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Research Article

IMPACT OF CAPITAL FORMATION ON NIGERIA ECONOMIC GROWTH: AN ECONOMETRIC ANALYSIS

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Abstract

The paper investigated the impact of capital formation on economic growth in Nigeria. The data were collected from Central Bank of Nigeria (CBN) statistical bulletin (2023).To analyze the impact of capital formation, stock market capitalization, human capital formation, inflation rate and interest rate on economic growth, the study employed Ordinary least square (OLS) technique. To test for the properties of time series, phillip-perron test was used to determine the stationarity of the variables and it was discovered that gross fixed capital formation and economic growth are integrated of order zero (I(0), Johasen co integration test was employed to determine the order of integration while error correction model was employed to determine the speed of adjustment to equilibrium. The empirical findings suggest that capital formation has positive and significant impact on economic growth in Nigeria for the period under review. This result corroborate the findings of Bakare (2017), Orji and Mba (2020). Stock market also showed a positive impact, while interest rate has a negative impact on economic growth in Nigeria for the period under review but the impact is statistically insignificant. The result further shows a long run relationship between capital formation and economic growth in Nigeria for the period under review. Therefore emphasis should be placed on accumulating capital in Nigeria as this will accelerate growth and development in Nigerian economy. The Nigerian stock market should be deepened more to enhance their contribution to the growth of the domestic economy.

Keywords: Capital Formation, Economic Growth, Interest Rate and Stock Market Capitalization

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INTRODUCTION

The rate of growth in Nigeria economy cannot be fully analyzed without a closer look at the contribution of capital formation to Nigeria's economic growth. This is in the understanding that capital formation has been recognized as an important factor that determines the growth of Nigerian economy. According to Bakare (2019), Capital formation refers to the proportion of present income saved and invested in order to augment future output and income. It usually results from acquisition of new factory along with machinery, equipment and all productive capital goods. Capital formation is equivalent to an increase in physical capital stock of a nation with investment in social and economic infrastructure. Continuing on the matter he noted that Gross fixed capital formation can be classified into gross private domestic investment and gross public domestic investment. The gross public investment includes investment by government and public enterprises while gross private domestic investment is investment by private enterprises. Gross domestic investment is equivalent to gross fixed capital formation plus net changes in the level of inventories. Economic theories have shown that capital formation plays a crucial role in the models of economic growth (Beddies 1999; Gbura and THadjimichael 1996, Gbura, 1997). This view called capital fundamentalism however was supported by the work of Youopoulos and Nugent (1976) as sited in Bakare (2019).

Growth models like the ones developed by Romer (1986) and Lucas (1988) predict that increased capital accumulation can result in a permanent increase in growth rates. Capital naturally plays an important role in the economic growth and development process. It has always been seen as potential growth enhancing player. Capital formation determines the national capacity to produce, which in turn, affects economic growth. Deficiency of capital has been cited as the most serious constraint to sustainable economic growth. Meanwhile, an understanding of the impact of capital formation is a crucial prerequisite in designing a policy intervention towards achieving economic growth. The process of capital formation according to Jhingan, (2006) involves three inter-related conditions; (a) the existence of real savings and rise in them; (b) the existence of credit and financial institutions to mobilize savings and to direct them to desired channels; and (c) to use these savings for investment in capital goods. The government of Nigeria in 1986 considered the need for improvement in capital information and pursued an economic reform that shifted emphasis to private sector. The public sector reforms were expected to ensure that interest rates were positive in real terms and to encourage savings, thereby ensuring that investment funds would be readily available to the real sector.

Besides this, the reforms were expected to lead to efficiency and productivity of labor; efficient utilization of economic resources, increase aggregate supply, reduces unemployment and generate low inflation rate. For example, during 1990s, gross fixed capital information average 21.3 percent of GDP in Nigeria. This proportion increased to 23.3 percent of GDP in 2001 and declined to 14.2 percent of GDP in 2007. It picked and increased to 17.4 percentage in 2015 and average 21.7 during 2016 to 2018. The gross capital formation rose from 22.3 percent of GDP in 2019 to 26.2 percent in 2021 and declined drastically to 21.3 percent in 2022 (Bakare 2023). It is germane to re-examine the impact of capital formation on economic growth in Nigeria from additional perspective, as capital formation in most studies in Nigeria has been viewed within the narrowed prism of just physical stock of capital. At the theoretical front, some scholars, including (Nurkse,2018; Becker, 2019, Romer, 2021) have argued that taking cognizance of physical stocks alone underestimate the true value and importance of capital formation in economic growth. In other words, capital formation is not limited to the accumulation of physical capital stock, but it encompasses human capital.

