Macroeconomic Determinants of Manufacturing Investment in Nigeria, 1979 to 2000

Ugboma, Ebele Patricia **Onochuku Okechuku Ph.d
*Department of Economics University of Port Harcourt Choba, Nigeria

ABSTRACT

The crucial role of manufacturing towards the industrial development of an economy has motivated successive Nigerian governments to take various measures aimed at boosting manufacturing. However, despite all this, the sector remained weak as exemplified by its meagre contribution to the GDP. This raises serious questions as to what factors that account for the investment behaviour in the Nigerian economy. The purpose of this work is to empirically investigate the investment behaviour in the Nigerian manufacturing sub-sector and to identify some of the macroeconomic variables that influence investment demand in the economy.

Apriori knowledge shows that private investment is influence by such factors interest rate, the level of income, inflation rate, the market size etc. in developing countries it is also believed that government expenditure, size of external debt, exchange rate and the availability of foreign exchange impinge on private investment demand. This is why economist believes that is a multivariate function. It is against this background that this study is undertaken to determine which of these factors adequately explain the private investment behaviour in the Nigerian economy.

Using the econometric tool of regression analysis the result revealed a strong correlation between the independent and dependent variables. With the exception of interest rate and public investment all the other variables conformed to economic theory. On the whole 99.9% variation in manufacturing investment in Nigeria is explained by the model. However, the income variable peroxide by GDP accounts for about 96% variation, the other regressors explain about 3.9% of the variation while the remaining 0.1% could be explained by other variables not included in the model. The study therefore concludes that the model developed provides a good understanding of investment behaviour in Nigeria's manufacturing sub-sector.

It is therefore recommended that government should embark on policies that

would reduce inflationary rate, external borrowing and attract more foreign direct investment into the domestic economy. Finally, the government should de-emphasize the role interest rate as a source of engendering investment demand in the Nigerian economy.

INTRODUCTION

After a phenomenal growth in the 1970s the manufacturing sector in Nigeria slumped in the early 1980s and has remained so to the present. This is usually attributed to the collapse of the international oil market following the 1980 83 worldwide recessions. As oil earning plummeted, shortage of foreign exchange resulted in scarcity of raw materials and other manufacturing inputs that were imported from abroad. This resulted in under capacity utilization, industrial closures and short time factory operations with consequent labour retrenchment. To shore up the crumbling economy which was made worse by bad macroeconomic and financial management, the Federal government in 1982-83 adopted a number of austerity measures. Import licensing became necessary to ration scarce foreign exchange. The inefficient administration of the various policies further compounded the problems of industrial sector.

With the glut in the oil market which affected Nigeria's balance of payment, there was then a need to change the policy stance. The structural adjustment programme was then introduced in 1986 as a response to this deepening crisis of the Nigerian economy which required structural changes to turn the situation around. And with this, industries were now required to source their raw materials locally. Manufacturing has been regarded, as the key to the industrial development, needed to stimulate rapid growth and development of the domestic economy. The concerted efforts at developing the manufacturing sector were premised on the hope that it would help to generate employment opportunities, create greater sectoral linkages, diversify the economy, increase foreign exchange earnings, enable local labour to acquire skills, lead to the fullest utilization of available resources and minimize the risk of over dependence on foreign trade. Because of the crucial role of manufacturing, successive Nigerian governments have designed and implemented several measures to boost manufacturing activities in the economy. Some of the measures include tax holidays for small scale manufacturing outfits, credit incentive measure, tariff protection, free repatriation of vested capital profits and dividends, industrial estate and non-nationalization of foreign private enterprises etc.

Despite government' efforts at supporting the sector over the years, the manufacturing sub-sector in the Nigerian economy has remained weak, ineffective, and is heavily import dependent. Its' share of GDP has remained below 10 percent over the years. Besides the sector is a net user of foreign exchange earnings while its contribution to same is grossly insignificant. What is responsible for this poor performance? Could it be that the sector has not attracted enough investment? Or could it be that the sector failed to respond to the investments channelled into it? What factors actually determine the amount of investment going into this sub-sector? It is therefore necessary to explore the investment behaviour in the sector and identify the different variables that influence investment in this sector give in particular the continued emphasis on the sub-sector in the struggle for industrialization, and development in Nigeria. This work attempts to examine some of the issues involved.

The major objective of this paper is to empirically investigate the determinants of private investment behaviour in the Nigerian Manufacturing sub-sector using time series data from 1979-1998. it is the intention of this paper to examine the relationship between investment in the sector and some macroeconomic variables like income, inflation rate, foreign capital, interest rate, market size, external debt, public investment etc.

Operationally, the study employed the econometric method of multiple regression analysis as the main tool to ascertain and estimate the relationship between investment and some selected explanatory variables. We relied on secondary sources of data in this study which were mainly generated from Central Bank of Nigeria publications, World Bank issues, Federal Office of Statistics as well as other published and unpublished works.

