 {1.307}**	**0.452 {2.324}**
LnAVPOP5	**1.481 {2.112}**		
LnAVP6-11	**-1.739 {-3.334}**	**-1.801 {0.413}**	**-2.231 {0.467}**
LnAVP18-24			**-3.014 {-2.098}**
LnAVP25-34		**1.983 {-1.285}**	**2.876 {1.345}**
LnAVP35-44			**1.975 {0.327}**
LnAVP45-54		**0.832 {2.642}**	
LnAVP55-64	**1.349 {4.876}**		**-3.815 {-2.326}**

[11] See the Big Push theory and the theory of balanced growth.

LnAVP65-74			**-2.362 {3.312}**
LnAbove75	**0.874 {2.221}**		**-1.672 {-4.610}**
LnInt	**0.830 {3.431}**	**-1.451 {-3.032}**	**-2.970 {1.098}**
LnRoete			**-.4.853 {-0.116}**
LnPcy			**2.993 {2.174}**
R^2	**0.729**	**0.664**	**0.935**

In general, estimation of this equation using a lagged dependent variable worsens the result. The results suggest that expenditure on this line item is correlated to the working age bracket. This is due to the believe that they are in a position to use non-cash methods such as credit card, value cards, cheques, etc to make most of their purchases and payments. Results indicate that households have less of their income to spend on this category. The estimated elasticities suggest that non-cash expenditure decreases with age brackets 5 to 24 because this category of households do not have much non- cash transactions to make as they are dependants and must spend only when they are given cash. The positive elasticity on interest rate with respect to this expenditure category suggests that high interest rate could mop up cash balances in the economy as households would undertake more saving and use I owe you and other means to pay for their purchases[12].

4.4. Population projections

Tables 7 to 9 show population parameters for the three scenarios used in this research. The parameters are from the National Population commission in Nigeria. The preference for these estimates as against those of the World Bank/UNFPA is to use locally generated data for analysis.

Table 7: Population Fertility Rate Projections

Year	Base case	Optimal case	Pessimistic case
2000 – 2005	4.01	5.76	5.77
2005 – 2010	3.66	5.63	5.65
2010 – 2015	5.47	5.5	3.66
2015 – 2020			

Source: National population commission projections; 1991 Population Census

Table 8: Crude Death Rate Projections

Year	Base case	Optimal case	Pessimistic case
2000 – 2005	53.19	56.35	62.09
2005 – 2010	53.75	57.85	63.82
2010 – 2015	54.5	59.35	65.33
2015 – 2020			

Source: National population commission projections; 1991 Population Census

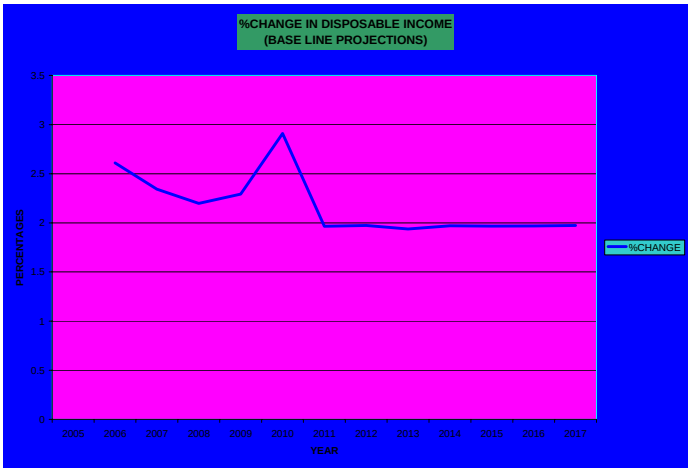
Table 9: Population Growth Rate

[12] The assumption here is that in future the money and capital markets will develop and become significant in the portfolio decisions of the household sector.

