

Determinant of Private Investment in Nigeria's Manufacturing Sub-sector

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Abstract

This study empirically investigates the determinants of private investment in Nigeria's manufacturing sub-sector between the periods 1975 to 2013 using annual time series data sourced from Central Bank of Nigeria Statistical Bulletin of various issues. In carrying out the study, econometric techniques were employed to analyze the data collected. However, stationary and co-integration tests of the variables were examined using Augmented Dickey – Fuller and Johansen co-integration tests respectively. Also, an endogenous growth model was specified and estimated using error correction mechanism (ECM) technique in order to test for the dynamic characteristics of the variables in the model. The results show that the main determinant of private investment in the manufacturing sub- sector of the Nigerian economy is interest rate, exchange rate and public sector investment. The study concludes that the empirically identified factors influencing private sector investment should be well – managed by the government to boost private investment in the manufacturing sub- sector and to ensure to the complete diversification of the Nigerian economy.

Keywords: private investment, manufacturing sub-sector, co-integration

1. Introduction

Manufacturing connotes the conversion of raw materials into finished goods for consumption or intermediate goods for further production. Manufacturing is a sub-set of the industrial sector. Like other industrial concerns, it creates avenues for employment, aids in the boosting of agriculture, and helps in the diversification of the economy. Also, it helps the nation to increase its foreign exchange earnings, and to minimize the risk of over dependence on foreign trade while also enabling the nation to maximizing her resources to the fullest (Uwubanmwun, 2003). In light of the important role of the industrial sector in the structural transformation of the economy, the Nigerian government regards genuine industrialization as a sine qua non for achieving the degree of self- reliance and confidence without which a nation can neither have stability necessary for social harmony at home nor muster the needed respect and the means required for meaningful involvement in international affairs and interaction. Hence, over the

years, a number of fiscal, monetary, exchange rate and commercial measures, among others have been implemented to encourage industrial development in Nigeria. In the Nigerian experience, the existing private sector investment institutions during and after independence were branches of multinational corporations supported with an unorganized indigenous private sector. After independence, government encouraged private investment especially foreign investment by providing various kinds of incentives like tax holidays, capital depreciation allowance etc. Nonetheless, the incentives were not far reaching and moreover existing laws still inhibited foreign private investment (Ekpo, 1996a). However, as impressive as the number of policies and measures are to encourage industrial development, the problems of the sector continues to generate much concern and debate among a variety of stakeholders. The concerns stems broadly from the major factors of:

- High production cost
- Low value addition
- Low capacity utilization
- High import content of industrial output, and
- Low level of foreign investment in manufacturing

Most of these problems are derived essentially from inadequate infrastructures, lack of executive capacity, poor utilization of available manpower and absence of a sound technological base. Of serious concerns are the poor returns on most of the project which from all practical purpose could not justify the enormous public funds that had been committed to their execution. In recognition of these perennial and deep rooted problems, a restructuring of the manufacturing sector is required. To cope with these problems, the government embarked on the structural Adjustment Program (SAP) in July 1986 with the primary objective of removing the bottlenecks and structural distortions militating against efficient capacity utilization in the manufacturing sector through the introduction of an exchange rate regime that is predicated on forces of demand and supply.

The objective of the study is to examine the determinants of private investment in Nigeria's manufacturing sector, specifically, to determine the influence of macroeconomic variables of interest rate, exchange rate on private investment in Nigeria. This contribution to the body of existing knowledge will enrich our understanding on what actually drives private investment in the manufacturing sector in the Nigerian economy.

The study is organized as follows: section 1 is the introduction section 2 discusses the theoretical and empirical literature. Section 3 provides the theoretical framework and methodology. Section 4 presents and discusses the empirical results. Finally, sections 5 conclude the study and make necessary recommendations.

2. Literature Review and Theoretical Framework

The study is located within the theoretical framework of endogenous growth model which maintains that long – run growth is derived considerably from other sources other than the exogenous technical change. In the literature, it is often argued that investment stimulates growth and within a market economy, private sector investment remains the engine of growth with the public sector providing the enabling environment. In the classical sense, the enabling environment may mean providing law and order to allow the free market to thrive. In recent times, the public sector has been known to go beyond the provision of law and order. The public sector regulates and intervenes in the system in order to allow the market to function properly. Government puts in place appropriate fiscal, monetary and exchange rate policies to ensure the functioning of the system. These policies are crucial if the private sector is to play its role properly. Theoretically, the private sector investment remains the engine of growth. Through capital accumulation, the private sector can ensure the reproduction and sustainability of a market system.