The rest of the paper is organised as follows: Section 2 shall examine the literature review and Theoretical Framework, in section 3 an empirical examination of the study is carried out, and finally section 4 concludes the paper.

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

The role of investment in the growth and development of the economy has been recognised by economists even from the period of Adam smith.

Accordingly various attempts have been advanced to try to understand investment, the factors that encourage it and other issues relating to it. Thus in the literature we come across various theories/explanations of investment. For instance we have the classical theory of investment, Keynsian theory, the Neoclassical theory, the accelerator theory etc.

Apart from these, other explanations have also been offered by other economists. For instance there is the works of tobins 1969, Soludo 1998, Boorman 1977, Atkinson 1991, Cambell, Stanley 1990, Greene and Villanueva 1990, Rahman et al 1968, Lall and Stanley 1990, Greene and Villanueva 1990, Rahman et al 1968. Lall and Streeten 1977 among others.

Soludo (1998), posits that it is not only that a given investment should be profitable by today's calculations, an investor also wants the basis for the calculation to remain fairly stable over time. Wherever the socio-political and economic environment is high volatile an investor is better off exercising his option to wait, on the other hand he might decide to invest on those projects whose cycles are very short and can easily be undone. He also asserted that while the maintenance of the macroeconomic stability, avoidance of over-valued exchange rates and export orientation are critical for the resurgence of investment they are necessary but not sufficient conditions.

Greene and Villanueva (1990) suggested that a higher rate raises the real cost of capital and therefore dampens the level of private investment. On the other hand poorly developed financial markets in these countries and inadequate access to foreign financing for most private projects implies that private investment is constrained largely by domestic savings. Brooman (1977) opined that interest rate does not have any impact or short term investment; he says that if the investment has a year yield in time, a change in interest will have a less impact on its present discounted value (PDV) and son on investment. But Atkinson (1991) argued that interest rate plays a very important role in determining the amount of investment project and hence the desire to invest depends on interest rate. For him interest rate impacts on investment through the present discounted value of a future stream of expected receipts.

The level of income is an important factor that influences investment behaviour. Economists have argued that income level is positively related to private investment activity because higher income countries are better able

to devote resources to savings hence investment. Also the accelerator theory stated that investment is positive function of income.

Profit expectation is the possible expectable yield which makes the present value of expected net returns equal to the purchase price such that subtracting future costs from future revenue yields the net returns. What can alter the yield of any investment is change in the following components; purchase price; future revenues and future cost (Onuchukwu 1999). Unlike the classical economists however, Keynes opined that profit expectation from future economic activity on the part of businessmen was the most important determinant of investment behaviour. Businessmen's optimism about future economic activity will prompt them to carry out their investment decision, the rate of interest not withstanding.

Cambell and Stanley (1990) asserts that profit expectations on investment project will affect aggregate demand. The argued that improved profit expectations and investment projects will increase the demand for capital goods and thereby shift the aggregate demand curve rightward for instance anticipated rise in spending by consumers may in turn improve the profit expectations of possible investment projects and vice versa. The Mundell model in Akpokodje (1998) reveals that high rate of inflation lowers the real interest rate thereby moving portfolio adjustments away from real money balances towards real capital. Therefore a high rate of inflation is expected to induce higher real investment.

However, in Nigeria where the capital and financial markets are largely under developed, the Tobin Mundell effect does not apply. Instead a high rate of inflation moves portfolio adjustment from real money balances to real assets thus indicating that a high rate of inflation in Nigeria lowers private investment (Akpokodje 1998).

Though it has been posited that foreign capital inflows discourage domestic savings (Rahman 1968 et al) it is advanced that foreign capital makes net contributions to investment in developing countries. Thus the use of foreign capital has also featured in the determination of investment behaviour.

Lall and Streetem (1977) posit that foreign capital raises income and some welfare in the recipient country thereby encouraging domestic and foreign competition through which domestic entrepreneurs are trained. Healey (1971) argued that lack of finance and foreign exchange are factors military

against domestic investment.

Ajayi (1995) observes that for Nigeria the existence of huge external debt has led to capital flight from Nigeria and has precluded new investment from coming in. Mirakhor and Montiel (1987) demonstrate that if substantial external debt leads to difficulties in meeting debt-service obligations, relations with external creditors may deteriorate, thus reducing the amount of trade financing a country can obtain. Oshikoya (1994) have found out increases in the debt service ratio dampens private investment.

Ekpo and Egwaikhide (1998) observed that public investment directly influences private investment behaviour though the effect is far from being significant even at 10 percent level. Public investment on infrastructures has attracted a shrunk budget overtime, with low complementarity between public and private investment as the inevitable concomitant.

