

# THE IMPACT OF MACROECONOMIC AND DEMOGRAPHIC FACTORS ON SAVINGS MOBILISATION IN NIGERIA

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## Abstract

*The role of savings in the economic growth of Nigeria cannot be over-emphasised. However, rapid population growth has posed a serious problem to savings mobilisation. A high dependency ratio of the population will require substantial increase in future spending on health, education and care for dependants. This envisaged decline in the working-age population could lead to lower savings and investment rates and slower GDP growth. Against this background, this paper examines the impact of dependency ratio on savings mobilisation in Nigeria using a number of macroeconomic indicators that influence savings. Nigerian data on relevant variables covering the period under investigation were utilised for the study. A multiple regression approach that incorporated an error-correction model was used for our data analysis and tests. The results suggested that savings ratio is determined by spread between lending and savings deposit rates (SLS), domestic inflation rate, real interest rate and foreign private investment (FPI). The major findings of this study are summarized as follows: (1) demographic factors seem to have played a positive and insignificant role in explaining the savings ratio in over two decades studied, (2) interest rates spread leads savings ratio, (3) domestic inflation rate has a negative and significant impact on savings ratio, and (4) foreign capital inflows, as measured by FPI positively and significantly affect savings ratio in Nigeria. The findings of this research will guide policy makers on economic growth and poverty reduction in countries of sub-Saharan Africa.*

**Jel Codes:** E21, D12, 018.

**Key words:** savings mobilisation, dependency ratio, macroeconomic indicators, spread, real interest rate, multiple regression, foreign private investment, domestic inflation rate.

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## 1. INTRODUCTION

The link existing among savings, investment and growth has been very close ever since, hence, the contribution of poor savings and investment to low growth performance of many developing countries is never in doubt. This discouraging growth performance has generally been followed by persistence decline in investment. In Nigeria domestic savings rates have witnessed a somewhat fluctuating trend over the years. This has been reflected in the savings ratio of the period 1970-1980. Between 1970 and 1980, there was a significant increase in savings mobilisation as reflected in the upward trend from the 1970s through the early 1980s, rising from 5.5% in 1970 to a peak of 19.1% in 1986. Thereafter, it trended downward to 7.2% in 1988, lower than that attained two decades ago but rose to 11.3% in 2003 (Nnanna, Englama and Odoko, 2004). This result becomes more worrisome than ever most especially now that Nigeria's population continues to grow every year raising her dependency rates to high proportions. Nigeria is a sub-Saharan African country and as such shares similar macroeconomic variables that do impinge on savings, investment and growth in the sub-region. According to one account,

*“sub-Saharan African countries are trailing most others in their progress through the demographic transition. And if economic growth continues to lag behind population growth, as was the case in the early 1990s, it will exacerbate poverty in the region” (World Bank, 2006, p. Vi)*

In fact, the challenges facing sub-Saharan African countries as it strives to meet its development objective challenges are more daunting than those facing other regions of the world. Its efforts to alleviate poverty, empower women, reduce child mortality, and improve maternal healthcare have been undercut by the AIDS epidemic, by conflict, and by human displacement in the wake of natural disasters. In the past three decades, its population has grown faster than that of any other region, doubling between 1975 and 2000 and now growing at 2.5% a year (World Bank, 2006). This report further states that roughly 47% of the sub-Saharan African population is between the ages 5 and 24, indicating that the population will continue to increase well into the twenty-first century. This large cohort will require substantial increases in future spending on health, education, and care for dependants. And of increasing concern is that HIV/AIDS looms as a new menace, threatening to cut life expectancy by 20 years and undermine the savings, growth and social fabric of many countries (Economic Commission for Africa, 2000). In Nigeria, life expectancy at birth has been averaging 54 years since 2000 (Central Bank of Nigeria, 2004). It may have even gone lower in recent times.

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The crucial role of domestic savings mobilisation to the sustenance and reinforcement of the savings-investment-growth chain in developing countries has pre-occupied development economists for decades (Chete, 1999). As Lewis (1970) in Uremadu (2006, p. 110) rightly notes, "the central problem in the theory of economic growth is to understand the process by which a community is converted from being a five per cent to a twelve per cent saver with all the changes in attitudes, in institutions and techniques which accompany this conversion". These changes as they affect population growth and its age structure and policies to fight endemic diseases like malaria and HIV/AIDS in sub-Saharan Africa and other efforts to increase average GDP per capita income of these countries cannot be undermined. It is with sole objective to extend empirical knowledge on leading macroeconomic indicators of gross savings ratio in Nigeria that this study is designed to assist policy makers in identifying the factors that favour savings accumulation, investment and growth in the 21<sup>st</sup> century Africa.

### ***1.1 The Research Problem***

The role of savings in the economic growth of any country cannot be over-emphasised. Savings represent that part of income not spent on current consumption. When assigned to capital investment, savings increase output. Institutions in the financial sector, like the commercial banks, mobilise savings in various ways including savings deposits on which they pay certain interest. To effectively mobilise savings in an economy, the deposit rate must be relatively high and inflation rate stabilised to ensure a high positive real interest rate, which motivates investors to save from their disposable income. People have also to find the institutions sufficiently safer than other alternatives. Economic and political stability also plays a preponderant role, as well as financial regulation. Moreover, the age structure of the population, measured by the ratio of population defined as dependant (under 15 years and over 64 years) to total population (i.e. dependency ratio) constitutes another important determinant of domestic savings as seen in the works of (Khan, 1988; Akhter, 1986; Burney and Khan, 1992 and Chete, 1999). In line with the above reasoning, the larger the population of the working-age population in a country, the greater the aggregate life time income and thus, the higher the aggregate savings. But the reverse has been the case in Nigeria. Causes and effects of this abnormal trend will form among the issues the present study will address. Although savings rates have fallen in many developing countries during the last two decades, Pakistan, unlike Nigeria, presents a unique picture of a country experiencing

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high rates of economic growth along with very low savings rates (Khan, Hasan and Malik, 1992, p. 1).