In a simple Keynesian framework, high levels of government consumption are likely to increase employment, profitability and investment via multiplier effects on aggregate demand. There are those who maintain that government consumption will ‘crowd out’ private investment by dampening any economic stimulus in the short – run and in the long – run by reduction in capital accumulation. Either way, the link is between levels of government spending and economic activity rather than total factor productivity. There exist significant relationship between public investment and private investment. Those that emphasize the financing side of expenditure draw attention to private investment crowding – out effects of government expenditure. When it is assumed that private investment has higher productivity than public investment, a negative effect on growth is deduced. Those that stress the expenditure side showed how the private investment crowd – in on public expenditures since these will tend to enhance the absorptive capacity of the economy and the profitability of private investment. Some scholars have hypothesized that the response of private investors depends on the stage of the cycle, the availability of financing and the level of public investment. While the effect of the stage of the cycle appears uncertain, that of available finance seems less ambiguous. However, the nature of capital markets in developing economies limits the financing of private investment to the use of retained profits, bank credit and foreign borrowing. There is no doubt that public sector investment can crowd – out private investment if it uses scarce physical and financial resources that would otherwise be available to private investors. Alternatively, the same scenario will occur if the public sector produces marketable output that competes with private output. In addition, the financing of public sector investment both through taxes, debt issuance or inflation will reduce the resources available to the private sector and hence dampen private sector activities (Chibber and Dailami, 1990).

Khan and Reinhart (1990) tested empirically the relative productivity of private and public investment for a cross – section of 24 developing countries. Their results showed that private investment had a large direct effect on growth than that of public investment. They also re – affirmed the indirect effects of public investment on growth through raising profitability of private investment and the absorption capacity of the economy.

There is also plethora of literature on the behavior of private investment. Alkhatib et al (2012) using annual data analyzed the economic determinants of domestic investment in Jordan for the period 1980 to 2010 employing the cointegration econometric method. The result showed that the growth rate – GDP and exports are significant in stimulating domestic investment. Vergara (2004) modeled the link between corporate tax reform and private investment performance in Chile in 1975 – 2003. The result confirmed that private investment is negatively affected by high corporate tax rates. Furthermore, crowding – in effect of public sector was established while the investment climate, prox by the lagged private investment was found to boost private sector investment in Chile. Using Panel data and fixed effects model, Tadeu and Silva (2014) explored the determinants of private investment in Brazil using sector data for the periods 1996 – 2010. The result revealed the importance of the available funds volume for investment with the complementary between public and private investment. Other similar studies on the determinants of private investment in the manufacturing sector have come up different opinions and findings.

In view of the forgoing analysis, it is pertinent at this point to re-state the objective of this study which is to further provide empirical evidence on the determinants of private investment in Nigeria’s manufacturing subsector. The need to investigate this specific issue is motivated not only by the paucity of empirical evidence on this aspect of research on private investment and the manufacturing sector but also to filling the knowledge gap. It is hoped that the contribution of the study would help provide a hint as to the determinants of private investment in the manufacturing sector in Nigeria.

3. Methodology

The data employed for the study are annual data covering the period 1975 – 2013 and following the analytical approach of Ekpo (1995) with some modifications, the variables are measured as follows: index of manufacturing production (AMCU), Exchange rate (EXR), gross domestic product, a proxy for gross fixed capital formation, SLC, (INT) interest rate, proxy for prime lending rate, political disturbance (POD) and public investment (PUV), a proxy for capital expenditure. All the variables are expressed in natural logarithms for linearity enhancement. Data are obtained from the Central Bank of Nigeria Statistical Bulletin of various issues.

3.1 Model Specification

The model takes AMCU as the dependent variable and exchange rate, gross domestic product, interest rate, political disturbance and public investment as the explanatory variables as follows:

$$LAMCU = \alpha_0 + \alpha_1LEXR + \alpha_2LGDP + \alpha_3LINT + \alpha_4LPUV + \alpha_5LPOD + \varepsilon_{t-1}.....1$$

b1>0, b2>0, b3<0, b4>0 and b5<0

Where LAMCU = Index of manufacturing Production, LEXR = Exchange Rate, LGDP = Gross Domestic Product (Proxy for Gross fixed Capital Formation), LINT = Interest rate (proxy for prime lending rate), LPOD = Political Disturbance, a dummy for Coup d’état and insurgency years and LPUV = Public Investment, a proxy for capital expenditure.