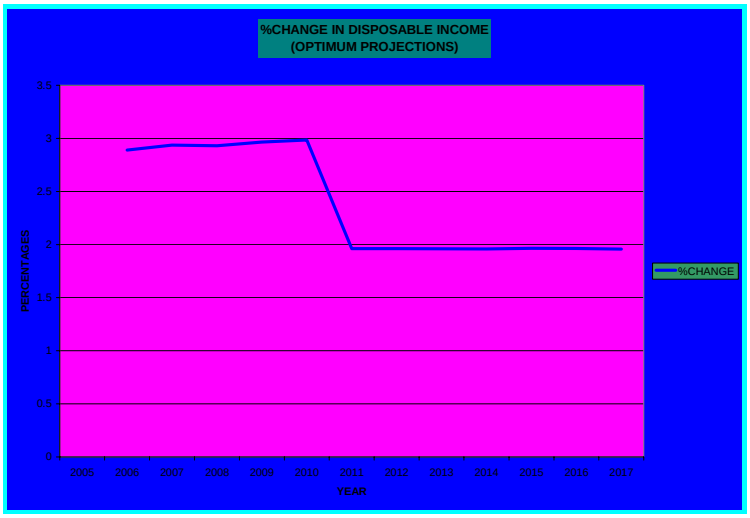
Year	Base case	Optimal case	Pessimistic case
2000 – 2005	1.95	2.98	3.23
2005 – 2010	1.82	2.92	3.15
2010 – 2015	1.67	2.86	3.09
2015 – 2020	1.47	2.80	3.04

Source: National population commission projections; 1991 Population Census

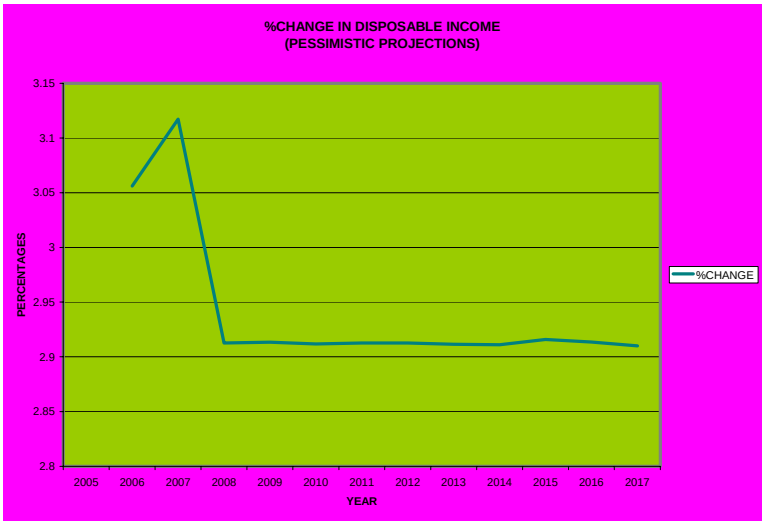
We used the estimated micro equations on the four expenditure categories to project the household aggregate consumption and hence the disposable income up to 2017, as well as their growth rates over the same period on the base line, optimum, and pessimistic population projections. Our results reveal interesting path for household consumption expenditure as the population expands overtime. We found that expenditure on food will continue to dominate the other components of household consumption expenditure in the long run, followed by expenditure on goods and services. As higher population is projected into the future, it is expected that households will spend more on food, as well as on goods and services than on other categories of expenditure (i.e., non-cash and monetary transactions expenditure).These results are displayed on the graphs below and shown in the appendix to this work.



From the graphs we can observe how the aggregate household consumption changes over time. The base line projection shows that aggregate real consumption would continue to decrease up to 2008 and thereafter begins to grow reaching all time high of 2.9% by the year 2010. The projection further shows that aggregate consumption would plummet to about 2% by the year 2011 and stabilizes there for the rest of the period. This is so because the fall in the growth rate of non-cash expenditure and monetary transactions would be counter-balanced by the increase in growth of the expenditure food, expenditure on goods and services, so that on the aggregate consumption remains stable at about 2% despite the threat for the total population to increase. The results from optimum projection suggest a two period variation in aggregate consumption over the projection period as the population expands. First, the projections show increasing consumption between 2006 and 2010 of about



three percent and thereafter, it decreases to about two percent and remained constant there despite the threat of population growth over the projection period. The pessimistic projection shows a somewhat different picture for aggregate consumption expenditure. The graph reveals that as population expands, the growth rate of aggregate expenditure converges to about 2.9 per cent. One common characteristic observed from the results is stability in the growth of aggregate consumption expenditure. This is an indication that the current reform policies as well as the



realization of the millennium development goals would lead to economic stability but may prevent rapid growth rate of the economy. Also, population dynamics is likely to lead to a rise in the aggregate consumption expenditure of the household, looking at the figures for the pessimistic projections. This would have profound implications on the growth of the Nigerian economy realizing that consumption expenditure alone accounts for about one third of total aggregate expenditure of the economy. High consumer spending especially on goods and services is needed to encourage investment and thus propel growth in any economy.
The findings are consistent with the observed data set shown in table 1 and represented in figure 2

We conducted micro simulations using the three categories of population dynamics: base line, optimum, and pessimistic. We found that food expenditure, and expenditure on goods and services dominate other components of consumer spending as the population increase. This could be attributed to the fact that population expansion is consistent with increases in the demand for food as well as the demand for goods and services especially in a typical developing country.