A number of empirical studies have given credence to the above stance. In fact, the national savings rates of Pakistan is not only low compared to that in many countries with per capita income about the same as Pakistan's but it is even lower to that in some South -Asian countries with lower per capita income. However, Nigerian economic growth has never been favoured in the same way as that of Pakistan (Qureshi, 1981; Khan, 1988; Burney and Khan, 1992; Akhter, 1986, Khan, Hasan and Malik, 1992; and Thanoon and Baharumshah 2002). Although the low savings rates have become a major source of concern in recent years, not much attention has devoted to highlight the key determinants of saving in developing countries. In recent years, few studies have been done on this issue using both the time-series and cross-section data. For example, Thanoon and Baharumshah (2002) carried out a study on the determinants of gross saving ratio in Malaysia utilising a co-integration and error-correction model to deal with the non-stationarity properties of time series of the variables involved. Their results suggest that saving ratio is majorly determined by dependency ratio (a result in line with life-cycle theory), economic growth, interest rate and foreign direct investment (FDI) in the long-run.

Similarly, Qureshi (1981) and Khan (1988) using time-series data have examined various determinants of household/national savings. Qureshi (1981) concentrated on economic determinants and found income and its rate of growth, the rate of return on financial assets and rate of inflation as key factors influencing household savings in Pakistan. Khan (1988), in order to seek an answer for the causes of low savings in Pakistan, tested two hypotheses, namely, the financial repressionist and the structuralist and found overwhelming support for them. Besides real income, the rate of return on deposits, unanticipated inflation, the variability of inflation and financial intermediation ratio (a measure of financial development) are found to have significant impact on aggregate savings in Pakistan.

Burney and Khan (1992) and Akhter (1986), using household income and expenditure surveys (HIES) for the period 1984-85 and 1979, respectively, attempted to examine the impact of various socio-economic and demographic factors on household savings in Pakistan. Besides households, the dependency ratio, various categories of education and age structure of the household head are found to be important factors influencing household savings. All these studies contribute to a better understanding of the various factors affecting savings in developing countries.

Back home in Nigeria, Chete (1999) studied macroeconomic determinants

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of private savings and establishes that among other eight variables (per capita income, real interest rate, inflation rate, debt service ratio, etc), dependency ratio has its hypothesised negative sign but it is insignificant at the five per cent level in impacting on savings rates. Apart from his work no other study has been furthered to confirm his findings or rebut it. Moreover, his results are on the contrary to theoretical expectations as expressed in most demographic economics literature that were later confirmed by recent studies of Thanoon and Baharumshah (2002); Chamberlin and Dey-Chowdhury (2008); Leff (1969); and Hadjimichael and Ghura (1995). Their previous research works on developing countries found a strong negative relationship between the dependency ratio and saving. Therefore to counter or confirm Chete (1999)'s work on savings rates in Nigeria, the need has urgently arisen for the present study to be conducted so as to extend knowledge on leading determinants of savings mobilisation in Nigeria. The problem of mobilising savings and deposits has always been the bane of economic growth and development in Nigeria. The present research is therefore designed to explore how to mobilise adequate savings in order to fill the wide gap which currently exists between savings and investment in Nigeria (Uremadu, 2006). Hence, the work will assess the impact of dependency ratio on savings mobilisation in Nigeria using a number of macroeconomic variables of interest that do influence gross national savings.

### *1.2 Objectives of the Study*

At this juncture, it will be good to state the objectives the paper hopes to achieve. Specifically, the study aims at achieving the following objectives which are; (1) to ascertain whether dependency ratio impacts significantly on gross national savings in Nigeria; (2) to ascertain whether real interest rate impacts significantly on savings rates in Nigeria; and (3) to empirically ascertain whether GDP per capita income also impacts significantly on savings mobilisation in Nigeria; by the time the study is completed and these objectives are achieved the paper will be in a position to discover independent variables on which savings ratio depends in Nigeria to spur capital formation and investment growth in the real sector of the Nigerian economy.

### *1.3 Hypotheses*

Based on the variables of interest to be used in conducting this research, we formulate the following hypotheses:

1.  $H_0$  : High negative dependency ratio significantly and negatively impact on savings mobilisation in Nigeria.
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2.  $H_0$  : High positive real interest rate significantly and negatively impact on private savings mobilisation in Nigeria.
3.  $H_0$  : High GDP per capita income impacts negatively on saving ratio in Nigeria.

Section 2 of the work will review related literature and discuss evidence of empirical studies already done on the topic in hand, while Section 3 will focus attention on methodology and model specification, data requirements and sources. Section 4 will centre on model estimates, analysis and discussion on results from tests. Finally, section 5 will make recommendations on findings from the study and conclude.

## 2. LITERATURE REVIEW

Theoretical and empirical investigation into savings behaviour in developing countries has produced very large literature. In particular, authors employ different neoclassical "life-cycle" and permanent income hypotheses as developed by Ando and Modigliani (1963) and Friedman (1957) as the principal ways for explaining consumption and savings behaviours. The standard life-cycle model presupposes that individuals save to balance their consumption over time in line with their anticipated life time income. As such, household savings is postulated to depend on lifetime income, wealth, and the expected returns on savings (Shiimi and Kadihikwa, 1999 and Leff, 1969). Hence, government policies that bear on any of these variables would naturally be expected to impact on savings too. Additionally, the dependency ratio constitutes another possible determinant of savings (Khan, 1988; Qureshi, 1981; Akhter, 1986 and Burney and Khan, 1992). Hence, Chete (1999) rightly observed that the larger the proportion of the working-age population in a country, the greater the aggregate life-time income and thus, the higher the aggregate savings.

