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Estimation of the Short Run and Long Run Determinants of Domestic Savings Rate in Nigeria (1970-2008)

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Abstract
Understanding the determinants of the aggregate savings rate is a crucial prerequisite in a number of policy interventions, from designing of the tax and social security system to the layout of financial markets regulation. Using a vector and error correction model (VEC), this paper showed that Nigeria's national savings rate decisions are positively influenced by per capita income and economic growth, and negatively influenced by financial sector development and bank density index. And savings interest rate, openness to trade, terms of trade, and inflation are not significant determinants of savings rate in Nigeria, given the historical data set. It is recommended that achieving productivity gains for Nigeria, which would enhance savings growth, the workforce would have to be better and adequately trained for skills enhancement; the domestic financial system should be more developed especially through improving financial intermediation which can be key factor for raising the level of domestic savings and efficiently channelling same into production-enhancing investments.

Key words: *Short run and Long run Determinants, Domestic Savings rate, Life-cycle Hypothesis, Nigeria.*

Background to the Study

Savings play a central role in national income determination, both in the short run through the aggregate demand and in the long run through capital formation and wealth creation. And the growth of output of any economy depends on capital accumulation, and capital accumulation requires investment and an equivalent amount of savings to match it. Two of the most important issues in development economics, and for developing countries, are how to stimulate investment and how to bring about an increase in the level of savings to increase investment. The challenging task is therefore that of understanding the determinants of savings and its relation with growth. This has received equal attention in both industrial and developing countries (see Masson,Bayoumi, & Samiei, 1998; Edwards, 1996; Bailliu and Reisen, 1998; Loayza, Schmidt-Hebbel & Serven, 1999; Corbo and Schmidt-Hebbel, 1991; Dayal-Ghulati and Thimann, 1997, and Hussein and Thirlwall,1999).

Traditional growth and savings models focus on the impact of higher savings rates on the long run growth and the impact of an increase in domestic savings on investment. The Solow's neoclassical growth model purports that during the transition between steady states, an increase in savings ratios generate higher growth, only in the short run as stated by Solow (1956) in Ozcan (2000). In the long run, equilibrium rate of growth can be explained by structural and demographic variables. Endogenous growth theories developed by Romer (1986) and Lucas (1988) suggest that permanent increase in growth rates can be determined by increased capital accumulation and achieved higher savings. If there is very limited international capital mobility, higher domestic savings result in higher investment and economic growth.

Table 1: Aggregate savings, nominal GDP, and savings rate in Nigeria (1970-2008)

YEAR	SAVINGS (N'M)	GDP(N'M)	Savings-GDP ratio
1970	341.6	5,203.7	6.56
1971	376.3	6,570.7	5.73
1972	461.2	7,208.3	6.4
1973	586.8	10,990.7	5.34
1974	1,137.1	18,298.3	6.21
1975	1,815.2	21,558.8	9.42
1976	2,255.3	27,297.5	8.26
1977	2,592.8	32,747.3	7.92
1978	3,009.7	36,083.6	8.34
1979	4,161.8	43,150.8	9.64
1980	5,769.9	50,848.6	11.35
1981	6,562.6	102,686.8	6.39
1982	7,514.4	110,029.8	6.83
1983	9,443.9	119,117.1	7.93
1984	10,988.1	125,074.8	8.79
1985	12,521.8	144,724.1	8.65
1986	13,934.1	143,623.9	9.7
1987	18,676.3	203,037.1	9.2
1988	23,249.0	275,198.2	8.45
1989	23,801.3	403,762.9	5.89
1990	29,651.2	497,351.3	5.96
1991	37,738.2	574,282.1	6.57
1992	55,116.8	909,754.2	6.06
1993	85,027.9	1,132,181.2	7.51
1994	108,460.5	1,457,129.7	7.44
1995	108,490.3	2,991,941.7	3.63
1996	134,503.2	4,135,813.6	3.25
1997	177,648.7	4,300,209.0	4.13
1998	200,065.1	4,101,028.3	4.88
1999	277,667.5	4,799,966.0	5.78
2000	385,190.9	6,850,228.8	5.62
2001	488,045.4	7,055,331.0	6.92
2002	592,094.0	7,984,385.3	7.42
2003	655,739.7	10,136,364.0	6.47
2004	797,517.2	11,673,602.2	6.83
2005	1,078,330.1	10,904,983.1	9.89
2006	1,739,636.9	5,165,742.0	0.34
2007	2,693,554.3	22,586,710.0	0.12
2008*	2,216,596	13,876,226	0.23
		Average	6.57