Consequently, limiting the impact of capital formation to just physical capital in any empirical studies, as is the case in several empirical literature on the subject matter in Nigeria, grossly underestimates the importance of capital on economic growth of the country. It is based on this backdrop that this study seeks to estimate the impact of capital formation on economic

growth, while incorporating human capital. The study will be relevant to those who will be making, interpreting or implementing economic policies in Nigeria. The study will also be relevant to the Nigerian government and, businesses and households in planning, organizing and implementation of policies leading to capital formation as well as provide the government with information on the extent to which capital formation has affected economic growth in Nigeria.

1.1 **Objectives of the Study**

The broad objective of this study is to examine the impact of capital formation on trade economic growth in Nigeria using the Autoregressive Distributed Lag Approach. The specific objectives however include:

i. To estimate the impact of capital formation on economic growth in Nigeria
ii. To recommend strategies for improving capital formation in Nigeria through better alternatives.

2. Review of Related Literature

Capital accumulation or formation refers to the process of amassing or stocking of assets of value, the increase in wealth or the creation of further wealth. Capital formation can be differentiated from savings because accumulation deals with the increase in stock of needed real investments and not all savings are necessarily invested. Recent literature has confused investment with capital formation. Investment can be in financial assets, human (capital) development, real assets that can be productive or unproductive. The increase in investment through non-financial assets has been held to increase value to the economy and the increase in the gross domestic product through further increase in employment (Adekunle and Aderemi 2012). The Central Bank of Nigeria (2007), defines capital formation as the total change in the value of fixed assets in the economy in addition to fixed assets either for replacing or adding to the stocks, it refers to the increase in the fixed capital stocks of the capital formed. Governments by their autonomous investment influence the direction of other investment by crowding in other investment as desired. The relationship between capital formation of the nation and economic growth has been studied by a number of authors with different findings. This section will present the empirical result of several writers in this study area. Keynes (1936) was the first to call attention to the existence of an independent investment decision in the economy. He observed that investment depends on the prospective marginal efficiency of capital relative to some interest rate that reflects the opportunity cost of the invested funds. After Keynes, the evolution of investment theory was linked to simple growth models. These models gave rise to the accelerator theory, which makes investment a linear proportion of changes in output. The flexible accelerator model is a more general form of the accelerator model. Other investment theories include the neoclassical model developed by Jorgenson (1967) and Jorgenson and Hall (1971) and the "Q" theory associated with Tobin (1969). The notion of irreversibility in investment has also been given considerable attention in the investment literature (see Pindyck, 1988; Bertola and Caballero, 1990). Moreover, the financial intermediation theory associated with McKinnon (1973) focuses on the role of financial deepening and high interest rates in stimulating growth in developing countries.

2.1 Life Cycle Theory of Savings

The life-cycle theory propounded by Modigliani and Brumberg (1950) is based on the observation that individuals make consumption decisions based on the resources available to them over their life time and their current stage in life. The theory predicts that the age consumption of a country's population should influence its savings behavior in such a manner that the higher the proportion of a country's population that is not in the active labour force, the lower its savings rate should be. In other words, individuals will save when they are young and have low income, save during their productive years, and once again save when they retire. Nwachukwu and Egwaikhide (2017) postulated that the life-cycle hypothesis is the principal

theoretical underpinning that has guided the study of savings behavior over the years. Each of the determinants of savings is articulated in the context of the life-cycle hypothesis which state that the determinant of savings behaviors include income, growth of income, interest rate, inflation and macroeconomic stability, fiscal policy, external debt, term of trade and financial development.

Life-Cycle Income Hypothesis (LCH) is derived from the aggregation of finitely-lived overlapping generations. It view individuals as choosing a life time stream of consumption and savings in a way that present value of their consumption equals the present value of their life time earnings and inheritance (Deaton,2018). The theory is related to the study because it explains that capital formation is a reflection of the age structure of the population and it is expected to affect the savings ratio within a society. The theory suggest that individuals save for retirement when they are in working age and don't save when they are old. Thus, younger societies are likely to display higher savings than other ones.

2.2 Endogenous Growth Theory

This theory is propounded by Romer in 1986. The theory suggested that investment in human capital; knowledge and innovation are the engine to accelerate economic growth. That is, the improvements in productivity will increase the pace of innovation and extra investment in human capital. He stressed the need for government and private sector institutions to encourage innovation and provide incentives for individual and business to be inventive. It is the central role of the accumulating knowledge which serve as a determinant of growth i.e knowledge industries such as telecommunication, electronics, software or biotechnology are becoming increasingly important in developing countries. The proponent of this theory also believes that positive externalities are to be exploited from the high value added knowledge economy which is capable of developing and maintaining competitive advantage and in fact growth within the global economy. The main points of the endogenous growth theory are as follows: the rate of technological progress should not be taken as a constant in growth model. Government policies can permanently raise a country's growth rate if they lead to more intense competition in markets and help to stimulate product and process innovation. There are increase returns to scale from new capital investment.