Moreover, theoretical ambiguity regarding the effect of a change in interest rates on savings exist because of the offsetting influence of the interplay of the negative income and the positive substitution effects of such a change (Chete, 1999). Higher interest rates will normally raise the opportunity cost of consumption and thereby inspire greater personal savings (the substitution effect) while increasing the wealth of positive savers and hence triggering greater consumption (the income effect). Empirically, the direction of association between savings and interest rates is similarly less than clear. Fry (1978 and 1980) reports a positive insignificant relation between the real interest rate and aggregate savings. This result was countered by Giovannini

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(1983 and 1985), who finds using a modified data set, that the response of aggregate savings to changes in the real interest rate is inconsequential. However, Uremadu (2006), reports a negative and significant correlation between real interest rates and gross national savings. Other empirical evidences abound like Williamson (1968), Boskin (1978), Juster and Taylor (1975) and Howard (1978).

The classic McKinnon-Shaw (1973) thesis, which is a repudiation of the basic theoretical postulate of a negative correlation between real interest rates and investment also contends that high real rates of interest relative to the marginal productivity of capital will raise the volume of both real and financial savings. However, empirical evidence fails to authenticate this relationship as seen in Schmidt-Hebbel and Serven (1996) in Uremadu (2006, p. 199) that “financial liberalisation and interest rate deregulation... had very little effect on improving the size and allocation of savings”.

The population structure typified by dependency ratio has been identified as an important factor impinging on savings behaviour in less developed countries. (Gupta, 1970; Leff, 1969; Hadjimichael and Ghura, 1995; Deaton, 1988 and Khan, 1988). The issue at the moment is the percentage of the young and elderly in the total population as well as the impact of endemic diseases – AIDS and malaria infections – on the working-age population. These groups of people generally have low or no incomes and therefore save less. Thus, if these categories of people are dominant in any economy, aggregate savings will be small. Leff (1969 and 1980), discovered a significant inverse relationship between dependency ratio and saving ratio in poor countries. He rationalised his findings as follows: rapidly growing populations are characterised by a high ratio of dependants to the working-age population who, because they contribute to consumption, but not to production, impose a severe constraint on society’s potential for saving. Similarly, Thanon and Baharumshah (2002), corroborated the popular view when they found, using Malaysian data, that saving ratio is determined mainly by dependency ratio, economic growth, interest rate and foreign direct investment in the long-run. According to them, dependency ratio leads saving ratio and this is in line with the life-cycle theory (Ando and Modigliani, 1963).

In Nigeria, only Chete (1999) has examined determinants of saving ratio incorporating dependency ratio as a factor of influence in his model. His findings, however, discovered dependency ratio as “the least important variables influencing private savings in Nigeria”, although with its right sign. How true this result is will either be affirmed or rebutted by the findings of the present study. For time being, no other recent work other than Chete’s (1999) has researched on this very important variable as it affects savings

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mobilisation in Nigeria. In other words, a similar study is long over due, but should now also give prominence to the effect of HIV/AIDS and malaria infections on the working-age population by determining the impact of dependency ratio on savings rates. Therefore an attempt to fill the vacuum existing in the previous studies within sub-Saharan Africa generally, and in Nigeria, in particular, is being made here.

### *2.1 Evidence from Study*

Despite an extensive literature on saving behaviour, several empirical issues are yet to be resolved conclusively, including the influence of real interest rates, demographic factors, spread between lending and savings rates and per capita income on private savings; the relationship between economic growth and savings (Boughton *et al.*, 1990; Deaton, 1992 and Masson, Bayoumi and Samiei, 1998). This paper extends the empirical knowledge of savings behaviour by using Nigerian data covering 1980-2004 and by looking at the impact of demographic factors (dependency ratios) on gross national savings. In doing this it will also consider a broad set of other possible determinants of savings ratio within the Nigerian context under the period reviewed. Although some previous studies have used both time series and cross-sectional data to examine how the variability of potential explanatory variables differ in those two dimensions (Masson, Bayoumi and Samiei, 1998), the present study will utilize only time-series information since it is limited to only one country.

The existing literature, like the present study, tends to be limited to one of these two dimensions, one of the few exceptions being Schmidt- Hebbel, Webb, and Corsetti (1992), who use panel data to study behaviour across developing countries (see Masson, Bayoumi and Samiei, 1998). Conclusions concerning the significance of one or another factor have often depended importantly on the choice of time-series or cross-sectional estimation, in addition to, the country or countries included. For example, time-series estimation has typically found evidence of demographic effects on private savings in Japan but not in the United States, whereas cross-sectional estimates have yielded large effects (see Horioka, 1993 FOR Japan; Carroll and Summers, 1991, FOR United States; and Modigliani, 1970 and Graham, 1987 for cross-sectional estimates). As said earlier, the present study will limit itself to one sub-Saharan African country, Nigeria, and as such utilizes time-series data to examine the robustness of a number of variables including demographic factors like dependency ratio, per capita income, etc., which do impact on savings mobilization in a developing Nigerian economy.

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### *2.1.1 Income and Savings*

To the question: Does rise in income raise savings?, Modigliani (1966) argues that a higher growth rate arising from population growth or productivity growth would, with unchanged savings rates by age group, raise aggregate savings because of those working relative to those not earning labour income (that is, retired persons living off their accumulated assets). This view is based on the life-cycle hypothesis, which relates savings behaviour to successive stages of schooling, increased earnings, and retirement (Modigliani and Brumberg, 1954; Modigliani and Ando, 1957 and Masson, Bayoumi and Samiei, 1998). Carroll and Weil (1994) confirmed that lagged values of increases in income growth seem to explain higher savings rates; they argue that the usual consumption models with either uncertainty or liquidity constraints are not sufficient to explain this result and advance instead the hypothesis of habit persistence, according to which higher consumption associated with temporarily higher income takes some time to be reduced when income falls back. If growth leads to higher savings, for whatever reason, then these will have an important implications for sub-Saharan African countries whose growth rates have been sluggish (Uremadu, 2006).