The results further show that the percentage change between the base line and optimum, and between the base line and pessimistic projected expenditure on food, and goods and services is increasing over time while that for monetary transactions and non-cash expenditure were negative but decreasing in absolute value which implies increase as well. But the percentage change between base line and pessimistic projection is wider than the percentage change between base line and optimum projection, thus suggesting that population dynamics have significant effects on the growth rate of consumption expenditure. (See tables B1 – B3 in appendix C). These findings reinforce the previous results in the aggregate case. The percentage increases are off-set by the percentage decreases so that in the long run, consumption expenditure follows a constant growth path, despite the increases projected for the total population. This prediction is consistent with Solow[13] growth model which concludes that changes in consumption, savings and investment as well as population increases can not account for sustained increases in either the standard of living or in economic growth. That sustained growth can only be achieved through increases in technological progress.

4.5. Conclusions

Rapid population growth has had many adverse effects on the economy. Nigeria has some of the fastest rates of urbanization in Africa mainly as a result of natural population increase and rural urban migration. Poverty and unemployment have increased. An estimated 28.9 per cent of the population lived on less than $1 a day between 1981 and 1995 while the unemployment rate is estimated to have averaged 2.8 per cent in 1996 (World Bank, 1997). Excessive pressure on social services, rapid increase in imports of food and consumer goods and the emerging phenomenon of street children are some of the other impacts of rapid population growth in Nigeria.

Available data show that Nigeria has started the demographic transition. A major issue, however, is whether the decline in fertility is real or due to problems with the data. While some evidence suggests that there has been an underestimation of births, data on other proximate determinants of fertility appear to be inconclusive. There is a need to strengthen initiatives made in health care to ensure that preventive and curative health services reach many women and children. This will contribute to the achievement of a sustained demographic transition. Economic difficulties in maintaining large families as a result of the economic crisis is forcing people to change traditional beliefs in large family sizes and the traditional system of African extended family that had hitherto led to high fertility rates. At the same time, the desire for child bearing is still strong in Nigeria particularly in the rural areas. This has given rise to the strong view that the levels of fertility and contraception use are not likely to change until there is a drop in desired family size and until the idea of reproductive choice is widely accepted.

There were obvious ups and downs in the expenditure trend on food over the period. During the early 80s expenditure on food nose –dived but started rising in the late 80s and also skyrocketed in the 90s. The implication is that most of national income was spent on food, constituting a crowding out effect for the economy. This did increase the demand for imported food products jeopardizing the domestic market. Furthermore, negative externalities ensued such as balance of payment problem, inflation, exchange rate devaluation etc. The non-existence or down movement of monetary transaction over the last two decades,

[13] See Robert M. Solow's contribution to the theory of growth 1956.

contributed to the poor economic performance of the economy, as well a drop in the marginal propensity to invest.

Various factors account for the high fertility rates driving population growth rate in Nigeria. Early marriages are still a common practice in many parts of the country. Three quarters (86.7 per cent) of mothers marry before the age of 18. The age at first marriage among all women is low (17 years), and the youngest ages at first marriage are found among women in the two northern zones. Various factors account for the high fertility rates observed in Nigeria. Early marriages are still a common practice in many parts of the country. The use of contraception is fairly limited and there is still a high demand for children due to tradition, religion and high infant mortality in many parts of the country. It is advocated that the following should be done to mitigate the negative externalities of rapid population growth:

- Government should strengthen population and development coordinating structures in terms of financing, training staff and improving facilities so as to make them more high-profile and enable them to coordinate and execute population and development policies effectively;

- Government should enhance the integration of population variables in socio-economic development and make policy makers, planners and grass root community agents appreciate the need for harmonized and balanced development activities;

- A need to enhance implementation of programmes at the grass-root level.

- Ensuring that strategies to reduce poverty, especially income generating and employment creation, are integrated into sectoral policies and programmes;

- Government should ensure collaboration between governments, NGOs, private sector, community leaders and religious organizations in publicity of development issues and teaching of population dynamics in schools;

In Nigeria, the nature of development planning and policy analysis has changed remarkably since the early 1980's. A lot needs to be done to fully realize the goal of full integration of population data in socio-economic planning. This process involves more than the adequacy of data and includes putting in place the required institutional arrangements to ascertain the interrelationship between population and capacity of the planning system. The National Planning Commission has a major role to play here while other data producing agencies should co-operate with it to ensure that data is produced in good time.