The assumption of the law of diminishing returns is questionable. Endogenous growth theorists are strong believers in the potential for economies of scale (or increasing returns to scale) to be experienced in nearly every industry and market. Private sector investment in research and development is a key source of technical progress. Availability of the workforce is an essential ingredient of long-term growth. Government policy should encourage entrepreneurship as a means of creating new businesses and ultimately as an important source of new jobs, investment and innovation. The protection of private property rights and patents is essential in providing appropriate and effective incentives for businesses and entrepreneurs to engage in research and development. Also, investment in human capital (including the quantity and quality of education and training made is important.

2.3 Related Empirical Review

Examining the capital formation in a study conducted by Azam and Daubreé, (2017), they concluded that private investment has been the ―strongest and the most significant contributor to growth in Kenya. They highlighted the predominant role of insufficient private investment and its failure to match the progress of human capital accumulation as an important factor in slowing growth in Kenya during this period. Private investment lagged behind accumulation of human capital, slowed by excessive competition from public investment in a context of financial repression. There are some evidences that the efficiency of capital use worsened over time, especially in the public sector activities, thereby reducing the growth effects of investment.

In some developing countries, there is massive under-utilization and unemployment of educated labour, so that its social productivity may be minimal at the margin. The findings

could also be attributed to measurement errors and possible non-linearities in the data, especially when micro evidence suggests high returns to education.

Recent empirical studies by Hernandez-Cata (2020), Ndikumana (2020), Ben-David (2019), Collier and Gunning (2019), Ghura and Hadji michael (2018), Khan and Reinhart (2010), conducted in Africa, Asia and Latin America have established, beyond doubt, the critical linkage between capital formation and the rate of growth. Throughout the 2000s, the ratio of total gross domestic investment (GDI) to gross domestic product (GDP) in Asia, which experienced a high average rate of growth compared with the rest of the world, was about 27 percent, while in Latin America and sub-Saharan Africa the corresponding ratios were 20 percent and 17 percent, respectively. Econometric evidence (Beddies 2019, Ghura and Hadji michael 2016, Ghura 2017) indicates that private capital formation has a stronger, more favorable effect on growth rather than government capital formation probably because private capital formation is more efficient and less closely associated with corruption.

According to Adekunle and Aderemi (2021), real domestic investment is expenditure made to increase the total capital stock in the economy. This is done by acquiring further capital-producing assets and assets that can generate income within the domestic economy. Physical assets particularly add to the total capital stock. Boosting economic development requires higher rates of economic growth than savings can provide. Part of the finance for investment is provided by the corporate sector, bank loans and households' savings make up the other part. With this, savings is no longer a constraint to investment demand. While short term investments are highly encouraged by external sources of fund, long-term investments are more domestically driven. This is one of the reasons why aid is less effective in the long run. With lower rates of interest, asset values tend to be on the upward swing which invariably represents the discounted value of such assets thereby increasing the rate of acquisition and investment in such assets increases aggregate demand. Investment therefore is not constrained by aggregate savings but more by domestic interest rates. Therefore, the new equation of investment is Investment = (Savings) + (newly created money available to Deposit Money Banks). Attempts at reducing expenditure have affected investment rates and had led to poor and sluggish growth and eventually affecting savings performance (Khan & Villanueva, 2016).

Ajao (2017) in his study concludes that long-term capital formation in Nigeria were not majorly sourced from the capital market as the above result shows the marginal contribution of Market Capitalization and New Issues to Gross Fixed Capital Formation. Though, it is unarguable that when investors take position for profit, it can affect the level of wealth which can then be used to build private capital. This result is in line with the findings of Sarkar (2006) where he concludes that there exists no meaningful relationship between stock market capitalization and gross fixed capital formation. Orji and Mba (2021) in their study looked at relationship between FPI, Capital Formation and Growth, in Nigeria using the two-stage least squares (2SLS) method of estimation. The study finds that the long run impact of capital formation and foreign private investment on economic growth is larger than their short-run impact. There is thus, a long-run equilibrium relationship among the variables as the error correction term is significant, but the speed of adjustment is small in both models. In their result, the two stage least squares estimates are very close to the OLS estimates suggesting that OLS estimates are consistent and unbiased. Hence, endogeneity was not a problem in the estimated models. There is therefore no simultaneity between GDP growth and capital formation model. These findings therefore have some policy implications as discussed in the work.

