

What Drives Private Saving in Nigeria

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Abstract

This study discusses the trend in Nigerian saving behaviour and reviews policy options to increase domestic saving. It also examines the determinants of private saving in Nigeria during the 1970-2007 period. It makes an important contribution to literature by evaluating the magnitude and direction of the effects of the following key policy and non-policy variables on private saving: Income growth, interest rate, fiscal policy and financial development. The framework for analysis involves the estimation of a saving rate function derived from the life cycle hypothesis while recognizing the structural characteristics of a developing economy. The study employs the Error-Correction Modelling procedure which minimizes the possibility of estimating spurious relations, while retaining long-run information. The results of the analysis show that the saving rate rises with both the growth rate of disposable income and the real interest rate on bank deposits. Public saving seems not to crowd out private saving, suggesting that government policies aimed at improving the fiscal balance have the potential of bringing about a substantial increase in the national saving rate. Finally, the degree of financial depth has a negative but insignificant impact on saving behaviour in Nigeria.

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1. Introduction

There is growing concern among researchers and policy makers over the declining trend in saving rates and its substantial divergence among countries. This concern is due to the critical importance of savings for the maintenance of strong and sustainable growth in the world economy. Over the past three decades, saving rates have doubled in East Asia and stagnated in sub-Saharan Africa, Latin America and the Caribbean (Loayza et al., 2000). Should these disparities make saving a policy concern? Theoretically, nothing stops economies that are faced with different preferences, income streams and demographic characteristics from choosing different saving rates. In practice, however, the intertemporal choices that underlie savings depend on an array of market failures, externalities and policy-induced distortions that are likely to drive saving away from socially desirable levels.

Development economists have been concerned for decades about the crucial role of mobilization of domestic savings in the sustenance and reinforcement of the savings-investment-growth chain in developing economies. For instance, Aghevli et al. (1990) find that saving rate and investment in human capital are indeed closely linked to economic growth. The relationship between savings, investment and growth has historically been very close. Therefore the unsatisfactory growth performance of several developing countries has been attributed to poor savings and investment.

This poor growth performance has generally led to a dramatic decline in investment. Domestic saving rates have not fared better, thus worsening the already precarious balance of payments position (Chete, 1999). In the same vein, attempts to correct external imbalances by reducing aggregate demand have led to a further decline in investment expenditure, aggravating the problem of sluggish growth and declining saving and investment rates (Khan and Villanueva, 1991).

The problem

The strong positive correlation which exists between savings, investment and growth is well established (Obadan and Odusola, 2001; Athukorala and Sen, 2004). The dismal growth record in most African countries relative to other regions of the world has been of concern to economists. This is because the growth rate registered in most African countries is often not commensurate with the level of investment. In Nigeria, for example, the economy witnessed tremendous growth in the 1970s and early 1980s as a result of the oil boom. After this, there was an investment boom, especially in the public sector. However, with the collapse of the oil market in the 1980s, investment fell, resulting in a fall in economic growth. For example, during the investment boom, gross

investment as a percentage of gross domestic product (GDP) was 16.8% and 31.4% in 1974 and 1976 respectively, whereas it declined to 9.5% and 8.9% respectively in 1984 and 1985.

The rise in oil prices during 1990-1991 was supposed to spark an investment boom. However, this did not happen in Nigeria since the accruing windfall went mostly to government, which decided how to use the funds. Nigeria's military government was inexperienced in formulating economic policy, thus investment decisions were undertaken with a high level of incompetence and mediocrity, resulting in enormous waste. To arrest this continued decline, the government adopted the structural adjustment programme in 1986 with a view to providing a stable macroeconomic and investment environment. To this end, interest rates which were previously fixed and negative in real terms were replaced by an interest rate regime driven more by market forces. This policy shift de-emphasized direct investment stimulation through low interest rates and encouraged savings mobilization by decontrolling interest rates.

However, the objective of enhanced investment and output growth was not realized as the country's investment rate failed to rise to anything near the level it had reached in the 1970s. Although successive governments implemented policies and strategies to deepen the financial sector and raise investment, these policies failed to meet the aspirations of the people. This failure can be traced to several factors including frequent revisions in projected expenditure, overemphasis on public investment, distortion in plan implementation, official corruption, poor coordination, inconsistencies and overdependence on oil.

The decline in investment in the late 1980s and the low investment ratio which persisted into the 1990s, no doubt, partly explain the slow output growth rate during the period. The growth rate averaged 2.3% over the period (1986-2000) compared with the target annual growth rate of 5% and the 3.2% average growth rate for developing countries. The growth rate also failed to level up with the population growth rate, which stood at an average of 2.9% during the period, thereby worsening the level of poverty. During this period, the country earned approximately US\$340 billion from the sale of crude oil alone.

Available data show that the saving culture in Nigeria is very poor relative to other developing economies. For instance, during the 1986-1989 period, domestic savings averaged 15.7% of GDP. However, with the distress in the financial sector during the 1990s, the rate of aggregate savings declined significantly. The distress syndrome resulted in a significant fall in domestic saving in the 1990-1994 period, with the saving to GDP ratio dropping to 6%. By 2004, the figure stood at 6.4%. These data indicate that there is an urgent need to encourage Nigerians to change their current attitude towards saving. However, the right saving culture must be put in place by institutions and regulatory agents who influence the decisions of households, firms and governments. In this regard, there is need to put in place a coherent economic policy which is capable of providing the much needed enabling environment. This includes job creation, poverty alleviation and infrastructural development.

The question remains: What is the impact of savings and investment on growth? It has been argued that saving affects investment, which in turn influences growth in output. The transformation of initial growth into sustained output expansion requires the accumulation

of capital and its corresponding financing. An output expansion in turn sets in motion a self-reinforcing process by which the anticipated growth encourages investment, which supports growth, as well as financial development. It is certain that without a significant increase in the level of investment (public and private), no meaningful growth in output would be achieved. Indeed if private investment remains at the current low level, it will slow down potential growth and reduce the long-term per capita consumption and income, resulting in low savings and investment.

Although empirical literature has shed light on various aspects of savings behaviour, several crucial questions remain regarding the relevance of policies in raising the saving rate vis-à-vis the non-policy determinants of saving. From the perspective of policies, there is need to know the following: What is the magnitude and direction of these variables on savings? How effective are growth-enhancing policies such as macroeconomic stability and higher income growth in raising the saving rate? What is the effectiveness of financial development in raising private savings? Is there a role for fiscal policy in increasing national savings? What is the impact of interest rate on total savings?

Objectives of the study

This study has two objectives:

- i) To carry out an analysis of the sources and trend of saving in Nigeria;
- ii) To evaluate the impact of the main determinants of saving identified in the literature on private savings in Nigeria.

Justification for the research

Analysing the factors explaining the level of savings, will determine what needs to be taken into consideration in order to increase both savings and investment. This is necessary if economic growth and development is to be stimulated in Nigeria. The experience of the East Asian tigers suggests that an investment ratio of between 20% and 25% could engender a growth rate of between 7% and 8%. Evidence from Nigeria reveals that output represented by real GDP showed a positive growth soon after the civil war, following the oil boom of the 1970s such that the growth rate stood at 21.3% in 1971.

As the oil glut of the 1980s hit the world economy, output growth in Nigeria contracted such that GDP had negative growth rates of 26.8% in 1981 and 5.3% in 1984. However, with the structural adjustment in the mid 1980s, it grew positively at 9.3% in 1985 before hitting a high of 10.9% in 1990. That was to be the highest growth rate recorded after structural adjustment. The economy has since been growing at steadily positive growth rates due mainly to the renewed confidence in the financial system as a result of a return to democratic rule since 1999.