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Appendix A –

Data Sets

Table A1

Base case expenditure projection

YEAR	GOODSAS	MONTRAN	NON-CASH	FOOD	AGGRE	% CHANGE
2005	120820550	39936486	3124942.4	148712154	312594134	2.61
2006	124683189	39566004	3823238	152896226	320968657	2.61
2007	128466658	38730579	4436415	157037555	328671206	2.34
2008	132034821	37704381	5301740	161016228	336057169	2.20
2009	135394569	36783077	6737165	165029069	343943881	2.30
2010	138526124	36172245	1062112	168931308	354250789	2.91
2011	141296637	36895915	10832646	172325561	361350759	1.96
2012	144122633	37634304	11046757	175820516	368624209	1.97
2013	147003482	38386366	11265933	179254477	375910259	1.93
2014	149941151	39154322	11495831	182874154	383465458	1.97
2015	152945494	39937581	11720654	186557257	391160986	1.96
2016	156006148	40734588	11954798	190318634	399014168	1.96
2017	159121773	41549316	12196877	194180528	407048494	1.97

Baseline Microsimulation of the components of disposable income

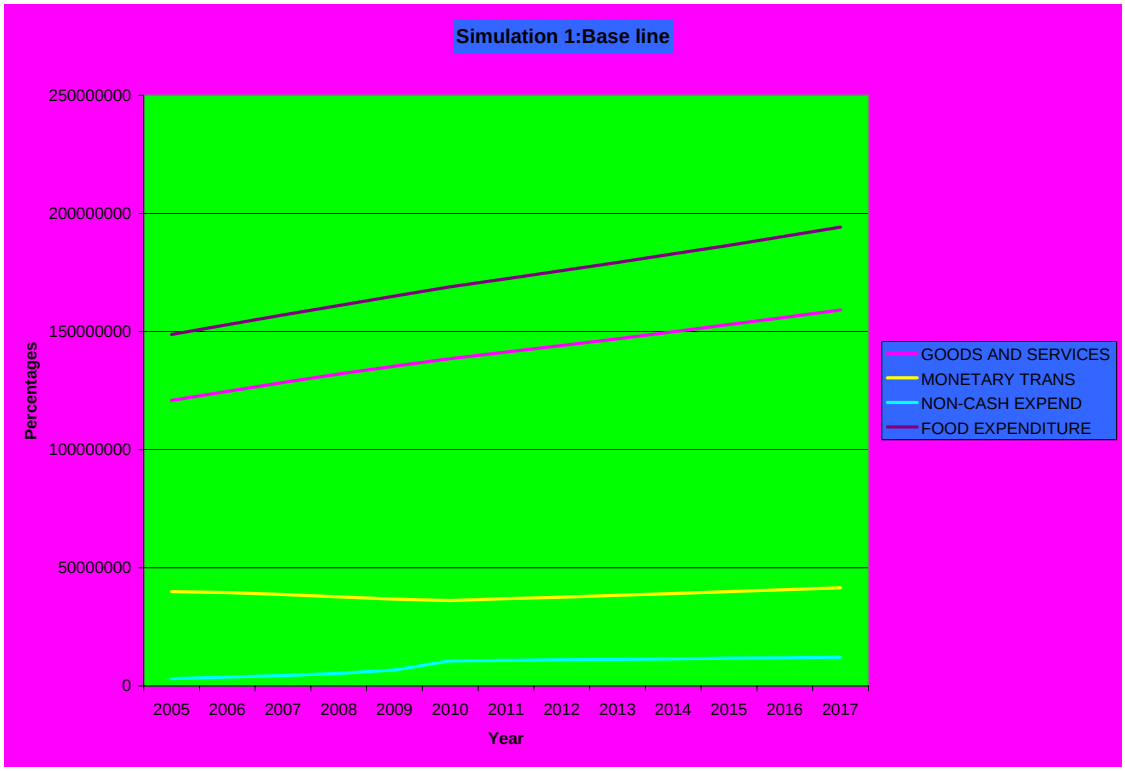

Table A2

Optimistic case expenditure projections

YEAR	GOODSAS	MONTRAN	NCE	FOOD	AGGRE	% CHANGE
2005	117024619	62361832	92747128	157308332	429441911	-
2006	120507739	63481920	97386749	162205911	443582319	2.89
2007	124152751	64116843	98800561	167118291	454188446	2.93
2008	127900629	64570642	81741063	161892085	436104419	2.93
2009	131809118	65018958	105446991	176746902	479021968	2.96
2010	135864726	65521789	109184762	181753907	492325183	2.98
2011	138582009	66274479	111367569	185761475	501985531	1.96
2012	141353717	67025722	113592379	189892723	511864540	1.96
2013	144179186	67773658	115862466	193986725	521802034	1.95
2014	147060364	68519647	118184292	198290998	532055301	1.96
2015	150007095	69262214	120542889	202684097	542496295	1.96
2016	153008982	69998870	122953479	207181713	553143044	1.96
2017	156064661	70732633	125415526	211806981	564019800	1.96