Adekunle and Aderemi (2020) examined the relationship between Domestic Investment, Capital Formation and Population Growth in Nigeria he used Secondary data from the Central Bank of Nigerian, for capacity utilization, capital expenditure bank credit and capital formation while growth and investment rates from World Economic Information database were used. Their result shows that the rate of investment does not assist the rate of growth of per capital

GDP in Nigeria. The paper tests on the curve estimation regression models confirm that growth is in existence but is found to be insignificant. The linear result indicates the importance of government expenditure, capacity utilization and bank credit in increasing the income of Nigerians. The results also show that there is negative relationship between growth rates of the population and capital formation. With the curve estimation method results, investment rate can engender growth in the economy though slowly, on a linear path.

RESEARCH METHOD

This study employed annual series data from Central Bank of Nigeria statistical bulletin (2023). The study will cover the period of 1994 to 2023. In other to achieve the objective of this study, Autoregressive Distributed Lag technique was used to determine the impact of capital formation on economic growth in Nigeria. The model that will analyze the relationship is implicitly stated as follows:

GDP = f(GFCF, INFR, SMC, INTR, HCF)……(1)

The results of several diagnostic tests, including the unit root test and the bound test on the variables used for the study, drove the decision to use this methodology. The study's use of an autoregressive lag model is justified by the variables' distinct orders of integration, or I(1) and I(0). As a result, the ARDL model can be described as follows in general:

$$I^{nRGDP_t} = f(GFCF_t, InINFR_t, InSMC_t, InINTR_t HCF_t)$$

Where In is the natural logarithm, RGDP is a log of Real Gross Domestic Product, GCFC is gross fixed capital formation, INFR is the inflation rate, SMC is the Stock Market Capitalization, INTR is interest rate and HCF is total government recurrent expenditure on health and education, which is a proxy for human capital development.

$$I^{nRGDP_t} = \alpha_0 + \alpha_0 GFCF_t, \quad + \alpha_2 InINFR_t, + \alpha_3 InSMC_t, + \alpha_4 InINTR_t, + \alpha_5 HCF_t + u_t \quad (2)$$

3.1 Estimation Procedure

The estimation commences with a unit root test to confirm the stationarity state of the variables that entered the model. In order to test for the stationarity, the Philips-perron test was adopted. The first step is to test for stationarity at level, without constant and trend. If the variables are not stationary, then the next step is to difference and test for the stationarity of the differenced variables. If the variables are stationary after the first differencing, then the variables are integrated of order one i.e 1(1). After that the co-integration regression will be obtained from the normalized coefficients of the model generated from the co-integrating vector. Based on this the Error Correction Mechanism which determines the speed of adjustment to the equilibrium will be estimated.

3.2 Unit Root

This involves testing the order of integration of the individual series under consideration. This is necessary because most time series are not stationary. One of the most popular unit root test is the Phillip-Perron (PP) test developed by Phillip (1987) and Phillip and Perron (1988). The PP test regression equations with constant are:

RESULTS

Table 1: Augnented Dickey-Fuller Unit Root Test (trend and Intercept)

VARIABLES	LEVELS	DIFF.	CRIT. VAL	DECISION
RGDP	-3.005938	-11.58264	3.53	1(1)
GFCF	-6.003813		3.54	1(0)
INTR	-4.768989		3.54	1(0)
INFR	-3.196615	-8.388052	3.54	1(1)
SMC	-2.352949	-3.821975	3.54	1(1)
HCF	-3.536601	-6.542906	3.54	1(1)

Source: Authors computation using E-views 10

The results indicate that the variables are integrated of different orders: GCFC and INTR were stationary at 1(0). While RGDP, INFR, SMC and HCF were stationary at the first difference 1(1). The regression result for the impact of capital formation on economic growth is presented below:

Table 2: Model Results

Statistics	Coefficient	Standard Error
β0	5594.021	1251.874
β1	1.151489	0.783546
β2	6.553843	1.001106
β3	-0.255578	0.146334

Source: Authors computation

The model for this study can be recalled and re-written as follows:

$GDP = \beta 0 + \beta 1GFCF1 + \beta 2HCF2 + \beta 3INTR3 + \mu$

$GDP = 5594.021 + 1.151489GFCF1 + 6.553843HCF2 - 0.255578INTR3$

The rewritten model shows that if all independent variables remain constant, the gross domestic product will remain at a positive value of 5594.021. Also, the coefficient values of gross fixed capital formation and human capital formation has positive values of 1.151489 and 6.553843 respectively. This simply means that, a unit increase in each of the variables will result to a simultaneous increase in Nigeria's gross domestic product. However, interest rate has a negative value of -0.255578. This explains that a unit increase in INTR will lead to a proportional decrease in Nigeria's gross domestic product.