The estimation procedure adopted in this study is in two sequences. (1) To stem the problem of spurious regression. It is important that the time series properties of the data set employed in estimation of equation (1) are ascertained. Therefore, it might seem reasonable to test for the presence of unit root in the series, using the most general of the models as:

$$\Delta Y_t = \alpha_0 + \gamma Y_{t-1} + \alpha_1 t + \sum \beta_j \Delta Y_{t-1} + e_t \dots \dots \dots 2$$

Where y is the series, t is trend factor, a is the constant term, et is the stochastic error term, and p is the lag length. The Augmented Dickey – Fuller (ADF) unit root test is employed to test the integration level and the possible co-integration among the variables, (2) If the data set indicates integration property of the order 1 (1) for the employed variables, then we proceed to test for co-integration among the variables employing Johansen (1991) and Johansen and Juselius (1994) test techniques.

4 Empirical result and Discussion

4.1 Unit Root Test

Before estimating the model, the characteristics of the data used were examined. The essence of the unit root test was to determine whether the data were stationary and the order of integration. In this respect, the study utilized the ADF (Augmented Dickey Fuller) test. The results of the Unit root test are presented in table 1

Table 1: Augmented Dickey Fuller Test (ADF)

Variables	Levels	1 st difference	Lag length	Order of integration
AMCU	-3.022188**	-	2	I(1)
LGDP	-4.619273*	-	2	1(1)
LEXR	-3.687146*	-	2	I(1)
INT	-6.278923*	-	2	1(1)
LPUV	-4.32975	-	2	1(1)

Source: Authors Computation using E-View 8.

The result of the unit root test, based on the ADF, provided strong evidence that all the time series variables are stationary at levels. This means that they integrated in the order of 1 at 95 percent confidence interval. The null hypotheses cannot, therefore, be rejected for all the variables under study. Since all the time series variables included in the regression line are I (1), the use of traditional econometric techniques, such as Ordinary Least Square (OLS) and the use of tests, such as t-statistics and f-tests, can lead to misleading results. The regression may produce results where all the diagnostic statistics are good, but in reality are spurious.

The next task is to investigate whether the variables under scrutiny are co-integrated. This is because the presence of co-integration helps to establish whether or not a well defined linear relationship exists among them in the long run. To do this, two approaches, namely the Engle –

Granger two – step procedures and Johansen maximum likelihood approach are used. The Engle – Granger two – step procedure is simple and straight forward. It involves regression using stationary time series, by using their levels, first difference and including the regression as an explanatory variable the lagged residuals from the levels regression. The results of the Engle – Granger tests shows that the residuals from the levels regression are well defined.

This indicates the existence of a linear relationship between dependent and explanatory variables included in the regressions (Gujarati, 2004). However, the Johansen maximum likelihood technique has several important advantages in comparison with the Engle – Granger method. First, it is an invariant test, which permits the existence of co-integration between the system variables without imposing bias on the variables. As a result, it does not assume somewhat arbitrarily the direction of the regression, which could lead to different and misleading results. Second, it can identify whether more than one co-integrating vectors really exists. Third, it can estimate the long – run or co-integrating relationship between non – stationary variables using the Johansen maximum likelihood procedure. Summarily, the Johansen test for co-integration is a multivariate unit root test which is also able to estimate the parameters of these co-integrating relationships. To test for co-integration, this study employed the maximum Eigen value test, which tests the null hypothesis that there are $\gamma + 1$ co-integrating vectors versus the alternative hypothesis that there are γ co-integrating vectors.

Table 2: Results from Co-integration Test

Eigen value	Likelihood Ratio	5 percent critical value	1 percent critical value	Hypothesis no of CE(s)
0.971620	244.5190	94.15	103.18	None**
0.778392	119.8462	68.52	76.07	At most 1**
0.612086	67.10660	47.21	54.46	At most 2**
0.443916	33.96263	29.68	35.65	At most 3**
0.288125	13.42335	15.41	20.04	At most 4
0.042732	1.528506	3.76	6.65	At most 5

Source: Author’s Computation Using E-View 8.0

Table 2 shows the Eigen values for the significant vectors. The result indicates that there are at least four significant vectors. This suggests the presence of co-integration in the time series. The presence of co-integration makes it possible to estimate error correction mechanism (ECM), which is a solution to the problem of spurious regression associated with estimating equations involving time series variables(Patterson, 1990). Adopting the general to the specific framework, the parsimonious error correction model of manufacturing production is estimated as in the table 4 below.