**2008 is simple average of 2006 and 2007 figures.*

Source: Central Bank of Nigeria statistical Bulletin, Volume 18, December, 2007.

A cursory look at Nigeria's data set on the trend of savings and gross domestic product (GDP) is revealing. Savings rate as measured by the ratio of total savings mobilized in the economy to nominal GDP between 1970 and 1986 (pre-structural adjustment period) shows a significant increase in savings rate (Table 1). This reflected in the upward trend from the 1970s through the early 1980s, rising from 6.56 per cent in 1970 to a peak of 11.3 per cent in 1980. Thereafter, it trended downward to an all-time low value of 3.25 per cent in 1996; lower than that attained two decades ago, but rose slightly to 7.42 per cent in 2002, and 9.89 per cent in 2005. The poor performance in the 1990s was attributed to the distress situation in the banking system and consequent loss of public confidence.

Several factors have been mentioned as possible explanations for the decline in domestic savings rates in Nigeria and in most African countries. Many argue that deregulation of the economy, including trade liberalization, combined with depreciation of the domestic currency, have increased the relative prices of durable goods. In addition, capital inflows as well as financial reforms have had the effects of relaxing liquidity constraints; and have provided the necessary resources for an increase in consumption. Others place the emphasis on increased taxation, which may have reduced private savings, which is a major component of national savings. From a different angle, labour reform increased disposable income by introducing a new type of labour contract (consolidated salaries) that includes all fringe benefits as part of the salary. This change in the wage regime may have increased consumption in credit-constrained households. The persistent significant oil boom may have also affected the perception of permanent income (CBN, 2000).

This paper therefore seeks to investigate the short run and long run determinants of national (otherwise domestic) savings in Nigeria. The study is important since the knowledge of the determinants of savings rate could enable government better act on those significant factors as policy variables in boosting savings growth. Following this introductory section, is section two which examines the empirical literature on determinants of domestic savings; section three examines the methodological issues; section four presents the data and the analysis; and section five concludes.

Empirical literature on the determinants of domestic savings

Thirlwall (2002) identified three basic types of private domestic savings, namely: voluntary, involuntary, and forced savings. Voluntary savings relate to the voluntary abstinence from consumption by private persons, out of personal disposable income, and by companies out of profits, and the government. However, voluntary savings depend on the capacity to save and the willingness to save. The capacity to save depends on three main determinants: the level of per capita income

(PCI); the growth of income, and the distribution. The willingness to save depends, in turn, on: the rate of interest; the existence of financial institutions; the range and availability of financial assets, and the rate of inflation.

Hussein and Thirlwall (1999) linked savings ratio as a non-linear function of per capita income, that is, as per capita income rises, the level of savings per head of population rises but at a decreasing rate. And this is broadly the pattern observed across countries, according to the authors.

Another important determinant of domestic savings ratio is the growth in income or output as suggested by the life-cycle hypothesis of savings. The basis of this hypothesis is that individuals and households attempt to spread out consumption evenly over their lifetime. A typical pattern of behaviour would be dis-saving in youth, positive saving in middle-age, and dis-saving in retirement, breaking even on death (on the assumption of no bequests). Thus, countries with higher growth rates might be expected to have at least higher personal savings ratios than countries with lower growth rates. The exceptions will be countries where population is not in balanced growth; where, for example, population growth has accelerated or slowed down dramatically, changing the balance between active and non-active households (that is, changing the dependency ratio). For this reason, in testing the life-cycle hypothesis, the growth of income is typically split into its two components: the growth of per capita income and the growth of population, with the expectation that the magnitude and significance of the coefficients will not normally be the same.