Table 3: T- Statistics Result

VARIABLE	T- Value	Probability Value

GFCF	1.469587	0.1537
INTR	6.546605	0.0000
HCF	-1.746545	0.0925

Source: Authors computation

The t-statistic results (probability level) of GFCF, HCF and INTR were 1.469578, 6.546605 and - 1.746545. The probability values of these variables are: 0.1537 (GFCF), 0.0000 (HCF) and 0.0925 (INTR). This indicates that gross fixed capital formation and human capital formation have significant effect on Nigeria's gross domestic product because their probability values were greater than 0.05 critical values. However, interest rate has p values of 0.0000 which is lesser than 0.05 critical values. Thus, interest rate has no significant effect on gross domestic product in Nigeria.

Table 4: Model Validity and ANOVA Results

Statistics	Results
R Square	0.984082
Coefficient of Determination (Adjusted R2)	0.982246
Probability value	0.000000
Durbin Watson (DW)	0.934196

Source: Authors computation

The coefficient of determination R2 is 0.984082 which means that 98.4% of the variation in Nigeria's gross domestic product is explained by the independent variables employed in the model while the remaining 1.6% unexplained variation is being influenced by other variables outside the model but captured by the error term. The adjusted R2 is 0.982246which means that 98.2% of the variation explained the fitness and generality of the model. The value is expected to be the same or very close to R2. The Durbin Watson statistics in the model is 0.934196 falls within the range 0 and 2. Value ranging from zero to two indicates a strong positive correlation while a value from two to four implies a strong negative correlation. The F statistics in the regression line 535.8007with pvalue of 0.0000. Therefore, the pvalue is less than 5% level of significance (0.0000<0.05). This can be easily inferred that capital formation has a significant effect on economic growth in Nigeria for the period of 1994 to 2023.

CONCLUSIONS

Evidence from results indicates that gross fixed capital formation was significant and positively related to economic growth, which is conforms to the apriori expectation. The positive relationship implies that as capital accumulation increases, economic growth increases. This is concurrent with earlier findings by Ajose and Oyedokun (2018) and further buttress the point made by Jhingan (2012), that capital accumulation is a decisive factor in economic growth. The decline in gross fixed capital formation might be a major factor in the reoccurring negative growth experienced in recent time. The coefficient of interest rate was negative but insignificant the 5% level. This implies that as interest rate rises, economic growth declines.

This agrees with Abdullahi, Hassan and Bakar (2016). The estimated model further suggests a statistically significant relationship at the 5% level, between HCF and economic growth. Human capital formation had the expected sign; implying that increases in human capital expenditure will bring about increase in economic growth. Stock market capitalization was statistically insignificant and a negative impact on growth. There is no question that both the public and private sector benefits from the stock of skilled manpower which are trained and sustained by investment in education. The Nigerian Government should embark on massive training of manpower and recruit the very best to be in charge of key positions. In real term the study has brought to the fore the need to disaggregate capital formation into physical and human capital formation for any meaningful analysis and consequential policy proposals. An increase in one without complimentary increase in the other would not yield the expected result, which might be the near positive relationship between quality of educational system and overall infrastructure as revealed in the infrastructure, health and skills competitiveness.

The study shows that despite the poor allocation to health and educational sectors (human capital formation), a positive impact has been seen to exist with growth. This confirms the need to decompose capital formation to better explain the role of human capital formation in the growth process. Therefore, government should consider expenditure on education and health as investment and not just expenditure. In this direction, it is necessary for both private investors and Government to scale-up funding to both sectors. Teaching should be the exclusive preserve of the best and the brightest. To avoid the decline in skill set of graduates, critical thinking in teaching and quality of vocation training as revealed by the global competitiveness report should be encouraged. There is also need for the institutions in Nigeria to inculcate into Nigerians the need to be productive, resourceful, innovative, and to learn how to build systems that will multiply, optimize their output and help them gain dominance of their market space with ease. This can be achieved by giving more credence to vocational skills, encouraging Nigerians to pursue relevant digital skills and rewarding hard-work and talents adequately.

Policy formulators in Nigeria need to enact some investor friendly policies that will encourage, promote and attract more capital inflows (Be it official or private inflows) and to provide a conducive and enabling environment for gross fixed capital formation to thrive. Lastly, macroeconomic projections should guide the overall level of expenditure. As such, their projections need to be more realistic, internally consistent and based on more accurate and timely information

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