Table 4: Parsimonious error correction results of manufacturing production in Nigeria

Variable	Coefficient	Std error	t-statistic	Prob.
C	-1.397190	1.17418	-1.189981	0.2431
D(LGDP)	6.111300	2.413006	3.703809	0.0264
D(LEXR)	0.149318	2.705123	0.055198	0.9563
D(INT)	-0.045711	0.188898	-2.241988	0.0303
D(LPUV)	0.699589	0.340920	2.057650	0.045
POD	0.953258	1.791877	0.53190	0.5985
ECT (-1)	-0.27475	0.088071	-30.068154	0.0162

Source: Author Computation Using E-View 8.0, $R^2 = 0.8940557$, DW = 1.877.

The novelty of the error correction mechanism (ECM) is that it provides a framework for establishing the link between long and short – run approaches to economic modeling. Thus, the ECM incorporates both the short – run dynamics and long – run information through error correction terms. A careful examination of the parsimonious results shows that the error correction terms is well specified as it has the expected a priori negative sign and is statistically significant. The existence of a well specified error correction model indicates how the production/manufacturing sector adjusts unanticipated changes in manufacturing output in this case, about 27 percent on the average. This means that about 27 percent of disequilibrium in aggregate manufacturing output is corrected within a year. The nature of the distribution of the error term indicates that it is stationary. This means that the combination of dependent and explanatory variables shows co integration. The existence of co-integration provides further validity of the regression results (Nyong, 1995, Engle and Granger, 1987, Domowitz and Elbadawi, 1987). A priori expectations about the signs of the parameters were met in all the variables and were also statistically significant at 5 and 10 per cent levels. There were no indications of serial correlation, as shown by the value of DW (1.877).

The negative sign on the coefficient of interest rate (proxy for prime lending rate) is consistent with the a priori expectation. Thus, suggesting that the monetary authorities (CBN) responded to adverse changes in the aggregate interest rate by reducing the MPR – Monetary Policy Rate. The correct a priori sign of interest rate also suggested that Central Bank of Nigeria (CBN) cares about financial market stability through appropriate monetary policy. This agrees with available statistical evidence that interest rate remained relatively stable especially from 2000 to 2005 with 23 percent on the average. The exchange rate variable has the expected a priori sign and is statistically significant at 5 percent level. This indicated that the monetary authorities reacted to depreciation in the domestic currency in the foreign exchange market by adopting restrictive credit expansion. The public investment/capital expenditure variable has the expected a priori sign and is also statistically significant at 5 percent level. This indicates that government

expenditure through the various reforms measures is yielding result which is also confirmed through the positive and expected sign of the Gross Domestic Product (GDP), proxy for gross fixed capital formation. Meanwhile, the POD (Political Disturbance) variable has a positive sign in contrast to the a priori sign. This does not signify estimation bias rather it indicates the efficacy of the policy measures to cushion the effect of the disturbance on the economy.

5 Conclusion and Policy Recommendation

This study explored the determinants of private investment in Nigeria's manufacturing subsector for the period 1975 to 2013. From the empirical results, it was observed that the variables of AMCU, LGDP, LEXR, INT and LPUV were all stationary at levels, while the co-integration results indicated that there are at least four significant co-integrating vectors, suggesting the presence of co-integration. Also a careful examination of the parsimonious ECM result showed that the error correction term is well specified as it has the expected a priori negative sign and statistically significant. The correct a priori sign of interest rate suggests that Central Bank of Nigeria (CBN) cares about financial market stability through appropriate monetary policy; also the exchange rate variable has the expected a priori sign and is statistically significant at 5 percent level. The public investment and capital expenditure variable has the expected a priori sign and is also statistically significant at 5 percent level. Finally, the political disturbance variable has a positive sign in contrast to the a priori. This indicated the efficacy of the policy measures to cushion the effect of the disturbance on the economy. The variable of LGDP, LEXR, INT, and LPUV influences the dependent variable of AMCU. Nonetheless, giving the industrial development stage of the country, the government still has a crucial role to play even within the framework in which the private sector remains the engine of growth. This is so because government maximizes national objectives but the objective of the private sector may be quite different from that of the government.

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