### *2.1.2 Interest Rates and Savings*

Again, to the question: Do higher interest rates lead to higher saving?, the paper argues that the savings behaviour of pension plans for an individual enhances the empirical importance of the income effect on private savings (Masson, Bayoumi and Samiei, 1998). For defined benefit plans, higher interest rates increase the income available to pay pensions, allowing lower contributions (Bernheim and Shoven, 1988). Empirical research has also reported elsewhere mixed results, paralleling the theoretical ambiguity that the effect of interest rates on consumption has potentially both offset negative substitution and positive income effects. For instance, using data on savings for industrial countries, Bosworth (1993) finds a positive interest rate coefficient in a time-series estimation for individual countries, but a negative coefficient in a panel (cross-country) estimation. For developing countries, Giovannini (1985) concludes that in most cases the real interest elasticity is zero, while Schmidt - Hebbel, Webb, and Corsetti (1992) also find no clear effects on savings. But surprisingly, Ogaki, Ostry and Reinhart (1995) find positive interest rate effects that vary with income but are still small. Uremadu (2006, 2007) finds a negative and significant real interest rates effects on gross national savings for Nigeria. Reason being that there have been high rates of inflation over the years resulting in negative real rates most of the years studied.

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Given that financial liberalization has the possibility of changing the interest rate effects it is not too surprising that results are often not robust. The effect of liberalization on savings behaviour can operate through at least two channels: (i). Financial development may provide outlets for financial savings, thereby raising savings rates, a channel that has been emphasized in the development literature (McKinnon, 1973) and Shaw, 1973). Although financial liberalization generally affects the form that savings take and so the efficiency of investment, it needs not raise the level of savings (De-Gregorio and Guidotti, 1994). (ii) The second aspect involves the liberalization of consumer access to bank credit, an indirect channel for money supply or financial deepening, as occurred in a number of industrial countries in the 1980s. It so happened that regulatory changes have allowed banks to lend more freely to individuals, for instance, for purchase of a house or for consumption, and this may lead to, at least initially, to a significant decline in savings. Empirical evidence supports this effect in countries that have liberalized access to consumer credit (Jappelli and Pagano, 1989; Bayoumi, 1993; Lehmussari, 1990; and Ostry and Levy, 1985).

### *2.1.3 GDP Per Capita Income and Savings*

Would it be appropriate to consider if savings vary with a country's per capita income? Most probably it may mean that differences in per capita income could be one of the factors that explain the wide range of savings rates in developing countries. It would appear that at subsistence levels, the potential for significant savings is small. A rise in per capita income may therefore lead to higher savings rates. Uremadu (2006, 2007) finds a positive and high significant per capita income effects on gross domestic savings for Nigeria. However, the size of this effect is likely to decline as per capita income rises and may even become negative for rich countries where investment opportunities and growth are relatively lower. It appears to be a stylized fact that the process of development involves in the latter phase low savings rates, and lower savings rates in more mature economies of the West (see Ogaki, Ostry and Reinhart, 1995).

### *2.1.4 Age Structure of Population (Dependency ratio) and Savings*

The paper also deems it appropriate to consider if the age structure of the population has a significant influence on savings. Hence, it may still be reasoned that the life-cycle hypothesis highlights the importance of the age structure of the population. If a high proportion of the population is of working age – especially if at peak earning years – then the economy should have

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a high rate of private savings, as workers provide for their retirement. Conversely, when this cohort reaches retirement age and dissaves, then the aggregate savings rate should decline (Masson, Bayoumi and Samiei, 1998). An extensive literature attempts to link demographic variables to savings behaviour. A good amount of literature gives credence to the fact that higher proportions of the young and elderly in relation to persons of working age (dependency ratios) are associated with lower savings rates (see Leff, 1969; Modigliani and Starling, 1983; Graham, 1987; and Masson and Tryon, 1990). These estimates, and the projections of population aging in coming decades, would produce quite large falls in private savings in many industrial countries, especially Japan (Masson, Bayoumi and Samiei, 1998). However, *World Bank Development Indicator* (2006) reports a higher population of working age group in Nigeria. Presently, meaning that percentage of “the young shall grow age group” is increasing. This development could be a good omen for Nigeria if the government can create more jobs, provide education, good health care, infrastructure and other enabling environments for its working-age populace against the future.

Again, Masson, Bayoumi and Samiei (1998) examined determinants of private savings behaviour using data for a large sample of industrial and developing countries. They find that demographics (dependency ratios) and growth are important determinants of private savings rates, and that interest rates and terms of trade have positive, but less robust, effect. Additionally, that increase in per capita gross domestic product seem to increase savings at low income levels (relative to the United States) but decrease it at higher ones.