With regard to methodological issues, most of the existing empirical literature on the determinants of savings has employed cross-country data without much consideration of their time series dimension. This cross-country empirical literature must, however, be approached with some caution. In the first place, these studies use relatively small samples. Secondly, most of the variables employed are correlated among themselves,

thus making it difficult to measure the effects of different variables accurately. Thirdly, there is controversy as to the direction of causality.

Even the alternative of employing panel estimation is fraught with problems. First, cross-country regression analysis is based on the assumption of homogeneity in the observed relationship across countries. This assumption is, however, restrictive. It is a well known fact that there are significant differences between developing countries with regard to institutional features and structural characteristics which determine the impact of financial factors on the growth process. Second, as a result of the differences that exist between countries with regard to the nature and quality of data, cross-country studies become problematic. This is because there is a significant difference between countries with regard to the statistical methods for measuring saving, as well as the error size in the data. Consequently, results obtained from cross-country regressions should be interpreted with caution.

The problems highlighted above underscore the need to carry out a thorough time-series analysis of the determinants of saving in a single economy through an appropriate interplay of qualitative and quantitative analysis of Nigeria's policies and performance. This will help build a strong empirical basis for informing policy debate. Country-specific studies of this sort, however, are few and the available ones are mired in controversy regarding the magnitude and sign of the coefficients of the variables of interest. All these issues emphasize the need to restrict our analysis to a single economy and utilize time series data because of its several advantages.

To begin with, our question is inherently a time series one: How did saving change when each of its determinants changed? In addition, given that the variables of interest vary significantly over time, their time series provide a considerable wealth of information which is lost in cross-sectional averages. This study recognizes that the use of time series analysis presents some problems for saving regressions. The effects of these variables on saving are likely to exhibit complicated dynamics, which may be obscured by temporal effects arising, for example, from the business cycle. Therefore, the study employed the Error-Correction Methodology which has the ability to integrate short-run dynamic and long-run equilibrium models in a unified system, while ensuring theoretical rigour and data coherence and consistency.

2. Stylized facts about saving in Nigeria

Sources of saving in Nigeria

The Nigerian economy, like any other, comprises of the public and private sectors, with both engaging in investment expenditure. Both sectors have to save and/or borrow in order to meet their investment requirements. The immediate source of funds is their own savings. The government, which represents the public sector, collects revenue from both tax and non-tax sources. After meeting its expenditure requirements on purchases of goods and services, the government uses whatever surplus there is to increase its stock of capital i.e. investment. This is also true of economic agents in the private sector. When investment expenditure exceeds the level of savings, the private and the public sectors mainly borrow from financial institutions.

The financial institutions that engage in providing funds or credit for investment in Nigeria include deposit money banks, mortgage institutions and development finance institutions. Other sources include non-bank financial institutions like insurance companies, the capital market, mutual trust funds, pension funds, equipment leasing companies, cooperative and thrift societies, etc. All these are regarded as formal sources of investment finance in Nigeria because they are well organized with appropriate records and, their operations are relatively open and regulated. Altogether, they provide the largest portion of the domestic funds for investment.

There is a large number of informal providers of domestic funds for investment in Nigeria. They are termed informal because of their mode of operations and the lack of enough documented information about them. They provide investment funds for individuals and small enterprises operating in the informal sector of the economy. The lack of information on their operations makes it difficult to determine the exact proportion of the total domestic funds for investment these providers make available. However, for a country like Nigeria whose informal sector is adjudged to be large, the informal providers of investible funds play a significant role in capital accumulation in the country. These providers include individuals, groups, town unions, occupational groups, “esusu”, religious organizations, etc.

Trend of saving in Nigeria

In mobilizing funds from the surplus units of the economy, banks incur some costs mainly in interest payments on deposit accounts. In order to recover the cost of deposit mobilization and other operating overheads, banks lend at higher interest rates. The

difference between the two types of rates is referred to as the interest rate spread or the intermediation spread. The spread measures the efficiency of the intermediation process in the market, such that, a high intermediation spread implies that there is inefficiency in the market, especially as it discourages potential savers and borrowers, thus, hampering investment and growth.

Before the deregulation of the banking sector, interest rates were administratively determined by the Central Bank of Nigeria (CBN). Both the deposit and lending rates were fixed by the CBN on the basis of policy decisions. At that time, the major goals were socially optimum resource allocation, promotion of orderly growth of the financial market, and reduction of both inflation and the internal debt service burden on the government. During the 1970-1985 period, the rates were unable to keep pace with the prevailing inflation rate, resulting in negative real interest rates. Moreover, the performance of the preferred sectors of the economy was below expectation, leading to the deregulation of the interest rate in August 1987 to a market-based system. This enabled banks to determine their deposit and lending rates according to the market conditions through negotiations with their customers.

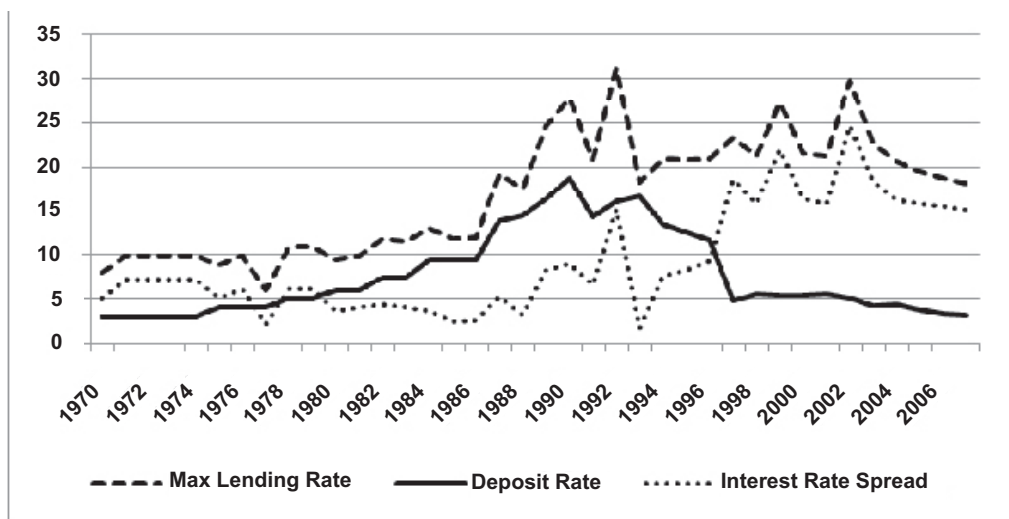
However, CBN continued to determine the minimum rediscount rate (MRR), the CBN nominal anchor. The lack of responsiveness of the structure of deposit and lending rates to market fundamentals makes the interest rate inefficient. The wide divergence between the deposit and lending rates (interest rate spread) is inimical to economic growth and development of the Nigerian economy. Between 1980 and 1984, interest rate differentials averaged 3.9%. Even though this was reasonable within the accepted limit, the spread widened between 1985 and 1989, averaging 4.3% per annum. This had a negative impact on the amount of loanable funds available to the private sector for investment.

The interest differential further widened to an average of 7.9% between 1990 and 1994. Thereafter, the yearly interest rate spread maintained an upward trend, rising from 8.2% in 1995 to 24.6% in 2002, before declining to 15.7% in 2005 (see Figure 1). The widening gap between the deposit and lending rates reflects the prevailing inefficiencies in the Nigerian banking sector and has deterred potential investors from borrowing, thus lowering the level of investment in the economy.

