CAPITAL ACCUMULATION, SAVINGS AND ECONOMIC GROWTH OF A NATION – EVIDENCE FROM NIGERIA

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Abstract

This study examines the problem of low savings and capital accumulation as it relates to economic growth in Nigeria. Addressing some of the methodological issues, underlying these macroeconomic aggregates, as well as identifying policy implications of the linkage between savings, capital accumulation and growth in Nigeria, The study covers a period of thirty-three years starting from 1980 to 2012. The study employed savings model, investment model and Growth model. Savings model shows that investment and gross domestic product have a positive and significant effect on savings in Nigeria while, inflation has a negative and insignificant effect on savings in Nigeria. Lending rate has a positive but insignificant effect on savings. Savings has a positive and significant effect on investment in Nigeria, investment has a positive but insignificant effect on economic growth while savings has a positive and significant effect on economic growth in Nigeria. It is recommended that, Particular attention should be paid to economic and socio-cultural shocks specifically, the investment climate and policies must be put in place to curb inflation in Nigeria so as to ensure macroeconomic stability and economic development.

Keywords: Investment, Savings, capital accumulation, economic growth, development.

1. Introduction

Capital accumulation as a component of economic growth and development in any society is the process of acquiring additional capital stock which is used in productive process. The foundation of capital accumulation is savings and it results when some portion of present income is saved and invested in order to augment future output and incomes. The extent to which the level of savings can affect capital accumulation and growth largely depends on the capacity of the economy to channel the savings into productive use. Higher savings then implies higher capital accumulation and hence, economic growth. Many attempts are being made on a regular basis to study the relationship between capital accumulation and economic growth in less developed countries (LDCs). It is believed that the people of LDCs are incapable of high level of individual savings for reasons like; low level of per capital income, indulgence in luxurious and conspicuous consumption by the few who could afford to save. Looking at it by intuition, according to Glahe (2005), it may seem that given higher level of savings investment, the capital stock will grow faster and a higher growth of income will result but it is instructive to note that the connection among savings, capital accumulation and growth is not as simple as it looks.

It has been observed that low level of savings has negatively affected capital accumulation which is germane in the development process. Nigeria like most developing economies is blessed with both natural and human resources with a population of over 140 million, yet the economy is faced with a lot of serious problems. This is evidenced by having over 90% of national income from crude oil and the nation is close to zero in terms of agricultural performance, technological advancement and industrialization. Over the years there has not been any synergy between savings and capital accumulation in Nigeria, neither savings nor investment is encouraged. Therefore economic growth is slowed down and economic activities are neglected. This study seeks to examine the problem of low savings and capital accumulation as it relates to economic growth in Nigeria. It also addresses some of the methodological issues underlying these macroeconomic aggregates as well as identifying policy implications of the linkage between savings, capital accumulation and growth in Nigeria. The study covers a period of thirty-three years starting from 1980 to 2012 both inclusive. This study is divided into four sections: the introduction, Literature review and empirical studies, methodology and Analysis, Discussion of findings, conclusion and recommendation.

Objectives of the Study

1. To evaluate the impact of savings on Nigerian economic growth
2. To examine the impact of capital accumulation on economic growth of Nigeria
3. To analyze the extent of the relationship between savings, capital accumulation and Nigerian economic growth.

In order to achieve the above objectives, the following research questions were asked

1. To what extent does savings affect Nigerian economic growth
2. What is the extent of the effect of capital accumulation on Nigerian economic growth and
3. What is the relationship between savings, capital accumulation and growth of Nigerian economy?

Therefore, to attempt these questions, we have the following null hypotheses;

H_{01}: Savings has no significant impact on Nigerian economic growth

H_{02}: Capital accumulation has no significant effect on Nigerian economic growth and

H_{03}: There is no significant relationship between savings, capital accumulation and the growth of Nigerian economy.