Concerning the willingness to save, it might be expected that the price of present consumption, namely, the real rate of interest, will affect savings positively. This classical idea lies behind the financial liberalization programmes in developing countries which seek to raise the real interest rate to "market clearing rates" in other to maximize savings, investment and growth. The test of the financial liberalization hypothesis and particularly the impact of the interest rate on savings have been mixed and largely inconclusive.

A more important determinant of the willingness to save is identified to be the existence of financial institutions and the range and availability of financial assets to suit savers with diverse needs. No single measure has been able to capture these institutional determinants of the willingness to save as stated by Thirlwall (2002). The number, diversity and distribution (or proximity) of financial institutions serving the different interests of savers could be important. Athukorala (1998) in Thirlwall (2002), for example, found the bank density index (population per bank branches) a highly significant variable in explaining inter-temporal saving

behaviour in India. Equally, the volume and range of financial assets with different terms and maturities might matter as a measure of financial deepening. Other indicators of financial deepening include: the ratio of money to quasi-money, and quasi-liquid liabilities as a percentage of GDP. Hussein and Thirlwall (1999) found these measures statistically robust in explaining differences in the savings ratio across countries.

Also, the rate of inflation can be expected to affect the willingness to save, but the effect is found in the literature to be ambiguous (Thirlwall, 2002). On the other hand, inflation acts as a tax on real money balance holdings. On the other hand, it is natural to expect individuals to avoid the tax if it becomes burdensome in relation to the convenience of holding money. Inflation may also discourage other forms of voluntary savings because its real value is falling. The most likely relation between inflation and the saving ratio is a quadratic showing savings rising with mild inflation and then falling as inflation becomes excessive. This is what empirical evidence shows.

Several scholars have also researched on the determinants of differences in the domestic savings ratio across countries. Results overwhelmingly favour the level of per capita income (PCI), the growth of income and financial deepening (Edwards, 1996; Masson, Bayaumi & Samiei, 1998; and Hussein and Thirlwall, 1999).

Edwards took panel data (that is, pooled time series and cross-sectional data) for 36 countries over the period 1970 to 1992, separating between private and government savings. His explanatory variables were level of per capita income, growth of income (reflecting the life-cycle hypothesis of savings), various monetary and fiscal variables (including measures of macroeconomic stability), foreign savings, and political variables. His results showed that per capita income growth is an important determinant of private and public savings; financial development is also important; higher government savings crowds out private savings, and higher foreign savings is linked with lower domestic savings. He found per capita income to be statistically significant but relatively low compared with other variables, may be because per capita income entered his model in linear form; whereas in practice, the relation between per capita income and savings is non-linear, especially when the sample includes high income countries as stated by Thirlwall (2002).

The study by Masson and others recognized this non-linearity using a quadratic specification, taking panel data for 21 developed countries (1971-1993) and 40 less-developed countries (1982-1993) to explain differences in the ratio of private savings to GDP. Many of the other explanatory variables were similar to those of Edwards; and similar conclusions were reached except that much greater importance was given to the level of per capita income.

Hussein and Thirlwall used panel data for 62 countries over the period 1967-1995, distinguishing between the determinants of the capacity to save and the willingness to save. The variables that proved to be significant and robust were: the level of per capita income which entered the model non-linearly, the growth of per capita income, the growth of population, the ratio of quasi-liquid assets to GDP, and the inflation rate entering the model as a quadratic. A measure of the personal distribution of income within countries, and the real rate of interest, were insignificant as determinants of inter-country differences in the savings function.

Ozcan (2000) examined the empirical determinants of private savings for a sample of economies in the Middle East and North Africa (MENA) over the period 1981-1994. Using the World Bank's savings data and employing a panel estimation technique; he found that the forces behind the savings in MENA countries can be delineated, to a large extent, be the growth of income.