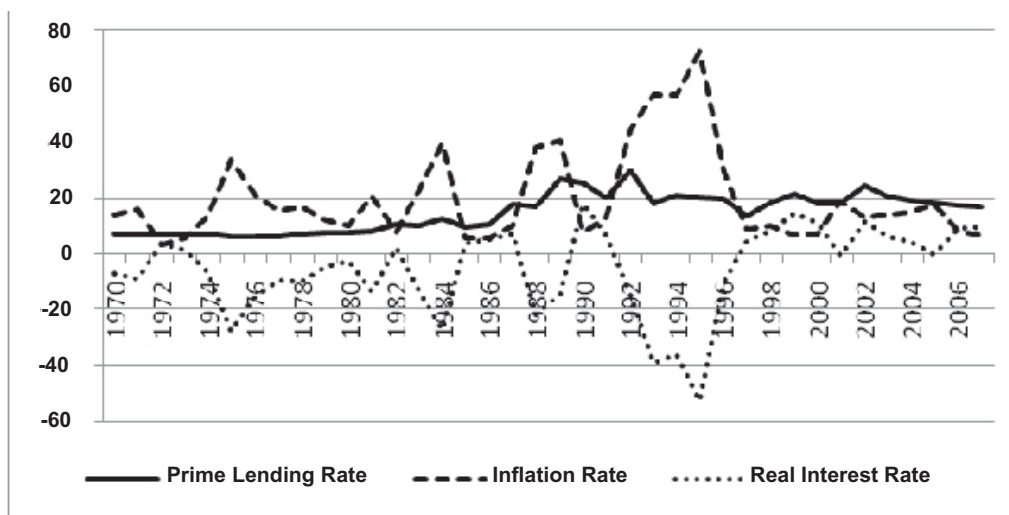
The use of interest rate spread has, however, been criticized given that higher levels of interest rates are usually associated with higher inflation rates, and therefore a higher cost of holding money. In addition, higher inflation rates tend to be associated with higher country premiums. As a result of these disadvantages of interest rate spread as an indicator of efficiency, net interest margin has been proposed as a better alternative. Net interest margin is equal to total interest revenues minus total interest expenditure divided by the value of assets. Higher values of net interest margin indicate a higher spread on deposit and lending rates and therefore lower efficiency.

Figure 2 shows the interest rate figures in Nigeria between 1970 and 2007. A cursory look reveals that the nominal interest rate was institutionally determined by the monetary authorities throughout the 1970s and the first half of the 1980s. However, the advent of the structural adjustment programme in the mid 1980s brought with it a rash of financial sector reforms. Nigeria therefore abandoned its fixed interest rate regime that saw nominal interest rates rising from 9.3% in 1985 to 26.8% in 1989, and reaching a peak of 29.8% in 1992. The figure has since hovered between 13.5% and 24.4%. It stood at 16.5% in 2007.

Figure 1: Interest rate spread



Source: Central Bank of Nigeria Statistical Bulletin, 2006.



Source: Central Bank of Nigeria Statistical Bulletin, 2006.

The real interest rate figures present an interesting picture. Between 1970 and 2007, the figure was negative 20 times, attaining positive figures on 18 occasions. The fixed interest rate regime of the 1970s and early 1980s no doubt contributed to this negative trend by fixing the interest rate at artificially low levels. For example, in the first two decades (1970 to 1989) when the fixed regime dominated, real interest rate was negative 14 times and positive only six times. However, in the past two decades (1990 to 2007), when market forces took over, the real interest rate was negative on only six occasions. The inflation rate also contributed to making the real interest rate negative for most of

the period. The results in figure 2 show that the years when the real interest rate was negative usually coincided with those of double-digit inflation rates.

Table 1 shows the components of saving in Nigeria. Saving and time deposits in banks is by far the single most important component of saving in Nigeria and has witnessed continuous growth over the years. Its contribution to total saving has, however, been mixed. In 1970, savings in banks consisted of 98.8% of total saving, with this figure reducing gradually to 89.5% in 1980, and further declining to 78% in 1990. From then the percentage of savings in banks of total saving has shown an upward trend, rising to 89.1% in 2000. Since 2003, this percentage has been 100% showing that it has become the only component of saving.

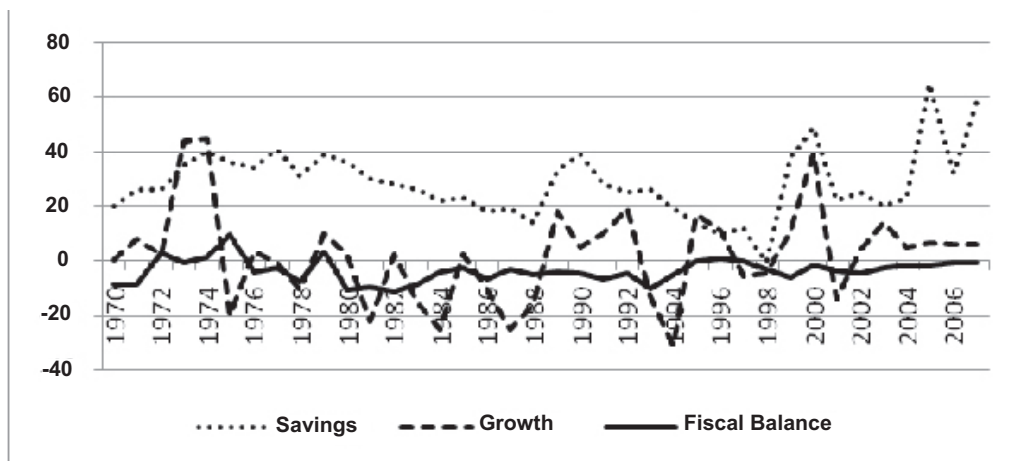
Table 1: Savings statistics (million Naira)

Year	Savings in Banks	National Provident Fund	Federal Savings Bank	Federal Mortgage Bank	Life Insurance Funds	Others	Total
1970	337	-	4.9	-	-	-	341.9
1971	372	-	4.5	-	-	-	376.5
1972	457	-	4.3	-	-	-	461.3
1973	582	-	4.5	-	-	-	586.7
1974	973	130	4.7	7.3	-	-	1,137
1975	1,572	160	8.1	11.3	-	-	1,815
1976	1,979	194	6.9	16.3	-	-	2,255
1977	2,255	230	8.0	16.8	-	-	2,593
1978	2,602	270	8.1	19.2	-	-	3,010
1979	3,702	307	7.7	27.9	-	-	4,162
1980	5,163	339	7.3	40.7	-	-	5,770
1981	5,796	375	7.1	56.0	-	-	6,563
1982	6,338	412	4.0	69.3	-	-	7,514
1983	8,083	472	5.0	89.9	-	-	9,444
1984	9,391	504	8.0	114.0	-	-	10,988
1985	10,551	541	8.1	104.0	-	-	12,522
1986	11,488	577	8.1	121.1	-	-	13,934
1987	15,089	614	16.9	133.7	-	-	18,676
1988	18,397	651	22.4	195.5	-	-	23,249
1989	17,813	669	37.5	213.2	1,067	-	23,801
1990	23,137	724	-	304.6	1,137	-	29,651
1991	30,360	650	-	433.7	1,242	45.6	37,738
1992	43,439	720	-	729.4	1,411	475.0	55,117
1993	60,896	767	-	819.5	1,570	1,679	85,028
1994	76,128	758	-	816.7	19,442	2,506	108,461
1995	93,328	731	-	435.7	2,894	-	108,490
1996	115,352	-	-	-	1,945	1,700	134,503
1997	154,055	-	-	-	3,829	-	177,649
1998	161,932	1,365	-	436.3	4,619	1,411	200,065
1999	241,605	1,365	-	-	4,340	5,648	277,668
2000	343,174	1,365	-	-	8,374	5,663	385,191
2001	451,963	1,365	-	22,300	8,490	3,927	488,045
2002	556,012	1,365	-	22,300	8,490	3,927	592,094
2003	655,740	-	-	-	-	-	655,740
2004	797,517	-	-	-	-	-	797,517
2005	1,316,957	-	-	-	-	-	1,316,957

Source: Central Bank of Nigeria Statistical Bulletin, 2006

The National Provident Fund and the Federal Mortgage Bank were both established in 1974 and ceased operations in 2002. The savings in the National Provident Fund peaked in 1998 (Table 1) and maintained this figure until the government discontinued the fund. The Federal Mortgage Bank experienced a more rapid growth than the Fund which it maintained until it closed down. The figures for the Federal Savings Bank have been mixed. They increased from 1970 to 1978 and thereafter declined to 1982, after which they climbed steadily until the bank was closed in 1989. Life insurance funds were established in 1989 and ceased operations in 2002.