Optimum Microsimulation of the components of disposable income

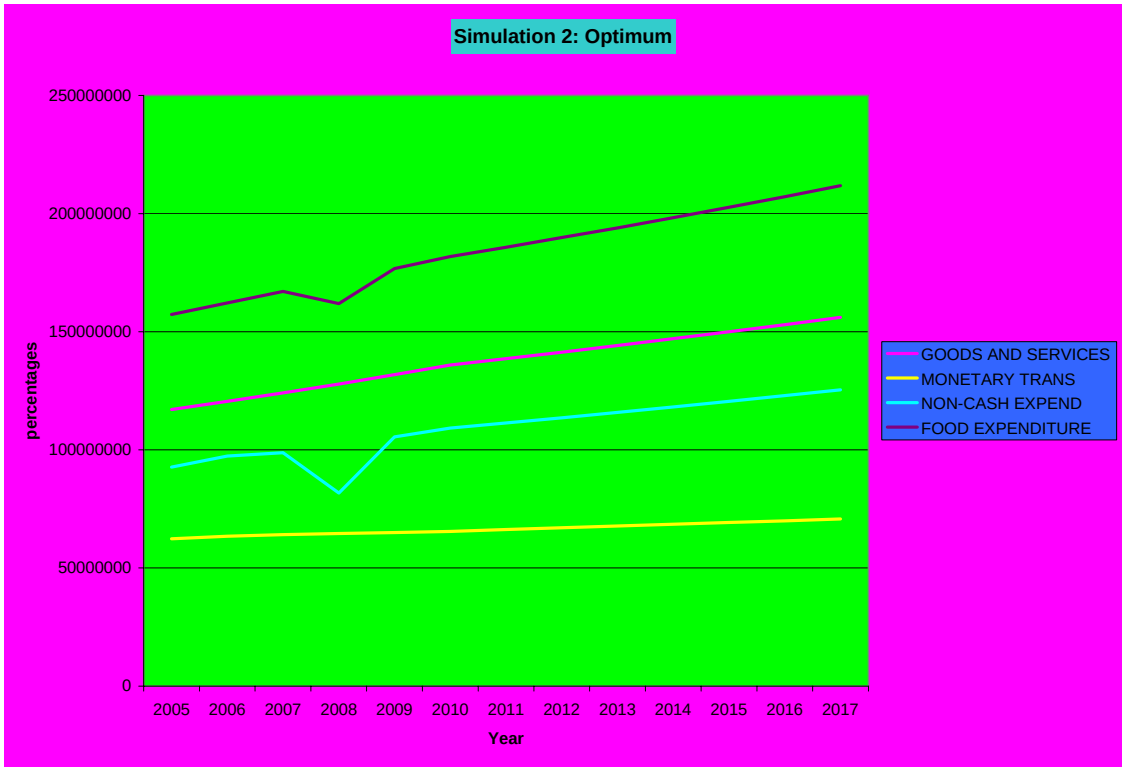

Table A3

Pessimistic case expenditure projection

YEAR	GOODSAS	MONTRAN	NCE	FOOD	AGGRE	% CHANGE
2005	118271302	66696831	2801581	160407674	348177387	-
2006	121999698	67991300	2709805	165503214	358204017	3.1
2007	125925084	68728353	2436193	170760874	367850504	3.1
2008	129702854	70790148	2508932	175852993	378854927	2.9
2009	133595063	72913576	2581352	181188039	390278029	2.9
2010	137601706	75100881	2659512	186613953	401976053	2.9
2011	141729666	77354111	2738294	192226049	414048121	2.9
2012	145981538	79675168	2817792	198039132	426513631	2.9
2013	150359296	82064769	2900479	203895186	439219731	2.9
2014	154867604	84526915	2992011	210044728	452431258	2.9
2015	159519105	87062865	3076561	216369407	466027938	2.9
2016	164306319	89672979	3168518	222888134	480035952	2.9
2017	169230889	92363185	3266489	229627361	494487926	2.9

Pessimistic Microsimulation of the components of disposable income