#### *2.1.5 Other Determinants of Savings Ratio: Inflation Rate and Foreign Savings*

Finally, there are other potential determinants. Other possible explanatory indicators of savings ratio from literature include inflation and foreign savings proxied for foreign private investment (FPI) or foreign direct investment (FDI) or international portfolio investment (IPI). Inflation may affect savings for several reasons: higher inflation tends to lead to higher nominal interest rates and hence higher measured household income and savings (Masson, Bayoumi and Samiei, 1998). Besides, foreign savings become a potential exogenous determinant of national savings when foreign borrowing is rationed, as often is the case in developing countries. Some empirical evidence supports such a negative relationship between national and foreign savings (Fry, 1978, 1980 and Giovannini, 1985) and between household and foreign savings (Schmidt - Hebbel, Webb and Corsetti, 1992). Uremadu (2008) establishes a positive and non-significant influence of cumulative foreign

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private investment (a surrogate for FDI) on capital formation for Nigeria, and literature has it that capital formation, another name for gross domestic investment (GDI) raises level of national income. That is, the process of capital formation helps in raising national output which, in turn, raises the rate and level of national income. When national income rises, people's disposable income consequently rises and out of this, they can make savings. By this implication then a rise in FDI can as well have a positive effect on savings accumulation, all things being equal (Uremadu, 2006, 2008).

### 3. METHODOLOGY

The methodology deals with model specification, data requirements and sources of data. Two analytical tools will be used in the study viz.: descriptive statistics and multiple regression analytical model. Multiple regression analytical models will be used to estimate the relationship between the level of gross national savings and the identified macroeconomic factors of influence such as the real interest rate, spread, inflation rate, dependency rate, broad money supply, etc. The descriptive statistics will be employed mainly to carry out economy analysis in relation to macroeconomic variables of interest. Empirical implementation of the econometric model will make use of a time series data covering 1980-2004 to determine the impact of dependency ratio on savings mobilisation in Nigeria. The study will apply the data to an ordinary least squares (OLS) method which will incorporate an error-correction approach to conduct its investigations and analysis.

#### 3.1 Model Specification

The study shall adopt and modify the models of Chete (1999) and Thanoon and Baharumshah (2002) in determining the impact of dependency ratio on savings mobilisation in Nigeria. The relevance of both models is that they fit perfectly well into the present study as they will help in pursuing the main objectives the paper is set to achieve. The present study will modify them by inclusion of some other target variables of importance like FPI for the former and SLS spread between lending rate and savings rate for the latter modifications, respectively. The multivariate specification of the probabilistic model will take the form of

$$Y = a_0 + b_i X_i + U_i \quad (1)$$

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where  $Y$  = GNS (gross national savings) and dependent variable;  $X_i = X_1, X_2, \dots, X_8$  are the explanatory variables;  $a_0$  is the regression constant; while  $b_i = b_1, b_2, \dots, b_8$  are the regression coefficients of the explanatory variables.

The above general least square equation (1) with specified variables will form equation (2) stated below as follows:

$$\text{GNS} = a_0 - b_1\text{DR} + b_2\text{RIR} + b_3\text{M2} + b_4\text{PCY} - b_5\text{INFR} - b_6\text{SLS} + b_7\text{FPI} + U \quad (2)$$

where;

GNS = Gross national savings is proxy for total savings ratio at current market price.

DR = Dependency ratio.

RIR = Interest rate, defined as the nominal interest rate from savings deposits minus annual domestic inflation rate.

M2 = Broad money supply, defined as the degree of financial deepening captured by broad money (M2) as ratio to GDP at current market price.

PCY = GDP per capita at current naira income of the people, rise in per capita income will positively impact on their savings ability (Uremadu, 2006).

INFR = Domestic inflation rate, defined as macroeconomic instability represented by annual rate of inflation. It has negative impact on savings.

SLS = Interest rate spread, defined as interest rate differential between maximum lending rate and savings deposits rate. It has a negative impact on savings. Interest rate determination is a critical factor in the loanable funds market given its role in the mobilization and allocation of financial resources (or credit) in any economy (Uremadu, 2006, 2007).

FPI = Cumulative foreign private investment, proxy for foreign direct investment (FDI) as a % age of GDP at current market price. It is expected to exhibit a positive and significant influence on private savings ratio (Thanoom and Baharumshah, 2007).

U = Random error term which captures all other unknown influences (uncertainties) or factors not stated in the model.

### ***3.2 Data Requirements and Sources***

Secondary data will be utilised to estimate the above model. The data to be employed will be extracted from different sources which will include

Central Bank of Nigeria *Statistical Bulletin Vol. 15 (Dec. 2004)*, and *Annual Reports and Statement of Accounts (various)*; *International Financial Statistics of IMF (2004)*, *World Tables (2006)* as well as *the Nigeria Annual Abstract of Statistics (2004)*, published by the Federal Office of Statistics (FOS), Abuja.

### 3.3 Estimation Method

Most macroeconomic time-series data display non-stationarity and can be classified as integrated or near integrated (Olusoji, 2003). Regressing with these variables leads to the danger of non-standard distributed parameter estimates which make influence much more difficult. Usually, the first difference transformation  $I(1)$  eliminates this linear trend, which makes the series stationary. Therefore, while estimating the model, we may test for the unit root characteristics of the variables and the extent to which the variables are co-integrated if our results warrant such tests to be carried out. This will be done using the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) (see Engel and Granger, 1987). This application will remove non-stationarity of some of the variables contained in the model to enable better results to be achieved from the study.

## 4. DATA ANALYSIS AND DISCUSSION ON THE RESULTS

The results of descriptive and quantitative analysis for OLS modelling of impact of demographic factors (dependency ratio) on savings mobilization in Nigeria are presented in Table 1 below.

From Table 1 above, the results of our regression analysis indicate that interest rate differential between maximum lending rates and savings deposit rates (SLS) is the leading determinant of positive private savings ratio in Nigeria. It is positive and highly significant at a 1 percent level, in affecting savings ratio. However, the plausible reason for carrying a wrong sign (that is positive instead of a negative sign) may be due to distortions prevalent in the Nigerian economy. This has been variously confirmed in Uremadu (2006, 2007).