Figure 3: Savings, growth and fiscal deficit



Notes: i) Savings is the ratio of private saving to Gross National Disposable Income (GNDI); ii) Growth is the growth rate of real per capita GNDI; iii) Fiscal Balance is the surplus or deficit of the entire federation as a percentage of GDP.

Source: Central Bank of Nigeria Statistical Bulletin, 2006

Figure 3 shows the other macroeconomic variables of interest, including private saving rate, growth and fiscal balance. The Nigerian economy has witnessed several fluctuations in its chequered history, with economic growth fluctuating between 45% and -31% in the period between 1970 and 2007. In the 1974-2001 period, the economy experienced negative growth 14 times, while making a positive showing only 13 times. However, growth has been positive since 2002. Fiscal balance was even more troubling given that Nigeria experienced a budget surplus only six times in the 38-year period between 1970 and 2007. The state governments have been as culpable as the government at the centre, with each level seemingly competing to outspend the other.

Private saving witnessed much less volatility, with the variable recording a negative value only once in the 38-year period. The saving rate fluctuated between 20% and 41% between 1970 and 1979. These figures changed to 14% and 36% in the next decade. Between 1990 and 1999, the saving rate hovered between -0.6% and 39%, reaching an impressive range of between 20% and 65% in the period 2000 to 2007. The private saving rate stood at 58% in 2007.

3. A review of theory and evidence

Theoretical framework

The life cycle hypothesis was formulated by Modigliani (1970) and is the principal theoretical underpinning that has guided the study of savings behaviour over the years. A critical analysis of this theory, however, shows that it seems to mirror what happens in developed economies with little or no regard for the peculiarities of developing countries like Nigeria. There are a number of reasons that make it imperative for saving behaviour in developing countries to be modelled separately from that in developed economies. First, at the microeconomic level, households in developing countries tend to be large and poor. They have a different demographic structure; more of them are likely to be engaged in agriculture, and their income prospects are much more uncertain. The problem of allocating income over time thus looks rather different in the two contexts, and the same basic models have different implications for behaviour and policy.

Second, at the macroeconomic level, both developing and developed countries are concerned with saving and growth, with the possible distortion of aggregate saving, and with saving as a measure of economic performance. However, few developing countries possess the sort of fiscal system that permits deliberate manipulation of personal disposable income to help stabilize output and employment. Third, much of the literature in the last five decades expresses the belief that saving is too low, and that development and growth are impeded by the shortfall. Sometimes the problem is blamed on the lack of government policy, other times on misguided policy. Lastly, saving is even more difficult to measure in developing than in advanced economies, whether at the household level or as a macroeconomic aggregate. The resulting data inadequacies are pervasive and have seriously hampered progress in answering basic questions.

Given the above, and following Deaton (1989), this paper appropriately modifies the life cycle theory by developing a model of households which cannot borrow but which accumulate assets as a buffer stock to protect consumption when incomes are low. Such households dissave as often as they save, do not accumulate assets over the long term, and have on average very small asset holdings. However, their consumption is markedly smoother than their income.

We begin by modelling household saving behaviour in developing countries. Our model diverges from the standard model in four important respects. First, households in developing countries tend to be larger than those in developed ones, and there is a greater tendency for several generations to live together. Such a household has no need for retirement saving because resources are shared between workers and dependents,

and ownership is passed from parents to children. This kind of household can internalize many of the insurance activities that would otherwise require saving. Transfers within the household can insure individuals against health risk and old age by providing what are effectively annuities, and the close relationship among the individuals concerned may mean not only that moral hazard issues are less severe than in a more individualistic society but also that the quality of the protection is very high.

Second, income derived from agriculture is inherently uncertain, an uncertainty that spreads from agriculture to related occupations and affects most of the population in predominantly agricultural economies. Uncertainty at low income poses a real threat to consumption levels, a threat that is likely to exert a powerful influence on the way income is saved and spent. The poorer consumers are the more risk averse (they are generally supposed to be), with declining risk aversion having important implications for the shape of the consumption function (see Leland, 1968; Zeldes, 1989; Kimball, 1990). The standard model in which consumption equals permanent income cannot be derived from utility maximization in such a context.

The third divergence from the standard model is the assumption that borrowing is not permitted. This is a simplistic assumption but more appropriate than its opposite, that households are free to borrow and lend at a fixed real interest rate. Borrowing constraints may be serious because in financially repressed economies, there may be no credit available to non-favoured borrowers. Besides, borrowing rates may be so much greater than lending rates that credit is only a last resort in dire emergency. Even where there are financial intermediaries, they may be unwilling to lend for consumption purposes to individuals who have no collateral or to lend across agricultural seasons rather than within them.

The fourth distinction between household saving in developed and developing countries is a consequence of the previous three. In the model developed here, saving provides a buffer between uncertain and unpredictable income and an already low level of consumption. Saving here is intertemporal smoothing saving, not life cycle intergenerational saving. The analysis is different, and so are the welfare issues, which are focused on the protection of consumption, particularly among those whose consumption levels may not be far above subsistence.

We now model the macroeconomic aspects of saving in developing countries. One of the most celebrated and most investigated predictions of the lifecycle model is that there should be a relation between aggregate saving and the rate of income growth. If saving is accumulated during the working years to finance retirement, then income growth provides more savers than dissavers, and positive aggregate saving. This is because workers are saving on a larger scale than retirees are dissaving. However, even at the theoretical level, there are complications. If young consumers anticipate a steady growth in income, and can and will borrow against that increase, their dissaving in the early years of the life cycle may induce a negative relation between saving and growth. The standard positive relation works best if each worker experiences a stationary income stream over his or her own life cycle, with growth taking place between rather than within generations.

The crucial question is whether households really want to have flat consumption streams. Cautious young people may not want to borrow against future income growth, even if that growth is extremely likely. Old people also, faced with daunting uncertainties

about health and death may not run down their assets in the prescribed manner. This is an assumption that is strongly supported by the balance of empirical evidence from developed countries (Deaton, 1989). The cross-country empirical evidence generally supports a positive effect of per capita income growth on saving rates, variously defined (Gersovitz, 1988). However, the results are rarely well determined and rely on how simultaneity between saving and growth are treated, and on the sample of countries selected.

The fundamental problem is the direction of causality: From growth to saving (according to the life cycle theory) or from saving to growth? This problem is addressed by several authors with various instrumental variables. However, these efforts are hardly convincing in the absence of an adequate theory of growth. Summers and Carroll (1989) authoritatively argue that whatever produces the positive correlation between saving and growth cannot be life cycle saving. They believe that the life cycle explanation assumes common differences across countries, but that differences in economic growth generate differences in the relative lifetime economic standing of young and old in different countries.