Dayal-Ghalati and Thimann (1997) examined the empirical determinants of private savings for a sample of economies in Southeast Asia and Latin America over the period 1975-1995. They used panel estimations to examine the relationship between private savings rate and policy and non-policy variables. Their results indicate that fiscal policy, particularly social security arrangements influences private savings; macroeconomic stability and financial deepening also appeared as important variables determining savings behaviour in the two regions.

To sum it up: it could be observed that empirical studies on determinants of domestic savings rate in Nigeria are scanty. It was John and Antai (2007) who examined the role of interest rate liberalization on domestic savings and found interest rate insignificant; therefore, this present study makes a significant contribution to fill this gap. The reviewed literature showed that growth of per capita income, income growth, real interest rate, financial development, bank density, inflation, terms of trade, and openness to trade have been examined as having some impacts on savings rate. Availability of data on these variables for Nigeria provides an opportunity to test the validity of the propositions.

Methodological Issues

(a) Analytical framework

This paper adopted the method of cointegration and the implied error correction model to by-pass the problems of spurious regressions usually encountered with the use of time series data. In specific terms, the Johansen's method of cointegration, which results in the vector error correction (VECM), was used. The vector error correction model is an extension of the vector auto-regression (VAR) model developed by Sims (1980), Johansen and Juselius (1990), and Johansen (1991).

(b) Model specification and description of variables

The specification of the empirical model is guided by the empirical literature. In the model, it is hypothesized that savings rate, per capita income, and bank interest rate are jointly determined (that is, endogenous to the system) while openness to trade, terms of trade, inflation, gross domestic product or economic growth, financial market development, and bank density rate are exogenous to the system. The empirical model is specified as follows:

SAVGDP= f(GDP, PCY, OPEN, r, INF, M2GDP, TOT, BANKDEN) .....(1)

All coefficients are expected to be positive but inflation can be positive or negative

Where:

SAVGDP= domestic savings-GDP ratio

GDP=nominal gross domestic product or income level

PCY=per capita GDP or income

OPEN=openness to trade [that is, (exports-imports) / GDP]

r= domestic interest rate (savings rate)

INF=inflation rate

M2GDP=financial market development index (that is, M2 / GDP)

TOT= terms of trade [that is, (exports / imports) *100]

BANKDEN= bank density rate (that is, population per bank branches)

In the life-cycle hypothesis framework, income growth can be considered as having an important positive effect on savings since savings and growth has been highly correlated in the long run- young people relative to that of the old people. On the other hand, permanent income hypothesis suggests a negative relationship between growth and savings since forward-looking agents believe their permanent income will increase in the future and then they will dis-save against future receipts.

For interest rate, the existing evidence suggests that there is only a weak interest elasticity of aggregate domestic savings for both developed and developing countries (Boskin, 1978 and Giarannini, 1983). McKinnon (1991) reported that aggregate savings, defined as the percentage of GNP accounts does not respond strongly to higher interest rates.

For financial market development, it has a positive net effect on savings. Almost all studies have used the degree of monetization of the economy measured by ratio of broad money (M2) to the GDP to measure financial market development (Edwards, 1996; Dayal-Gulati and Thimann, 1997; Johansson, 1996; and Loayza, Schmidt-Hebbel & Serven, 1999). For an open economy, terms of trade is a critical variable, particularly for oil exporters such as Nigeria (Ostry and Reinhart, 1992; Dayal-Gulati and Thimann, 1997).