Results also reveal that three out of the seven explanatory variables dependency ratio (DR), real interest rate (RIR) and interest rates spread (SLS) assumed wrong signs while the remaining four: broad money supply (M2), per capita income (PCY), inflation rate (INFR) and foreign private investment (FPI) retained their right signs. In general, the descriptive statistics for the model ( $R^2$ , F-stat and W-Stat) are fit being within the acceptable bounds. The results of DW-Stat of 1.99 which is tending to 2.00 profoundly attest ab-

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**Table 1: Modelling: GNS Functions by OLS**

Variable	Coefficients	Std. Error	t-Statistic	P-value
C(Constant)	-57.29444	61.60005	-0.930104	0.3653
DR	67.71207	66.85083	1.012883	0.3253
RIR	-0.547611	0.216551	-2.528791**	0.0216
M2	0.082555	0.09989	0.917382	0.3718
PCY	1.487484	4.414116	0.336984	0.7403
INFR	-0.730271	0.206680	-3.533346*	0.0026
SLS	1.063275	0.256689	4.142268*	0.0007
FPI	1.091037	0.580000	1.881098	0.0772
<b>Fit Statistics:</b>				
R <sup>2</sup> = 0.747859		74.78%		
Adjusted R <sup>2</sup> = 0.644036		64.40%		
S.E.of regression = 5.114716		5.11		
Durbi_Watson Stat = 1.990935		1.99		
F-Stat = 7.203216		7.20		
Prob(F-Stat) = 0.000437		0.000438*		

Source: Author's Calculations

Key: \* Significant at 1% level; \*\*Significant at 5% level.

sence of residual serial correlation (Masson, Bayoumi and Samiei, 1998), hence needless to subject dependent and independent variables to quasi-difference using the method of (Bhargava, Franzini, and Navendranathan, 1982). Analysis of results of other explanatory variables will now follow.

Regression results besides established that inflation rate negatively and significantly impacted on savings ratio in Nigeria. It ranked the second influencing savings ratio in Nigeria. This is in line with economic thinking backed by relevant theories (Chete, 1998; Uremadu, 2006, 2007 and Olusoji, 2003)

Next in importance in order of significance is the real interest rate (RIR) which ranked third in the series. The results of our regression from Table 1 above show that it is very significant at a 1 percent level. However, it exhibited a wrong sign (that is, it has a negative impact on savings in Nigeria) which is against our *a priori* expectations. What this means is that as real interest rate is rising, it leads to a decrease in gross domestic savings. However, these results confirm Uchendu's (1993) finding that nominal rates instead of real rates are a major determinant of private savings mobilization using

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Nigerian data. That is, as the nominal rate rises, it leads to a rise in gross domestic savings mobilization due to money illusion. This is a plausible reason why in Nigeria people are yet to be properly aware of the workings of the real interest rate as the main rate to consider while taking decisions to invest or save in a bid to optimally reap from returns on their investments (Uremadu, 2006 and Uchendu, 1993).

The results of our regression show that foreign private investment (FPI) as a percentage of gross domestic product at current market price is fourth in magnitude in impacting on the savings ratio. FPI is positive and significant at a 5 percent level in influencing private savings within the period studied. Since the variable assumed the right sign, it then goes to show that a rise in flows of foreign private investment (FPI or FDI or IPI) will prompt rise in gross domestic savings (or GNS) for that matter. This finding agrees with Uremadu (2008) as stated elsewhere in this work, that FDI has a positive relationship with gross fixed capital formation (GFCF) and by extension gross national savings, while some empirical evidence documents a negative relationship between national and foreign savings (Fry, 1978, 1980 and Giovannini, 1985).

The results show that the dependency ratio (a demographic factor) has a positive BUT statistically insignificant impact on national savings. The plausible reason for its non-significance is that per capita income (PCY) which is also a demographic factor with (DR) was included in the model. However, when we omitted PCY from the originating equation (2) the results assumed an improved performance rating for dependency ratio (DR) from its former t-value of 1.012883 to 1.253769 in influencing savings rates in Nigeria (see Table 2) in the appendix. Again, when DR was omitted from the model equation (2), it improved t-value of PCY but not with much magnitude. However, with elimination of DR from the originating model (2) the value of DW-Stat had an enhanced value of 1.95 from its previous 2.25 quantum it attained prior before we omitted PCY to retain the DR factor. In general, it can be deduced from these results that the presence of both demographic factors; DR and PCY in the model constituted a high correlation with other macroeconomic variables in the results of modelling savings ratio by OLS function in Nigeria (see Tables 2 and 3) in the appendix. Hence, using PCY growth rate ratio in Nigeria gives better result as it had its correct sign than that of DR which neither engendered higher DW-Stat value nor attained its *a priori* expected negative influence on savings mobilization in Nigeria.

By the present results, it then means that an increase in gross national savings, and the plausible reasons for it exhibiting this posture are: (i) the working population is higher in number than the non-working population structure going by 2006 national population census results (NPC, 2006a); (ii)

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also 2006 national population results stated that number of males is greater than females. Traditionally, more men work than females especially in the northern Muslim dominated area of Nigeria where women are kept in “pu-da” (that is, in the home as full time house wives). (iii) Again, Nigerian children help their parents farm as from age six. They also hawk goods on the streets to generate income for their parents. Hence, “the use of age fourteen as the cut-off point for the dependent children” may not be appropriate for Nigeria (Adams, 1971). These results have concurred with John Conlisk and Donald Huddle’s conclusion in Adams (1971) that “among developing countries there is apparently a significant relationship between the rate of growth of output and the rate of population growth”. It may have contributed to the positive effect of DR(dependency ratio) results on the national savings ratio (NPC, 2006b). (iii) Besides, *World Bank Development Indicator (2006)* reports a higher population of working-age group in Nigeria.