Deaton (1989) provides evidence to the effect that the relative lifetime economic status of different age groups does not directly determine their current consumption levels. Given this, the standard explanation of life cycle rate of growth effects, that younger cohorts are saving and consuming on a larger scale, simply breaks down. The reason is, however, unclear because even if the life cycle model is false, there may be strong precautionary motives that prevent young consumers from borrowing against their expected future incomes.

In developed countries, concern about the nature of the consumption function has centred on its implications for government policy, in particular the extent to which short-term fiscal policy, by manipulating household disposable income, can affect consumption and thus the level of economic activity. If most of the consumption is determined by permanent income, short-term fluctuations in income will have less effect on consumption than if liquidity is constrained for a sizeable fraction of consumers. Few developing countries have income tax systems that permit fine-tuning of disposable incomes. Nevertheless, fiscal arrangements do have important effects on income fluctuations, on the distribution of income, and most likely on the level of national saving.

Examples include various agricultural taxation schemes prevalent in developing countries, particularly in the countries where there are substantial exports of primary commodities. Agricultural taxation affects the way income fluctuations are shared between government and farmers, and so determines who must save to smooth consumption. The effects of various schemes on total domestic saving depend on how public and private saving differ. One possibility is that there is no difference, while another is that households and farmers do not save, either because of lack of suitable instruments or because they lack foresight.

In such a world, the government would have a custodial role both as guardian of future generations and as an insurance company, to protect farmer's consumption against the volatility of commodity prices (see Mirrlees, 1988). The custodial role for government was prominent in most of the development literature in the 1960s and 1970s, and is embedded in most of the standard costbenefit procedures. However, a more sceptical attitude toward the ability of governments to handle these problems better than the private sector now prevails.

Prices of primary commodities are extremely volatile, so that the incomes of countries that sell them fluctuate widely. Such fluctuations are generally considered undesirable in themselves, but their undesirable effects would seem to arise from their translation into fluctuations in consumption. If so, developing countries ought to save and dissave in order to ride out the fluctuations in income. Consumption is assumed to respond to permanent but not transitory innovations, thus, there is the need for a mechanism for sorting out permanent fluctuations from transitory ones. The standard theory of commodity price determination is one of speculative demand for inventories interacting with agricultural supply and demand. Typically, the underlying supply and demand conditions are assumed to be stationary, so that the price process is stationary. As a consequence, price booms and slumps are transitory, and price shocks convey no useful information about prices in the future.

Following McKinnon (1973) and Shaw (1973), we argue that for the typical developing country, the net impact of a change in real interest rate on saving is likely to be positive. This is because, in the typical developing economy where there is no robust market for stocks and bonds, cash balances and quasi-monetary assets usually account for a greater proportion of household saving compared to that in developed countries. In addition, in an environment where self-financing and bank loans constitute the major source of investment funds, accumulation of financial saving is driven mainly by the decision to invest and not by the desire to live on interest income. Given the peculiarities of saving behaviour, in addition to the fact that the bulk of saving comes from small savers, the substitution effect is usually larger than the income effect of an interest rate change.

Lewis (1955) notes that people would save more if saving institutions were nearer to them. As a result, a negative relationship is assumed to exist between population per bank branch and household financial saving. However, whether increased financial intermediation itself significantly increases the overall propensity to save depends also on the degree of substitution between financial saving and other items in the household's asset portfolio. Consequently, the expected sign of this relationship in the private saving function is ambiguous.

Empirical evidence

There are many empirical studies that deal with the impact of the different variables of interest on savings mobilization. Some authors have found a strong positive relationship between real per capita growth and saving rates (see for example, Modigliani, 1970; Bosworth, 1993; Carrol and Weil, 1994). However, its structural interpretation is controversial, since it is viewed both as evidence that growth drives saving (Modigliani, 1970; Carrol and Weil, 1994) and that saving drives growth through the saving investment link (Levine and Renelt, 1992; Mankiw et al., 1992).

Given the importance of controlling for the joint endogeneity of saving and income growth, a panel instrumental-variable approach to estimate the effect of income growth on saving was carried out by Loayza et al. (2000). They found that a one percentage point rise in growth rate increases the private saving rate by a similar amount, although this effect may be partly transitory. In their study, they utilized the world saving database, whose broad coverage makes it the largest and most systematic collection of

annual time series on country saving rates and saving-related variables, spanning 35 years (1960-1994) and covering 134 countries (112 developing and 12 industrialized). Obadan and Odusola (2001) employ both graphical analysis and Granger Causality tests to determine the impact of growth on saving. Their results reveal that growth of income does not Granger-cause saving, suggesting that saving is not income-induced in Nigeria. Evidence on the reverse causation argument also shows that saving does not Granger-cause growth. The findings therefore do not show any direct relationship between saving and income growth.

The seminal work in the early 1970s of McKinnon (1973) and Shaw (1973) placed at the heart of the development debate the issue of financial and monetary policy. At the centre of the debate was interest rate policy which often resulted in the imposition of below market rates thereby creating a disincentive to save and retarding the process of financial deepening. The results were a shortage of investible resources and growth retardation. Several studies have been done of the McKinnon-Shaw Model. The empirical results have not provided a consensus on the validity of the model. Fry (1980) and Watson (1992) find some empirical support for the McKinnon-Shaw model.

One of the more innovative and interesting approaches to testing the McKinnon-Shaw hypothesis was that of Roubini and Sala-i-Martin (1992) who, expanding on the growth model of Barro (1974), showed that financial repression, proxied by a dummy variable capturing three ranges of the real interest rate, has been a factor in the retarding growth in Latin America during 1960 to 1985. However, Giovannini (1985) and Watson (1992) did not find empirical support for McKinnon-Shaw hypothesis. Ajakaiye and Odusola (1995) utilize quarterly data for Nigeria from 1980 to 1993 to investigate the impact of the real interest rate on savings rate. Their results show that the coefficient of real deposit rate is statistically insignificant even at 10% and is wrongly signed for one of the two interest rate regimes.

Analytically, the effect of financial liberalization on private saving rates works through the expansion of the supply of credit to previously credit-constrained private agents. This allows households and small firms to use collateral more widely, and reduces down payments on loans for consumer durables and housing. Quantitative evidence strongly supports the theoretical prediction that the expansion of credit should reduce private saving as individuals are able to finance higher consumption at their current income level. Loayza et al. (2000) find that a one percentage point increase in the ratio of private credit flows to income reduces the long-term private saving rate by 0.75 percentage point. Bandiera et al. (2000), on carrying out a deeper analysis of eight episodes of financial liberalization, fail to find a systematic direct effect on saving rate: it was positive in some cases (Ghana and Turkey), clearly negative in others (Mexico and Korea), and negligible in the rest.

In another study, Loayza and Shankar (2000) find that financial development has induced private agents to change the composition of their assets to favour durable goods. This, however, did not affect the total volume of saving once saving is measured to include durable purchases. This conclusion should lead to a reinterpretation of the negative relationship between financial development and private saving. In addition, the indirect positive effects of financial liberalization on saving should not be overlooked. Liberalizing domestic financial markets improves the efficiency of financial intermediation and hence,

investment, thus resulting in higher growth. The conclusion is that it is mainly through increased income growth that financial liberalization will increase private saving rates in the long run. Essien and Onwioduokit (1989) employ the Error-Correction Methodology to examine the effects of financial development on savings mobilization in Nigeria. Their results reveal that there is no long-run equilibrium relationship between financial depth and domestic resource mobilization. In a comparative analysis of average private saving rates in 15 African countries for the period 1970-1993 Mwega (1997) finds a negative and highly significant coefficient on fiscal balance. Specifically a 1% increase in government budget surplus was found to reduce the private saving rate by up to 0.9, implying full Ricardian Equivalence. The implication is that fiscal balance and private saving are perfect substitutes.