Consequent upon these conditions, we go ahead to specify the following vector error correction model (VECM):

$$\Delta Y_t = b + \Gamma_1 \Delta Y_{t-1} + \Gamma_2 \Delta Y_{t-2} + \ldots + \Gamma_{p-1} \Delta Y_{t-p+1} + \Pi Y_{t-p} + \Upsilon X_t + U_t \ldots\ldots..(2)$$

Where:

Y is a (n x 1) vector of jointly determined non-stationary I(1) endogenous variables; $Y = Y - Y$

X_t is a (q x 1) vector of stationary I(0) exogenous variable

b is a (n x 1) vector of parameters (intercepts)

Π and are (n x n) matrices of parameters

Υ is a (n x q) matrix of parameters

U_t is a (n x 1) vector of random variables, distributed as empirical white noise, also:

Γ is a (n x 1) vector of coefficients of lagged Y variables

Π is a (n x 1) long run of impact matrix. The Π matrix is a product of two n *x* 1 matrices a and b such that $\Pi = a_z b$.

a_z represents the speed of adjustment coefficient

b represents the unique nature of the cointegration space.

From equation 2

Y= [LnSAVGDP, LnPCY, Lnr] and X= [LnGDP, LnOPEN, LnINF, LnM2GDP, LnTOT, LnBANKDEN]

Where all the variables are as formerly defined.

Given the above specification, the information about the short run and long run adjustments to the changes in Y_t through the estimates of Γ and Π respectively can be obtained. The long run impact matrix of the error correction mechanism, that is the Π matrix in equation 2, is of vital role. First, the rank of Π provides the basis for determining the existence of cointegration or long run relationship among variables. According to Johansen (1998) in Nkang, Udom & Ndifon (2008), there are three possibilities with regard to the rank of Π : if rank(Π) is zero, then the variables are not cointegrated and the model is equivalent to a VAR in first difference; if 0< rank (Π)< n, then the variables are cointegrated; and if the rank(Π)=n , then the variables are stationary and the model is equivalent to a VAR in levels.

Second, since the term ΠY_{t-p} provides information about the long run equilibrium relationship (cointegrating relationship) between the variables in Y_t, the Π matrix can be decomposed into the product of matrices a and b, that is, $\Pi = a b$ where is the matrix of speed of adjustment coefficients which characterizes the long run dynamics of the system, while b is the matrix representing the cointegrating relations in which $b'Y_t$ (the disequilibrium error) is stationary (see for example,

Johansen and Juselius, 1990; Chang and Griffith, 1998 in Nkang, Udom & Ndifon,2008). When a is large, it means that the system will respond to a deviation from long run dis-equilibrium very quickly (that is, with a rapid adjustment) and vice versa.

With the above vector error correction model in equation (2), the long run cointegrating equation for savings rate can be represented as:

$$LnSAVGDP = l_0 + l_1 LnPCY_t + l_2 LnR_t + m_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where:

l_0 is a constant intercept term
l_1 and l_2 are the long run static coefficients; and
m_t is the random term with the usual stochastic assumptions

(c). Model implementation technique

This paper adopted the Johansen Maximum Likelihood procedure of cointegration. This involved a preliminary analysis being carried out to find the unit root test after which one tests for cointegrating (long run equilibrium) relationship among the data set. If a valid cointegrating relationship is found, then one goes ahead to estimate a vector error correction model, since cointegration is a pre-condition for the estimation of an error correction model.

(d). Unit root tests

The augmented Dickey-Fuller (ADF) test was used to test for stationarity of the variables (a unit root is an indication of non-stationarity). The ADF includes the first difference in lags in such a way that the error term is distributed as white noise; the ADF test adopts the formula:

$$\Delta Y_t = \alpha + \beta Y_{t-1} + \sum_{t=1}^{j} \gamma \Delta Y_{t-j} + m_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Here, the lag length j chosen for ADF ensures that u_t is empirical white noise; the significance of β is tested against the null that $\beta = 0$, based on t- statistics on β obtained from the OLS estimates of equation (4). Thus, if the null hypothesis of non-stationary cannot be rejected, the individual variables are differenced accordingly until they become stationary, that is, until the existence of a unit root is rejected. One then goes ahead to conduct a co-integration test.