The results of the regression analysis also reveal that broad money supply as a percentage of GDP at current market price is not significant, though with the right sign, in impacting on savings ratio. These findings portray that financial liberalization of 1986 – to date has not had much effect on quantum of private savings mobilized in Nigeria ever-since. There may be a need to apply other types of financial intermediation techniques that would lead to financial deepening and have maximum impact on savings mobilization for investment to raise economic output in the country.

Finally, the results of per capita income (PCY) from Table 1 above and Tables 2 and 3 of appendix, show that PCY is positive but statistically insignificant in impacting on savings. Since a rise in real GDP per capital income will lead to a rise in savings accumulation, serious efforts should be mustered and directed towards raising our per capita income so that people will have high disposable income that will prompt them to save in our financial system. When adequate savings are mobilized, commercial banks will extend increased credit (lending) to the domestic economy to be invested to create wealth for the nation (Uremadu, 2008).

## **5. SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION**

### ***5.1 Summary of Findings and Recommendations***

The paper has observed that the descriptive power of the specified equation (2) is relatively very high as evidenced in our fit statistics (Adjusted R<sup>2</sup>

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of over 74.79 percent and DW-Stat of 1.99). It has also been noted that the long-term multipliers and elasticities are employed not just in structural analysis only, but also in forecasting and policy evaluation issues by the instruments – targeting techniques (Timbergen, 1956 and Aneke, 1999).

Again, we have already used the estimates of these entities, which are derived from the model presented here, to evaluate economic and financial policy in Nigeria over the period of this research. The calculated statistics are fiscal policy multipliers which covered the period 1980-2004, 25 years. At this juncture, we can now make our policy recommendations arising there from findings of this work to state as follows:

1. Findings from the study established a positive and highly significant association between the interest rate spread and private savings ratio. However, a wide spread between lending and savings deposit rates discourage private savings mobilization, the reasons banks give for charging such high lending rates (e.g.s high cost of doing business and rising inflationary pressures that depreciate value of naira), notwithstanding. That interest rate spread exhibited a wrong sign was due to distortions existing in the Nigerian economy that lead to high inflation and high overhead costs as established in the literature (see Uremadu, 2006). In order to bridge this wide gap presently existing between lending and savings rates (spread) in the banking system, we make three recommendations to action policy plans: (i) Government, through monetary authorities, should vigorously pursue anti – inflationary measures, as inflation was observed from past studies (Enendu, 2003 and Uremadu, 2006), to increase spread though with a lag. (ii). It is also important that commercial banks should exercise the highest degree of professionalism in their operations in a bid to reduce the incidence of high overhead costs, which tends to raise the interest rate spread. (iii). Additionally, it is suggested that banks should gear their efforts towards mobilizing cheaper funds with a view to increasing the availability of loanable funds. This positive action will raise supply and dampen the price of credit, reduce spread and ultimately, the national economy will be the better for it (Enendu, 2003 and Uremadu, 2006, 2007).
2. As expected, the domestic inflation rate exhibited negatively with a high proportion of influence on the savings ratio in Nigeria. This variable (INFR) being a critical factor in both the real interest rate (RIR) determination and the private savings mobilization, government should urgently pursue anti-inflationary policies in the country. Such policy actions could incorporate deliberate reduction in growth of broad money supply, engender an increase in real GDP to abate high inflationary pressures; minimize in-

creases in the exchange rate, to also tame domestic inflation and raise food production and supply in the country targeted at reducing consumer price index (CPI), (see Uremadu, 2001, 2005; Fakiyesi, 1996 and Moser, 1994).

3. Findings from our study also established that positive real interest rate (RIR) is very critical to savings accumulation in the country. However, money illusion arising from people's preference to high nominal interest rates has blurred their minds from realizing the importance of real rates in investment decisions and therefore has been the main motivation for attracting increased deposits in the banks. In the present situation, we strongly recommend policy actions to sensitize the Nigerian public towards realising the importance of positive real interest rates while considering returns from their funds towards investment decisions to optimize returns from investment (ROI). As already recommended in (2) above, anti-inflationary policies should be intensified to beat down high inflationary pressures in these times, hence, enhance the real interest rate return from saved funds in deposit accounts with the banks (Uremadu, 2006). From this perspective, desired domestic savings would be mobilized for future investment strides towards realizing high gross fixed capital formation and growth (Uremadu, 2008).
4. Policy makers should promote high inflows of foreign capital like flows of cumulative foreign private investment (FPI) and its surrogates such as FDI and IPI with a view to complementing locally mobilized funds for investments in the real sector of the economy so as to raise capital formation, savings and output (Uremadu, 2008).
5. Finally, findings from the empirical analysis confirmed that the rise in Nigeria's working-age population may have resulted in the positive and insignificant impact of dependency ratio on savings mobilization in the Nigerian economy. Being so, we therefore recommend for policy implementation (i) Nigerian Government should optimize these positive developments also revealed by *World Bank Development Indicator (2006)* reports that the working population is higher in number than the non-working population structure, to raise productivity and (ii) The country should equally engage energy of this teaming population of working age group by creating new jobs where they will work (channel their energies) which will eventually translate into rise in real GDP growth.

## 5.2 Conclusion

In conclusion, the model presented here is significantly spectacular (and germane to the determination of national savings mobilization in the Niger-

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ian economic system) in that although studies on private savings or financial savings mobilization have been variously carried out on Nigeria before now, none has ever been conducted known to us, that has included the demographic factor of dependency ratio in its model estimation of savings ratio on Nigeria, thereby making the present research both timely and relevant.