These studies, however, have a number of shortcomings. To begin with, each of them focuses on only one of the determinants of saving. They, therefore, do not identify the determinants of saving and analyse their impact on the saving rate. In addition, the conclusion of Essien and Onwioduokit (1989) should be taken with a measure of caution. This is because the time span of their study is relatively short (1987-1993). It is therefore difficult to separate the effect of financial development from the effect of recovery and increased capital inflow to the economy, all of which were taking place concurrently. Our study will try to overcome this problem of simultaneity by using a longer time frame: 1970-2007.

In a bid to overcome some of these flaws, Chete (1999) uses the Error-Correction Methodology to evaluate the determinants of saving in Nigeria, using data from 1973 to 1993. He finds that financial development and external debt have a negative significant relationship on private saving, while terms of trade changes and level of income have a positive significant impact on saving. However, real interest rate, inflation, public saving and dependency ratio are all insignificant in the regression. The main problem with his analysis is that there are too many explanatory variables (eight). In addition to the equation being over-determined, given the period of study and the methodology he utilizes, there is also the problem of degrees of freedom.

A second shortcoming with the study by Chete (1999) is that the period of analysis does not include the far reaching reforms that have been put in place since the distress in the financial sector in the 1990s that had catastrophic effects on domestic savings. The reforms include the National Housing Fund, the National Social Insurance Trust Fund (1993), the National Savings Certificate (2001), the new Pension Scheme (2004) and the consolidation in the banking sector (2005). These shortcomings are taken care of in this study by using four explanatory variables derived from the life cycle framework. In addition, the period of study runs from 1970 to 2007, adequately capturing the effects of all the reforms aforementioned.

4. Methodology

The framework for this analysis is derived from the life cycle model which has withstood the test of time in explaining the changes in private saving over time. It is appropriately modified to accommodate the peculiarities of a developing country and builds on the existing cross-country literature on saving which quantifies the effects of a variety of policy and non-policy variables on private saving. Its attractiveness lies in its elegant formulation of the effects of interest rate and growth on saving. In addition, its flexibility makes it possible for other relevant theoretical considerations to be incorporated, thus forming an integrated analytical framework, without altering its fundamental structure. This framework makes a new contribution to the literature by employing time series data in evaluating the determinants of private saving in Nigeria between 1970 and 2007. It does this while explicitly addressing some of the econometric problems arising from the use of time-series data.

The cointegration and Error-Correction Methodology (ECM) is utilized in this study. There has been a move in recent times towards the issues of unit roots, cointegration and error-correction modelling in the econometric analysis of time series data. Classical econometric theory assumes that the underlying data processes are stationary. However, most economic variables have been shown to be non-stationary. In other words, the means and variances are not constant. For valid estimation and inference to be made, a set of non-stationary variables must be cointegrated. This means that a linear combination of these variables that is stationary must exist (see Wood, 1995).

The error-correction modelling procedure involves first estimating the saving function in an unrestricted form, after which it is progressively simplified by restricting statistically insignificant coefficients to zero, until a parsimonious representation of the data generation process is obtained. The aim is to minimize the possibility of estimating spurious relations, while at the same time retaining long-run information. It achieves this by placing the relationship being investigated within a sufficiently complex dynamic specification. The major advantage of this methodology is that it yields an equation with a stationary dependent variable which also appropriately retains long-run information in the data. In applying this estimation technique, we set the initial lag length on all the variables in the unrestricted equation at one period. This is the maximum we can go given the need to preserve degrees of freedom.

The ECM is made up of models in both levels and differences of variables and is compatible with long-run equilibrium behaviour. The notion of ECM is a very powerful organizing principle in applied econometrics and has been widely applied to such important problems in developing economies as private investment (Shafik, 1992; Watson, 1992), inflation (Downes et al., 1991) and money demand (Craigwell, 1991).

The steps that were followed are:

- i) Study the temporal characteristics of the variables in the saving function. This basically involves testing for unit roots for all time series variables in the model. The presence of a unit root implies that the series under investigation is non-stationary, while the absence of a unit root shows that the stochastic process is stationary. We employed both the Augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1981) and the Phillips-Perron (PP) tests (Phillips and Perron, 1988) for this purpose.
- ii) Formulate the static (long-run) theoretical relationship and test for stationarity among non-stationary series of the same order. We explored the Johansen cointegration procedure, while relying on both the Trace and Maximum-Eigen statistics to determine the cointegration rank (see Johansen, 1991).
- iii) Estimate the error-correction or dynamic (short-run) representation of the relationship and test for the adequacy of the resulting equation. This short-run equation includes the lagged error term as a regressor. This acts to correct any deviations from long-run equilibrium. Specifically, if actual equilibrium value is too high, the error correction term will reduce it, while if it is too low, the error correction term will raise it.

Drawing from the analysis above on the life cycle framework, the following model was specified:

$$PSR = \beta_0 + \beta_1 GTCY + \beta_2 RIR + \beta_3 FB + \beta_4 DFD + \varepsilon$$

Where: β_1, β_2 and $\beta_4 > 0$, while $\beta_3 < 0$ and

PSR = private saving rate

GRCY = growth rate of real per capita GNDI

RIR = real interest rate

FB = fiscal balance

DFD = degree of financial depth

The saving equation was estimated using annual data for the period 1970 to 2007. The estimation period was determined largely by the availability of adequate data on all variables. Below are the sources of each variable and how they were calculated where applicable:

Private saving rate:

From Central Bank of Nigeria (CBN) Statistical Bulletin 2006, CBN Annual Report and Statement of Accounts 2007 and International Financial Statistics (IFS) Year book 2006 and 1999 published by the International Monetary Fund (IMF). Private saving rate is the ratio of private saving to gross national disposable income (GNDI), where private

saving is GNDI less household consumption expenditure, including non-profit institutions serving households (NPISHs). Household consumption expenditure, including NPISHs consists of the expenditure incurred by resident households and resident NPISHs on individual consumption goods and services. Thus, the private saving variable consists of savings by both households and firms.

Growth rate of real per capita GNDI: From CBN Statistical Bulletin 2006, CBN Annual Report and Statement of Accounts 2007 and International Financial Statistics (IFS) Year book 2006 and 1999 published by the IMF. Real per capita GNDI was obtained by adding net primary income from abroad to GDP in order to give GNI. When net current transfers from abroad are added to this, we obtain GNDI. Deflating GNDI by the consumer price index (CPI) will give us real GNDI. Dividing this by the population will give us real per capita GNDI whose growth rate we then calculate. Note that net primary income from abroad is the difference between the total values of the primary incomes receivable from and payable to non-residents. Net current transfers is the difference between all current transfers received by the Nigerian economy (except those made to the economy to finance its overall balance) and all current transfers paid by the Nigerian economy. CPI reflects changes in the cost of acquiring a fixed basket of goods and services by the average consumer. Preference is given to series that have wider geographical coverage and relating to all income groups, provided they are no less current than more narrowly defined series. Data on population are provided by the Population Division of the Department of Economic and Social Affairs of the United Nations. These data represent mid-year estimates and are revised every two years.