2. Literature Review and Empirical Studies

Adam Smith, David Ricardo and Thomas Malthus are behind classical economic growth model in which they emphasized productive investment and capital accumulation as engine of growth. Economic growth in Smith's view is stated below;

$$growth\ of\ output = f\ (accumulated\ capital)$$
$$Accumulated\ capital = f\ (Investment)$$
$$Investment = f\ (Savings)$$

Other relational variables according to him are; technological progress, the concept of specialization and changes in production methods which are not in the scope of this study. He emphasized about specialization which comes from two sources, the savings and capital accumulation as well as the extent of the market. It is however good to note according to Gavin (2007) that specialization is useless if the market is small. Another conventional model, which is related to this study is that of Harrod –Domar, which gives insight into the dynamics of growth. He suggests that economic growth rates depend on two things; level of savings (higher savings enable higher capital accumulation) and capital output ratio (efficiency of accumulated capital). It is argued that in developing countries the level of savings is low if left to the free market, hence there is need for government intervention to increase the savings rate of the economy. This thought prompted the work of carlos (2010), in which he concludes that Gross domestic Product (GDP) growth rate has a positive correlation with the average propensity to save.

We build the savings and investment model of this study on molho (1986) model. Using a theoretical and comparative static model, he investigated the Mckinnon – Shaw hypothesis that high real deposit rate encourages savings accumulation which will encourage investment from own sources (Mckinnon, 1967) and external borrowing (Shaw, 1967). Molho said the effect of future rate of return on capital and current supply of loan is indeterminate and discovered that past deposit rate and current supply of loans negatively affect current savings. However he made several assumptions and he concludes that the deposits and capital are complementary. Adopting the augmented production function, Obaseki and Onwioduokit (1998) specified their investment-growth model as a function of public investment, private investment, labour and imports. This forms the basis for our investment production model in this study.

2.1 Empirical Review

There are lots of literature relating savings and capital formation to economic growth of an economy. Some of these works are reviewed in this section. Pahlavani (2006) investigates how capital accumulation and savings promote economic growth in Iran over a period of four decades (1960 -2003). Galbis (2007) considers a two sector economy with the assumption that in the traditional sector as opposed to modern sector, investment is more productive because of superior technology and the investors in these sectors have access to both self and external finance. Therefore provided that deposit institutions are accessible, any rise in the real rate of interest will diverge resources from low yield real investment in the traditional sector and raise credit availability to investors in the modern one, resulting in a higher volume and productivity of investment in the whole economy. Stiglitz and Weiss (2010) argue that unequal or insufficient information lead to adverse risk selection particularly under conditions of macroeconomic instability. Soludo as cited by Gotera (2002) opine that there is a near consensus among economists about the over aching importance of capital accumulation in the growth process. The traditional growth model with separate factors of production predicts that output can only grow through increased factor accumulation and/or through technical progress. Positive factor accumulation can itself only take place through investment. Iyoha (1998) regressed both aggregate investment-income ratio and one-year lag per capita gross national product. Using annual time series data for the 1970-1994 period, he found a strong and positive correlation between investment and growth. George and Morisset (2012) investigated the impact of price uncertainty on private investment using chile as a case study. They contended that the role of prices and quantities in investment demand is important for the analysis of adjustment policies in many developing countries. They equally observed that recent studies emphasize the negative impact of uncertainty on private investment as a result of a higher risk premium. Abiodun and Basiru (2013) examined the cause and effect relationship between domestic savings and economic growth in Nigeria and found that causality runs from savings to economic growth using granger causality and Engle-Granger causality co-integration test. They recommend that policy makers in Nigeria should employ policies that will accelerate savings so as to increase economic growth in Nigeria. Using VAR approach, Igbatayo and Agbada (2012) found that changes in savings effectively stimulate output and output critically cause movement in savings. Ugwuegbe and Uruakpa (2013) investigate the impact of capital formation on the growth of Nigerian Economy and found out that both inflation rate and interest rate has a negative effect on the economic growth of Nigeria.