Our estimated results have undoubtedly rightly opened the possibility of augmenting the instruments – targeting approach of Timbergen (1956) with the Samuelson multiplier – accelerator interaction model (see Samuelson, 1939); and Thanoon and Bharumshah's (2002) model on Malaysia as well as Masson, Bayoumi and Samiei's (1998) savings model on industrial and developing economies. Theirs have been applied to both industrialized and developing economies outside Africa. Hence, our results aptly provide evidence from one of the developing economies of sub-Saharan Africa (SSA) of the 21<sup>st</sup> Century emerging markets of present world.

As a matter of fact, the period covered by the study, has witnessed a number of evolutions and revolutions in the Nigerian financial system like financial liberalization which began in the wake of 1986, bank recapitalization and capital market explosion or developments of the 2000s (Uremadu, 2007, 2008). The evolutions in the capital markets are still in progress and have contributed to significant developments in the financial system that could, in fact, impact on the savings mobilization. As such so much has occurred and we feel it is time to do an empirical work that will examine what indices in company of relevant demographic factors do have significant influence on achieving high growth premium in the economy. Certainly the present work is timely. It is a backdrop to policy evaluation and suitability of our model to undertake this follow-up task. Further studies could still come up immediately on the key indicators of savings ratio on Nigeria using other demographic factors and other relevant indices that do significantly impact on savings mobilization towards optimizing capital formation and bridging the existing gap between savings and investment in the Nigerian economic system. Sooner or later we might still think of examining the issue of research from another perspective. Expected contributions from study will, no doubt, deepen knowledge and urge application towards growth of the Nigerian economy, in particular, and the SSA, in general. These are our motivations in research.

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Work profited elaborately from P. R. Masson, T. Bayoumi and H. Samiei's (1998) "International Evidence on the Determinants of Private Savings". *The World Bank Economic Review* Vol. 12, No. 3 (1993) p. 483-501 especially for review of related literature and evidence from empirical works cited.

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**Appendix**

**Table 2: Modelling:  
GNS Function by OLS with Per Capita Income (PCY) Omitted**

Variables	Co-efficient	St-Error	t-statistic	P-value
C (Constant)	-72.65497	63.12837	-1.150908	0.2657
DR	86.84128	69.12837	1.253769	0.2269
RIR	-0.553441	0.201403	-2.747940	0.0137**
M2	0.067303	0.091571	0.734978	0.4724
INF	-0.767253	0.206846	-3.709288	0.0017*
SLS	0.999461	0.262997	3.800296	0.0014*
FPI	0.928056	0.62775	1.473631	0.1589
R <sup>2</sup> = 75.55%; R <sup>2</sup> Adjusted = 65.49%; SE of regression = 5.11; Durbin-Watson Stat = 2.25; F-Stat = 7.51; Prob (F-Stat) = 0.000343*				

**Source:** Author's calculations.

**Key:** \* Significant at 1% level. \*\* Significant at 5% level. \*\*\* Evidence of high correlation with other variables.

**Table 3: Modeling:  
GNS function by OLS with Dependency Rates (DR) Omitted**

Variables	Co-efficient	St-Error	t-statistic	P-value
C (Constant)	4.926023	8.625064	0.571129	0.5754
RIR	-0.627667	0.266556	-2.354723	0.0308**
M2	0.095652	0.092635	1.032566	0.3163
PCY	2.763071	5.693105	0.485336	0.6336
INF	-0.782720	0.247312	-3.164904	0.0057*
SLS	1.064355	0.274696	3.874660	0.0012*
FPI	1.031128	0.649572	1.587394	0.1308
R <sup>2</sup> = 73.66%; R <sup>2</sup> Adjusted = 62.81%; SE of regression = 5.29; Durbin-Watson Stat = 1.95***; F-Stat = 6.79; Prob (F-Stat) = 0.000613*				

**Source:** Author's calculations.

**Key:** \* Significant at 1% level. \*\* Significant at 5% level. \*\*\* Evidence of high correlation with other variables.

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### Résumé

Il serait erroné d'accorder trop d'importance au rôle joué par l'épargne sur la croissance économique au Nigeria. Toutefois, la croissance rapide de la population a sérieusement entravé la mobilisation de l'épargne. Un taux élevé de population dépendante implique que l'on augmente sensiblement les dépenses en matière des soins de santé, de l'éducation et du soutien économique. Ce préconisé déclin de la population active pourrait influencer négativement l'épargne, ainsi que les taux d'investissements, et pourrait également ralentir la croissance du PIB. Compte tenu de ces réflexions, cet article examine l'impacte du taux de dépendance sur la mobilisation de l'épargne au Nigeria, en s'appuyant sur de nombreux indicateurs macroéconomiques qui influencent l'épargne, ainsi que sur les donnée des variables pertinentes à la période prise en examen. Pour l'analyse des données et des tests on s'est servi d'une approche de régression multiple qui incorporait un modèle de correction d'erreur. Les résultats ont suggéré que le ratio d'épargne est déterminé par l'écart entre les taux d'intérêts de dépôt et de prêt, par le taux d'inflation intérieure, le taux d'intérêt réel et les investissements privés étrangers (IPE). On en a déduit que: (1) les facteurs démographiques n'ont joué qu'un rôle à la foi positif et marginal sur le ratio d'épargne pendant les deux décennies prises en examen; (2) l'écart des taux d'intérêt influence le taux d'épargne; (3) le taux d'inflation intérieure a un impacte négatif et important sur le taux d'épargne, et (4) l'afflux de capitaux étrangers, mesuré en termes de IPE, a également un effet important mais positif sur le taux d'épargne au Nigeria. Les décideurs politiques pourront se servir des résultats de cette recherche en matière de croissance économique et de réduction du taux de pauvreté dans le pays de l'Afrique sub-Saharienne.

**Mots clés:** mobilisation de l'épargne, taux de dépendance, indicateurs macroéconomiques, écart, taux d'intérêt réel, régression multiple, investissements privés étrangers, taux d'inflation intérieure.