Real interest rate: From CBN Statistical Bulletin 2006 and CBN Annual Report and Statement of Accounts 2007. Real interest rate is obtained by

subtracting the inflation rate from the nominal interest rate on bank deposits. The nominal interest rate on bank deposits refers to rates offered to resident customers for demand, time or savings deposits. The real interest rate variable will serve as the relative price of current consumption with respect to future consumption.

Fiscal balance:

From CBN Statistical Bulletin 2006 and CBN Annual Report and Statement of Accounts 2007. Fiscal balance is defined as overall surplus or deficit of the federation as a percentage of GDP. This will enable us to evaluate the Ricardian equivalence.

Degree of financial depth:

This was calculated based on data obtained from CBN Statistical Bulletin 2006 CBN Annual Report and Statement of Accounts 2007 and International Financial Statistics Yearbook 2006 and 1999. Degree of financial depth is proxied by the ratio of broad money (M2) to GNDI.

5. Results and discussion

Descriptive statistics

The characteristics of the distribution of the variables are presented in Table 2. Jarque-Bera is a statistical test that determines whether the series is normally distributed. This statistic measures the difference of the skewness and the kurtosis of the series with those from the normal distribution. Evidently, the Jarque-Bera statistic rejects the null hypothesis of normal distribution for the real interest rate. However, the null hypothesis of normal distribution is accepted for degree of financial depth, fiscal balance, income growth and private saving.

Kurtosis measures the peakedness or flatness of the distribution of the series. The statistic for Kurtosis shows that growth of income is normally distributed. However, fiscal balance, private saving and real interest rate are leptokurtic, since their distributions are peaked relative to the normal. However, degree of financial depth is platykurtic, suggesting that its distribution is flat relative to the normal. Lastly, skewness is a measure of asymmetry of the distribution of the series around its mean. The statistic for skewness shows that fiscal balance, income growth and private saving are positively skewed, implying that these distributions have long right tails. The degree of financial depth and real interest rate are negatively skewed, meaning that the distributions have long left tails.

Table 2: Summary of the descriptive statistics of the variables

	DFD	FB	GRCY	PSR	RIR
Mean	24.24	-3.46	2.02	28.69	-5.31
Median	24.00	-3.50	3.00	26.00	-0.60
Maximum	35.00	9.80	45.00	65.00	18.00
Minimum	12.00	-11.10	-31.00	-0.60	-52.60
Std. dev.	6.39	4.29	17.84	12.79	16.01
Skewness	-0.07	0.52	0.48	0.56	-1.05
Kurtosis	2.009	4.01	3.33	4.05	3.74
Jarque-Bera	1.54	3.24	1.61	3.65	7.61
Probability	0.46	0.20	0.45	0.16	0.02
Sum	897.00	-127.99	74.70	1061.40	-196.40
Sum sq. dev.	1472.81	661.12	11459.88	5886.52	9229.21
Observations	37	37	37	37	37

DFD = degree of financial depth; FB = fiscal balance; GRCY = growth rate of real per capita GNDI; PSR = private saving rate; RIR = real interest rate.

Results of stationarity tests

Testing for the existence of unit roots is a principal concern in the study of time series models and cointegration. The presence of a unit root implies that the time series under investigation is non-stationary, while the absence of a unit root shows that the stochastic process is stationary (see Iyoha and Ekanem, 2002). The time series behaviour of each of the series using the ADF and PP tests are presented in Tables 3 and 4 respectively. The results show that while the private saving rate (PSR), growth rate of real per capita GNDI (GRCY) and fiscal balance (FB) are I(0) variables (stationary before differencing), real interest rate (RIR) and the degree of financial depth (DFD) are I(1) variables (stationary after first differencing). This is deduced from the fact that the absolute values of both the ADF and PP test statistics of RIR, GRCY and FB before differencing are greater than the absolute value of the critical values at the 1% significance level. For the other variables, this is the case only after differencing once.

Table 3: Results of Augmented Dickey-Fuller (ADF) unit root test

Variable	ADF value before differencing	ADF value after differencing	Critical value	Level of integration
PSR	-3.657*	n.a	3.621	I(0)
GRCY	-5.068*	n.a	3.627	I(0)
RIR	-3.204	-6.275*	3.621	I(1)
FB	-4.450*	n.a	3.621	I(0)
DFD	-1.979	-5.784*	3.621	I(1)

DFD = degree of financial depth; FB = fiscal balance; GRCY = growth rate of real per capita GNDI; PSR = private saving rate; RIR = real interest rate.

* denotes significant at 1%; the null hypothesis is that there is a unit root.

n.a = not applicable.

Table 4: Results of Phillips-Perron (PP) unit root test

Variable	PP value before differencing	PP value after differencing	Critical value	Level of integration
PSR	-3.683*	n.a	3.621	I(0)
GRCY	-5.019*	n.a	3.627	I(0)
RIR	-3.045	-13.017*	3.621	I(1)
FB	-4.405*	n.a	3.621	I(0)
DFD	-2.047	-5.784*	3.621	I(1)

DFD = degree of financial depth; FB = fiscal balance; GRCY = growth rate of real per capita GNDI; PSR = private saving rate; RIR = real interest rate.

* denotes significant at 1%; the null hypothesis is that there is a unit root.

n.a = not applicable.

Cointegrated models

In this study, the method established by Johansen (1991) was employed to carry out the cointegration test. This is a powerful cointegration test, particularly when a multivariate model is used. Moreover, it is robust to various departures from normality in that it allows any of the five variables in the model to be used as the dependent variable while maintaining the same cointegration results.

Accordingly, Johansen's test was carried out to check if the saving equation is cointegrated. Table 5 shows that both the Trace and Maximum Eigen statistics rejected the null of no cointegration at the 5% level. While the Trace test indicated that there are two cointegrating equations at the 5% level, the Maximum Eigen test indicated only one cointegrating equation at the 5% level. The implication is that a linear combination of all the five series was found to be stationary and thus, they are said to be cointegrated. In other words, there is a stable long-run relationship between the series and so we can avoid both the spurious and inconsistent regression problems which otherwise would occur with regression of non-stationary data series.

Table 5: Johansen's cointegration test results

Maximum Eigenvalue test					Trace test			
Null hypothesis	Alternative hypothesis	Eigenvalue	Critical value		Alternative hypothesis	Likelihood Ratio	Critical value	
			95%	99%			95%	99%
$r = 0$	$r = 1$	39.79*	37.52	42.36	$r \geq 1$	108.69**	87.31	96.58
$r \leq 1$	$r = 2$	31.30	31.46	36.65	$r \geq 2$	68.90*	62.99	70.05
$r \leq 2$	$r = 3$	18.02	25.54	30.34	$r \geq 3$	37.60	42.44	48.45
$r \leq 3$	$r = 4$	16.09	18.96	23.65	$r \geq 4$	19.58	25.32	30.45
$r \leq 4$	$r = 5$	3.49	12.25	16.26	$r \geq 5$	3.49	12.25	16.26

* denotes significant at the 5% level; ** denotes significant at the 1% level.

Long-run model

We now present the results for the long run relationship.

$$\text{PSR} = +0.4013 + 0.5016\text{GRCY} + 0.0028\text{RIR} - 0.0190\text{FB} - 0.1226\text{DFD}$$

$$(3.346)** \quad (2.233)* \quad (3.769)** \quad (0.459)$$

As postulated by our modified version of the life cycle hypothesis, the income growth variable (GRCY) is an important determinant of the private saving rate. The coefficient of GRCY is both positively signed and statistically significant at the 1% level. An increase in the growth rate by 1% leads to a long-run increase in the saving rate by 0.5%. These results are consistent with those obtained by Modigliani (1970), Maddison (1992), Bosworth (1993) and Carroll and Weil (1994). Thus, as the incomes of private agents grow faster, their saving rate increases. This is consistent with the existence of consumption habits and our modified version of the life cycle model. The implication is that any policy that encourages income growth in the long run will have a strong impact on private saving rate. Given the historical close link between saving and investment rate, a rise in growth rate will lead to a virtuous cycle of higher income and saving rates.