3. Methodology

The interrelationship between savings, capital accumulation and growth in Nigeria is explored in this paper with three models. They are; savings and investment models patterned after Molho (1986), as well as growth model of Obaseki and Onwioduokit (1998). Multiple linear regression using ordinary least square estimator was employed to estimate the parameters. The models are stated below:

Model 1 (Saving function)

$$S_t = f(Dr_t, Rgdp_t, Inv_t, Inf) ------------------- i$$

Where; S_t is Gross national savings
Dr_t is Savings Deposit Rate
$Rgdp_t$ is real gross domestic product
Inv_t is Gross Fixed capital formation
Inf is inflation

In econometric form;

$$S_t = \delta_0 + \delta_1 Dr_t + \delta_2 Rgdp_t + \delta_3 Inv_t + \delta_4 Inf + U_t \quad - - - - - - - - - - - - - - - ii$$

Apriori expectation for the parameters in model 1 are;

$\delta_1 > 0, \delta_2 > 0, \delta_3 > 0,$ and $\delta_4 < 0,$

 Model 2

The investment function is specified thus;

$$Inv_t = f\left(S_t, Rgdp_t, L_t, Inf\right) \quad - iii$$

   Where, L_t is lending rate

To specify equation iii in econometrics form, we have;

$$Inv_t = \varphi_0 + \varphi_1 S_t + \varphi_2 Rgdp_t + \varphi_3 L_t + \varphi_4 Inf + U_t \quad - - - - - - - - - - - iv$$

On apriori, $\varphi_1 > 0, \varphi_2 > 0, \varphi_3 > 0,$ and $\varphi_4 < 0$

Model 3

$$Rgdp_t = f\left(Inv_t, S_t, Imp_t\right) \quad -v$$

Specifying equation (v) in econometrics form we have;

$$Rgdp_t = \emptyset_0 + \emptyset_1 Inv_t + \emptyset_2 S_t + \emptyset_3 Imp_t + U_t \quad - - - - - - - - - - - - vi$$

On the apriori, we have; $\emptyset_1 > 0, \emptyset_2 > 0$ and $\emptyset_3 < 0$

   These macroeconomic secondary data were obtained from central bank of Nigeria statistical bulletin (2010), the global economy.com, world - bank documentations.

3.1 Data Analysis

   The data spanned between 1980 and 2012 (33 years). Savings increased at an average annual rate of about 46% between 1980 and 1985 and continued increasing between 1986 and 1991. Between 1992 and 1997, it increased at a decreasing rate of 2.2%. from 1998 there has been a continuous increase in savings in Nigeria up till year 2012. Deposit rate over the years has not been at a constant rate. It increased from 1980 till 1983 but later reduced slightly but increased till 1985. Deposit rate in Nigeria has been fluctuating at different rates but started decreasing in 2008 till 2011 and later experienced a slight increase in 2012.

   In 1981, Nigeria experienced a growth in real Gross Domestic Product to the tone of about 85%, however between 1982 and 1984 RGDP decreased slightly. The situation got better in 1990 when it increased by about 11% and continued to increase at an increasing rate without any decline and by 2011, it recorded a really high increase of about 98%.

   Gross fixed capital formation experienced an increase of 49% in 1981 but since then started to deteriorate until 1985. In 1986, it started to rise at an increasing rate till 1991 when it experienced a slight decrease. From 2000, gross fixed capital formation in Nigeria continued to rise until 2012 where it experienced a decline of 20%.

   Nigeria is ranked among the top ten countries with high rate on inflation by world bank (2012). Nigeria experienced a sharp increase in inflation rate in 1981 and continued to drop till 1986. Inflation rate increased at an increasing rate till 1988 but reduced drastically in 1990. In 2001 inflation rate reached the peak of 18.9% and reduced to 12.9% in 2002. Inflation rate in Nigeria also reached 17.9% in 2005 which is about 19.3% increase in inflation rate. As at 2012, the inflation rate in Nigeria is 12.2%.