(e). Test for cointegration

Co-integration is said to exist between non-stationary variables if their linear combination, namely the residuals of the co-integrating regression are stationary (Granger, 1987; Hendry, 1986). Thus, falseness can only be avoided if a stationary co-integrating relationship is established between the variables. The error correction form requires modelling co-integrated series. When variables are co-integrated, there exists a valid error correction mechanism (ECM) describing their relationship, with the implication that co-integration between variables involved is a precondition for the ECM (Granger, 1987).

The Johansen method uses the reduced rank regression procedure to estimate and, and the trace test and maximum-eigen value test statistics were used to test the null hypothesis of at most r cointegrating vectors against the alternative that it is greater than r. The consideration here is to test for the presence of a valid cointegrating vector which gives a unique long run equilibrium relationship. Once this is ascertained, the vector error correction model can then be estimated. All the estimations were performed using the standard version of Eviews (4.1) econometric software.

Results and Discussions

(a) Test of Stationarity

The result is presented in Table 1 below. The null hypothesis of the presence of a unit root (non-stationarity) was tested against the alternative hypothesis of the absence of unit root (stationarity). All the variables were stationary at the first difference. It could be seen from the test result which adopted the augmented Dicker-Fuller (ADF) that the variables were integrated of order one, that is, I (1).

Table 1: results of Augmented Dickey-Fuller (ADF) unit root test (sample 1970-2008): dependent variable: savings rate (SAVGDP)

Variable	Variable levels	ADF 5%	Variable First difference	ADF 5%	Order of integration
1.LnGDP	-5.230	-3.574	-9.108	-3.537	I(1)
2.LnSAVGDP	-0.671	-2.291	-5.298	-2.943	I(1)
3.LnPCY	-4.994	-3.574	-8.924	-3.537	I(1)
4. LnOPEN	-3.692	-2.941	-5.419	-2.946	I(1)
5. Lnr	-1.283	-2.943	-8.591	-2.946	I(1)
6. LnINF	-3.534	-2.941	-6.826	-2.946	I(1)
7. LnM2GDP	-1.071	-2.943	-8.819	-2.943	I(1)
8. LnTOT	-4.264	-2.941	-7.729	-2.943	I(1)
9. LnBANKDEN	-2.065	-2.941	-6.049	-2.943	I(1)

Note: *Critical values of ADF test were based on Mackinnon (1996) one-side p-values. Lag length selection was automatic based on Eviews (4.1) Schwarz information criteria.*

Since the time series were stationary, it became necessary to test for cointegration. By using the log-level form of the data, we estimated a multivariate cointegration relationship to establish the existence of a long run equilibrium relationship.

(b) Cointegration tests

Table 2: Results of multivariate cointegration tests

Null Hypothesis	Eigen Values	Trace Statistics	Critical Value 5%	Prob.	Max-Eigen Statistics	Critical Value 5%	Prob.
r>0**	0.984	166.415	29.68	0.0019	152.261	20.97	0.0015
r£1	0.186	14.154	15.41	0.1449	7.606	14.07	0.166
r£2*	0.162	6.549	3.76	0.0439	6.549	3.76	0.052

*(**) denotes rejection of the hypothesis at the 5 %(1%) level
Trace test indicates 1 indicates 1 cointegrating equation (s) at both 5% and 1% levels
Max-eigen test indicates 1 cointegrating equation (s) at both 5% and 1% levels

The summary of results of the Johansen Maximum likelihood cointegration test is presented in Table 2. The test relations were done with linear deterministic trend in a vector auto regression (VAR) model of order 1 with a lag length of 2 which was found to be parsimonious with the data set. The Johansen cointegration tests are normally based on the Maximum Eigenvalue of the stochastic matrix as well as the Likelihood Ratio test which is in turn based on the Trace of the stochastic matrix.

From the results, it becomes evident that the trace test and the maximum eigenvalue test indicate two cointegrating equation each, as the null hypothesis of r=0 is rejected. Thus we conclude that there is a unique long run equilibrium relationship among savings rate, per capita income, and domestic saving interest rate.