The result for the real interest rate variable suggests that the real rate of return on bank deposits has a statistically significant positive effect on saving behaviour in Nigeria. A 1% increase in RIR is associated with a 0.003 percentage point increase in the private saving rate. This finding is consistent with the McKinnon-Shaw proposition which states that, in an economy where the saving behaviour is highly intensive in money and near-money assets, the direct incentive effect of high real interest rates on saving behaviour (i.e. the income effect) generally overwhelms the substitution of other assets for financial assets in response when faced with such interest rate changes (i.e. the substitution effect). The implication is that government should find an effective mechanism for increasing the abysmally low interest rate on bank deposits if the present crusade to increase the private saving rate is to achieve any measure of success.

The result for fiscal balance points to a significant substitutability between public and private saving in the Nigerian context. However, there is no support for full Ricardian equivalence, which predicts full counterbalancing of public saving by private dis-saving. Specifically, an improvement in the fiscal balance by 1% is associated with 0.019 percentage point reduction in the private saving rate. The rather weak private saving offset to changes in the fiscal balance behaviour may be explained by substantial uncertainty in the economy, widespread liquidity (or wealth) constraints, tax-induced distortions and limits in attempts by households to smooth consumption over time. Thus in the Nigerian context, policies geared to improvement in fiscal balance have the potential of bringing about a substantial net increase in total domestic saving. This finding is consistent with cross-country results obtained by Corbo and Schmidt-Hebbel (1991) and by Athukorala and Sen (2004) for India.

The degree of financial depth failed to attain statistical significance in the saving function. Thus, there is no empirical support for the view that the development of the financial sector has contributed to the growth in private saving. The implication is that financial deepening may not bring about an automatic improvement in the saving rate. For this, one requires a deeper analytical understanding of the various factors at work here.

Dynamic error-correction model

Having identified the cointegrating vector using Johansen, we proceed to investigate the dynamics of the saving process. Table 6 reports the final parsimonious estimated equation together with a set of commonly used diagnostic statistics. The estimated saving function performs well by the relevant diagnostic tests. In terms of the Chow test for parameter stability conducted by splitting the total sample period into 1970-1986 and 1987-2007 there is no evidence of parameter instability.

The results showed that the coefficient of the error-correction term for the estimated saving equation is both statistically significant and negative. Thus, it will rightly act to correct any deviations from long-run equilibrium. Specifically, if actual equilibrium value is too high, the error correction term will reduce it, while if it is too low, the error correction term will raise it. The coefficient of -0.4415 denotes that 44% of any past deviation will be corrected in the current period. Thus, it will take more than two years for any disequilibrium to be corrected.

Furthermore, it is only the income growth variable that is statistically significant at the 1% level, indicating that in the short run, it is only growth in income that has a relationship with the private saving rate. The implication is that short-run changes in private saving rate that correct for past deviations emanate principally from changes in income growth. The coefficient estimate shows that a unit change in income growth will bring about a 0.3% change in private saving. The other four explanatory variables (PSR(-1), RIR, FB and DFD) do not have any short-run impact on the private saving rate. This result is in keeping with the long-run relationship where over 50% of changes in private saving are explained by changes in income growth.

Table 6: Estimated short-run regression results for the private saving model

Variable	Coefficient	T-statistic	Probability
C	0.1137	2.9728	0.0063
DPSR(-1)	0.0303	0.1952	0.8467
DGRCY	0.3047	3.5435	0.0015
DRIR(-1)	-0.0016	-1.6013	0.1214
DFB	-0.0054	-1.2194	0.2337
DDFD	0.8020	1.6733	0.1063
ECM(-1)	-0.4415	-3.3118	0.0027
Adjusted R-squared	0.3356	S.D Dependent Var.	0.1064
S.E of regression	0.0867	F-Statistic	3.6936
Durbin-Watson stat	2.2200	Prob. (F-statistic)	0.0087

$$\text{JBN} - \chi^2(1) = 0.33$$

$$\text{Probability (JBN)} = 0.85$$

$$\text{LM} - \chi^2(1) = 1.92$$

$$\text{Probability (LM)} = 0.18$$

$$\text{ARCH} - \chi^2(1) = 1.0$$

$$\text{Probability (ARCH)} = 0.32$$

$$\text{CHOW} - \chi^2(1) = 1.6$$

$$\text{Probability (CHOW)} = 0.20$$

Dependent variable: DPSR.

Included observations: 35 after adjusting endpoints.

6. Conclusion and policy implications

This paper has investigated the determinants of private saving in Nigeria for the period between 1970 and 2007. The estimation results for the long-run model point to the growth in income and the real interest rate as having statistically significant positive influences on domestic saving. There is also a clear role for fiscal policy in increasing total saving in the economy, with the private sector considering public saving as an imperfect substitute for its own saving. The Ricardian equivalence was, thus, found not to hold in Nigeria contrary to what obtains in industrialized and semi-industrialized economies. Finally, financial development seems not to have any impact on the saving rate. We began this study by asking what the relevant policies for raising the Nigerian saving rate are. Our results help to understand the effectiveness of policy variables in raising the saving rate in terms of their magnitude and direction.

Some major recommendations for policy can be drawn from the analysis. First, the focus of development policy in Nigeria should be to increase the productive base of the economy in order to promote real income growth and reduce unemployment. For this to be achieved, a diversification of the country's resource base is indispensable. This policy thrust should include a return to agriculture; the adoption of a comprehensive energy policy, with stable electricity as a critical factor; the establishment of a viable iron and steel industry; the promotion of small- and medium-scale enterprises; and a serious effort at improving information technology.

A stronger policy framework is imperative in bringing about improved macroeconomic performance. The government should sustain its National Economic Empowerment and Development Strategy (NEEDS) programme which is partly responsible for the increasing diversification emerging in the economy. The growing contribution of non-oil sectors in GDP growth in recent years is a positive development and should be encouraged. Agriculture has grown strongly in recent years and was the largest industry contribution to GDP in 2007. With about 70% of the working population employed in the agricultural sector, the strong agricultural contribution to GDP bodes well for employment. More importantly, government efforts to diversify the economy appear to be yielding results and should be sustained.

Second, public saving has been shown to be a complement rather than a substitute for private saving in Nigeria. Government should, therefore, sustain its oil-price-based fiscal rule (OPFR) which is designed to link government spending to national long-run oil price, thereby de-linking government spending from current oil revenues. This mechanism will drastically reduce the short-term impact of fluctuations in the oil price on government fiscal programmes. State governments should also desist from spending their share of excess crude oil revenue indiscriminately. This is because this practice can

severely test the absorptive capacity of the economy, in addition to risking the fuelling of inflation. The challenge is for state governments to save excess revenue or spend it directly on imported capital goods in order to sustain Nigeria's hard-won macroeconomic stability.

Third, monetary policy should focus on ways of increasing the abysmally low real interest rate on bank deposits. It should also devise means of substantially reducing the interest rate spread. Lastly, it is pertinent to note that even though this paper has concentrated on Nigeria, its results can be applied to other African countries not previously studied. They contain some valuable lessons for informing policy measures in the current thrust towards greater mobilization of private saving in the African continent.

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