   Lending rate in Nigeria was 7.67% in 1980 and increased at an increasing rate to 25.8% in 1990 but later reduced to 18.4% in 1991 and increased from then till 1993 when it reached its peak after which it began to reduce at an increasing rate. The lending rate in Nigeria reduced between 2010 and 2012. Import rate in Nigeria experienced an increase of 42% in 1981 but from then started to decrease until 1986. In 1987, there was a 98% increase in imports and from then continued to increase till 1995. In 1996, import in Nigeria reduced by 25% and from 1997 started to increase again until 2010. In 2011, there was a slight decrease in import and also decrease in 2012.

The estimated model 1 is;

$$lnS = -4.3412 + 0.2699 logDr + 0.2155 logRgdp + 1.1060 logInv - 0.0825 logInf + e$$

The regression result for model 1 is presented in table 1 below;

Variable	Coefficient	t-statistic	Probability
Intercept	-4.3412	3.173195	0.0036
logDr	0.2699	1.217128	0.2337
logRgdp	0.2155	2.541847	0.0168
logInv	1.1060	16.55296	0.0000
logInf	-0.0825	-0.665052	0.5115
$R^2 = 0.97$			
F-Statistic = 234.98 (0.000000)			
$\alpha = 0.05$			

   It was assumed that the variables are not stationary at level and therefore, the variables were transformed into logarithm and hence are interpreted in terms of elasticity. The regression result shows that all the explanatory variables conform to apriori specification (i.e conformity to economic theory). This implies that savings deposit rate has a positive effect on savings in Nigeria but the effect is not statistically significant in that the probability attached to t-statistic is greater than 0.05. Real gross domestic product and Gross fixed capital formation also have positive and statistically significant effect on savings in Nigeria. In conformity with apriori expectation, inflation rate has a negative effect on

savings in Nigeria but the effect is not statistically significant. The coefficients of these parameters show that a change in savings deposit rate will bring about a positive change in savings in Nigeria by 27%. A change in real gross domestic product by 1% will increase savings in Nigeria by 22% so also a change in fixed capital formation will positively change savings in Nigeria. However, the negative coefficient of inflation rate in Nigeria suggests that a 1% change in inflation rate will bring about a reduction in savings in Nigeria by 8%. To test the overall significance of the model, F - statistic was used with the accompanied probability of 0.00000. Since the probability is less than 0.05, we conclude that savings deposit rate, real gross domestic product, gross fixed capital formation and inflation have a statistically significant effect on savings in Nigeria. To test the explanatory power of the variables, R^2 was used and we found that 97% of the variations in savings in Nigeria are explained by the variation in the independent variables (Dr, Rgdp, Inv, Inf) while the remaining 3% are explained by other variables which were not captured by the model. In the work of Ugwuegbe and Uruakpa (2013), inflation rate has a negative impact on growth in Nigeria likewise, this result shows that it has a negative effect on savings of the nation.

The estimated model 2 is;

$$lnInv = 2.7246 + 0.8899 logs - 0.0933 logRgdp - 0.0048 logInf - 0.0616 logLr + e$$

The regression result for model 2 is presented in table 2 below;

Variable	Coefficient	t-statistic	Probability
Intercept	2.7246	2.8281	0.0086
Logs	0.8899	16.0558	0.0000
logRgdp	-0.0933	-1.1311	0.2676
logInf	-0.0048	-0.0424	0.9665
logLr	-0.0616	-0.2183	0.8288
$R^2 = 0.97$			
F-Statistic = 197.92 (0.000000)			
$\alpha = 0.05$			

The regression result shows that not all the explanatory variables conform to apriori specification. This implies that savings has a positive effect on fixed capital formation in Nigeria and the effect is statistically significant in that the probability attached to t-statistic is less than 0.05. Real gross domestic product, inflation rate and lending rate have negative and statistically insignificant effect on investment (gross fixed capital formation) in Nigeria. The coefficients of these parameters show that a change in savings will bring about a positive change in investment in Nigeria by 89%. This implies that as savings increases, investment also increases. A change in real gross domestic product by 1% will reduce investment in Nigeria by 9%. Also a change in inflation rate will negatively affect investment in Nigeria to the tune of 0.4%. However, the negative coefficient of lending rate in Nigeria suggests that a 1% change in lending rate will bring about a reduction in investment in Nigeria by 6%. To test the overall significance of the model, F - statistic was used with the accompanied probability of 0.00000. Since the probability is less than 0.05, we conclude that savings, real gross domestic product, inflation rate and lending rate have a statistically significant effect on capital formation (investment) in Nigeria. To test the explanatory power of the variables, R^2 was used and we found that 97% of the variations in investment in Nigeria are explained by the variations in savings, real gross domestic product, inflation rate and lending rate while the remaining 3% are explained by other variables which were not captured by the model.