The Johansen model is a form of vector error correction model (VECM) and the parameters are interpreted as the long run cointegrating relationship among the variables concerned since there was existence of cointegrating vector (Hallam and Zanoli, 1993 in Nkang, Udom & Ndifon, 2008).

(c). Vector Error Correction Estimates

Table 3: Short run and long run VECM estimates

Vector Error Correction Estimates			
Date: 07/26/09 Time: 16:35			
Sample(adjusted): 1973 2008			
Included observations: 36 after adjusting endpoints			
Standard errors in ( ) & t-statistics in [ ]			
Cointegrating Eq:	CointEq1		
SAVGDP(-1)	1.000000		
PCY(-1)	15.93942		
	(0.40690)		
	[39.1727]**		
R(-1)	0.104666		
	(0.20807)		
	[0.50303]		
C	-139.8354		
Error Correction:	D(SAVGDP)	D(PCY)	D(R)
CointEq(ECM(-1)	-0.006583	-0.069125	0.005549
	(0.05496)	(0.00190)	(0.01733)
	[-0.11978]	[-36.3580]**	[0.32027]
D(SAVGDP(-1))	-0.273560	0.072445	0.022535
	(0.44492)	(0.01539)	(0.14027)
	[-0.61486]	[4.70681]**	[0.16065]
D(SAVGDP(-2))	-0.398394	0.063640	0.121506
	(0.29637)	(0.01025)	(0.09344)
	[-1.34423]	[6.20705]**	[1.30035]
D(PCY(-1))	0.020669	0.111683	0.033286
	(0.78038)	(0.02700)	(0.24604)
	[0.02649]	[4.13692]**	[0.13529]

D(PCY(-2))	0.011496	0.098623	-0.603541
	(0.79025)	(0.02734)	(0.24915)
	[0.01455]	[3.60753]**	[-2.42240]
D(R(-1))	0.207620	-0.019571	-0.281031
	(0.61441)	(0.02126)	(0.19371)
	[0.33792]	[-0.92079]	[-1.45076]
D(R(-2))	-0.280780	-0.017648	-0.096649
	(0.61440)	(0.02125)	(0.19371)
	[-0.45700]	[-0.83031]	[-0.49894]
C	-5.342590	-12.47537	2.395047
	(10.8583)	(0.37564)	(3.42343)
	[-0.49203]	[-33.2112]**	[0.69961]
OPEN	-0.184123	-0.000705	0.026248
	(0.12541)	(0.00434)	(0.03954)
	[-1.46822]	[-0.16258]	[0.66388]
TOT	0.524850	-0.016481	-0.153606
	(0.57966)	(0.02005)	(0.18275)
	[0.90545]	[-0.82186]	[-0.84051]
INF	0.029518	-0.000765	0.061421
	(0.20819)	(0.00720)	(0.06564)
	[0.14178]	[-0.10624]	[0.93574]
M2GDP	-0.647261	-0.051786	-0.052102
	(0.61145)	(0.02115)	(0.19278)
	[-1.05857]	[-2.44820]**	[-0.27027]
GDP	0.210825	0.965975	-0.172310
	(0.75676)	(0.02618)	(0.23859)
	[0.27859]	[36.8981]**	[-0.72220]
BANKDEN	-0.845864	-0.080068	0.223934
	(0.67805)	(0.02346)	(0.21377)
	[-1.24750]	[-3.41347]**	[1.04752]

R-squared	0.499983	0.997930	0.545167
Adj. R-squared	0.204518	0.996707	0.276402
Sum sq. resids	7.145473	0.008551	0.710273
S.E. equation	0.569907	0.019716	0.179681
F-statistic	1.692192	816.0090	2.028415
Log likelihood	-21.97507	99.13133	19.57945
Akaike AIC	1.998615	-4.729518	-0.309969
Schwarz SC	2.614428	-4.113705	0.305843
Mean dependent	-0.092388	0.179442	0.002982
S.D. dependent	0.638983	0.343592	0.211229
Determinant Residual Covariance		3.08E-06	
Log Likelihood		101.7847	
Log Likelihood (d.f. adjusted)		75.19094	
Akaike Information Criteria		-1.677274	
Schwarz Criteria		0.302124	

Diagnostics
J-B-F-stat *12.694[0.0448]*
ARCH test F-stat *9.982[0.0006]*
Serial correlation LM 17.79[0.038]

Table 3 reports the VECM Estimates for domestic savings rate and its determinants. Both the short run and the long run estimates as well as diagnostics are presented in the table. The result shows that the model fits the data well as indicated by the adjusted R-Squared (0.9967) and F- statistics (816.009) of the relevant error correction equation the expected signs are met except for financial sector development and bank density variables in the short run per capita income is significant at 1% level and also at the long run. Specifically, a 1% increase in per capita income will increase domestic saving rate by 0.11% while in the long run, domestic saving rate will increase by 15.94%. In the short run financial sector development was significant but negative while bank density index was also significant but negative. This indicates their depressing effects on domestic savings rate. Interest rate (savings rate) was insignificant at both short run and long run also openness to trade, terms of trade, and inflation were insignificant in a model; income growth (GDP growth) was a significant determinant of saving rate. Specifically in 1% increase in GDP growth will boost domestic savings by 0.97% and vice versa.

The error correction coefficient (- 0.069), which measures the speed of adjustment towards long run equilibrium carried the expected *a priori* negative sign and it is very significant at the 1% level. The coefficient indicates a fit back of about 7% of the previous year's disequilibrium from the long run elasticity of savings rate and per capita income. This implies that the speed with which interest rate and per capita income adjusts from short run disequilibrium to changes in savings rate to attain long run equilibrium is only 7% within one year this is very low and signals and under reaction of domestic savings rate as a result of changes in per capita income and interest rate (savings).

The historical data for Nigeria that was used to test the various hypotheses about savings rate is somewhat revealing. The results reveal that income growth (GDP growth) was positive and highly significant to savings rate; inflation was insignificant and negative, and terms of trade was also insignificant and negative to savings rate. The positive sign for income growth confirms that the life-cycle hypothesis holds for Nigeria. This confirms the work of Hussein and Thirlwall (1999) who found the relationship between savings rate and income growth positive for Egypt. The insignificance of inflation variable, with a negative sign indicates that savings rate may not be moving with inflation in Nigeria as suggested by Thirlwall (2002). In relation to national income per head level, this study confirmed the works of Edwards (1996), Masson, Bayoumi, & Samiei (1998). It contradicts Ozcan (2000) whose result for Turkey showed a positive relationship between savings rate and per capita income.

Conclusions and Policy Implications

Summary of Findings

The major findings of the study include the following:

(i) There is a cointegrating relationship (long run static equilibrium) among per capita income, interest rate (savings) and Nigeria's domestic savings rate.

(ii) Economic growth is a short run determinant savings rate in Nigeria

(iii) Per capita GDP or income is a positive long run determinant of Nigeria's domestic savings rate.

(iv) Financial sector development and bank density index have negative short run depressing effects on Nigeria's domestic savings rate.

(v) Savings interest rate, openness to trade, terms of trade, and inflation failed the test of statistical significance in a national savings rate model, thus, they did not prove to be important determinants of Nigeria's national savings rate, given the data set.

Conclusions and policy recommendations

The study provided an empirical test of the short run and long run determinants of domestic savings rate for Nigeria using samples for the period 1970 to 2008. It provided an empirical refute of the permanent income hypothesis, but rather holds the life-cycle hypothesis. The significance of the economic growth and the per capita GDP variables in a domestic savings rate model is an indication that savings would only increase based on productivity gains and not from oil boom which only increases favourable terms of trade.

Based on these empirical findings, it is recommended that achieving productivity gains for Nigeria, which would enhance savings growth, the workforce must be a vibrant one with adequate training for skills enhancement. The domestic financial system should be developed especially through improving financial intermediation which can be key factor for raising the level of domestic savings rate and efficiently channelling same into growth-enhancing investments.

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