The estimated model 3 is as follows;

$$lnRgdp = 7.6543 + 0.2913 loginv + 0.7990 logs - 0.6219 logImp + e$$

The table below shows the regression result for model 3

Variable	Coefficient	t-statistic	Probability
Intercept	7.6543	6.0339	0.0000
logInv	0.2914	0.4992	0.6214
Logs	0.7990	2.3153	0.0279
logImp	-0.6219	-1.8089	0.0808
$R^2 = 0.61$			
F-Statistic = 14.9598 (0.000005)			
$\alpha = 0.05$			

The regression result shows that all the explanatory variables conform to apriori expectation. Gross fixed capital formation has a positive impact on real gross domestic product, savings has a positive impact on growth as well and imports have a negative impact on real GDP. A rise of 1% in capital formation will bring about a positive change in growth of Nigeria by 29.1%. Also, an increase in savings will increase gross domestic product by 79%. While a change in import rate will bring about a reduction change in the growth of Nigeria. The positive effect of investment on the growth of Nigeria is not statistically significant likewise the negative effect of imports but the positive effect of savings on the growth of Nigerian economy is statistically significant at 5% level of significance. Fixed capital formation, savings and import jointly explains 61% of the variation in real gross domestic product, while the remaining 39% of the variation are explained by other variables which are not included in the model. The model is statistically significant in that the probability attached to F-statistic is 0.000005 which is less than the level of significance. This result is in line with the findings of Abiodun and Basiru (2013), Ahortor and Adenutsi (2009).

4. Summary of findings, Economic Implications and Policy Relevance of the result
From the study, gross domestic product and fixed gross capital formation have a positive and significant effect on savings in Nigeria. Savings deposit rate has a positive but insignificant effect on savings. Inflation rate has a negative and

insignificant effect on savings. Savings has a positive and significant effect on investment (gross capital formation) in Nigeria, while GDP. Inflation and lending rate have negative and insignificant effect on investment in Nigeria. Import has a negative and insignificant effect on gross domestic product in Nigeria. Savings has a positive and significant effect on GDP while gross capital formation has a positive but insignificant effect on growth in Nigeria.

From the first model, there is a relationship between capital accumulation, savings and economic growth. Savings can be increased by increasing capital formation, also, by increasing output to increase real gross domestic product which leads to increase in savings. Inflation in Nigeria should be curbed through various policies in order to increase the level of savings. This study reinforces the findings of Gotera (2002) which explains that higher growth raises wealth, but increases consumption less than proportionately, thereby increasing savings. Also, capital accumulation would increase if there is an increase in the level of savings, from this study, when real gross domestic product in Nigeria increases, there is a decrease in capital accumulation which could be due to frivolous spending of the citizens as evidenced by ownership of private jets by some government officials and as output increases, people spend on luxury goods rather than investing for the creation of further wealth also, an increase in lending rate would reduce the level of capital accumulation. This study shows that economic growth can increase if there is an increase in capital accumulation and savings and it implies that a country with low savings, will lead to low investment as well as low growth rate.

In conclusion, since capital accumulation matters greatly for a country's standard of living and growth, there is need for a rekindled interest in the mobilization of domestic resource to finance savings and economic growth. If savings can be improved, thereby leading to increased investment then, we can have economic growth. Particular attention should be paid to economic and socio-cultural shocks specifically, the investment climate in Nigeria so as to ensure macroeconomic stability and economic development.

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