Oshikoya (1994) has found a negative impact of the real exchange rate on private investment which Chete and Akpokodje (1997) confirm a negative relationship between the real exchange rate and private investment. Jhingan M.L. (1997) observed that a rapidly growing population means a growing market for all types of goods which naturally induce investment since large markets presuppose quick turnover.

The literature on the theories of investment behaviour is legion. The accelerator theory states that an increase in the rate of output of a firm will require a proportionate increase in its capital stock. It emphasises the relationship between the capital stock and the flow of output, which is know as the capital output ratio. Hence the accelerator principle is a basic Keynesian model of investment.

$$K^*t = vYt$$
$$K^*t = K^*t\text{-}1 = v(Yt\ Yt\text{-}1)$$
$$Int = v(Yt\ Yt\text{-}1)$$
$$= v\Delta Yt$$

Where $\Delta Yt = (Yt\ 1)$ and Int is net investment.

However in the modern dynamic world the capital output ratio cannot be constant due to inventions and improvement in technology. The marginal efficiency of capital (MEC) defines the relationship between the capital stock and the rate of return on the aggregate capital stock. Glahe (1977) states that the marginal efficiency of investment (MEI) is the relationship between the internal rate of return and the addition' to capital stock.

Therefore the marginal efficiency of any asset shows what a firm expects to earn from acquiring one asset as compared to the cost of that asset, hence MEI defines the maximum rate of interest the firm is willing to pay to obtain loans for an investment project.

The Neoclassical Investment theory usually variant of the "accelerator models is one in which the representative firm maximizes expected future profit, and investment decisions are made if the discounted returns of a unit of capital exceeds its replacement cost hence investment is linearly dependent on changes in output, expected returns on investment and cost of capital (Soludo, 1998).

A variant of the traditional framework is that of Tobin (1969) which focus on the capitalized value of the marginal unit of capital relative to its replacement. Central to these neoclassical framework is a convex cost function to its replacement. Central to these neoclassical framework is a convex cost function in the process of adjusting to the desired capital stock. Thus in the Neoclassical world such investments whose expected benefits exceed the cost should be undertaken. Jorgenson Neoclassical theory of investment do not clarify how the actual capital stock adjusts the optimal capital stock.

However recent empirical studies extend the neoclassical model by incorporating considerations of irreversibility, uncertainty, political and country risks. Besides the political and external risks (External debt, and term of trade) is the policy induced risks and uncertainties. Which constitute the major reason for investors to wait. The logic of this argument is that even though a country might be liberalizing it is ultimately the investor's perception of risks associated with the variability rather than levels of key macroeconomic variables (especially relative prices) that matter most in vestment response since very investment is gamble into the future an investor would want to minimize risk associated with a particular investment.

3.0 DATA PRESENTATION AND ANALYSIS

In this section we intend to carry out the investigation of the extent to which our selected variables explain investment behaviour in the Nigerian economy and in the sub-sector that is our concern. The variables we are interested in include income proxied by GDP, inflation rate, interest rate, foreign capital, external debt, public investment proxied by government capital expenditure, and market size proxied by population.

Table 3.1

Years	Investments (N million)	Income (GDP)	Inflation rate (%)	Foreign capital (N million)	Interest rate (%)	External Debt (N million)	Public investment (N million)	Market size
1979	387.0	41,947.7	11.8	1402.5	9.17	1611.5	8379.1	8348171
1980	794.9	49,632.2	9.9	1503.9	8.5	1866.8	1065.1	8114401
1981	830.9	50,456.6	20.9	1705.7	9.17	2331.2	6564.2	79727121
1982	856.4	51,570.3	7.7	1922.5	9.92	8819.4	7998.0	78556196
1983	983.0	56,709.8	23.2	2128.1	10.14	10577.7	6807.3	80563196
1984	1004.2	63,006.2	39.6	2109.3	10.83	14808.7	4634.6	82621000
1985	1094.3	71,368.1	5.5	2278.1	9.83	17300.6	6516.4	84885728
1986	1226.5	72,128.2	5.4	2810.2	11.0	41452.4	5445.9	85022712
1987	1314.5	106,883.2	10.2	3122.3	18.56	100789.1	14,759.4	86689546
1988	1614.2	142,678.3	38.3	3637.0	17.13	1339563	10588.6	86583482
1989	2298.2	222,57.6	40.9	5406.4	25.76	240393.7	9291.1	87078480
1990	2984.1	257,873.0	7.5	6339.0	26.4	298614.4	255.6	88775353
1991	3497.2	320,247.3	13.0	8693.4	20.44	328054.3	13085.4	851498
1992	3806.1	544,330.7	44.5	9746.3	30.6	544264.1	15975.9	92737284
1993	5513.4	691,600.0	57.2	12885.1	31.16	633144.4	18600.0	99566775
1994	6775.7	911,070.0	57.0	14059.9	21.0	648813.0	31000.0	104047279
1995	28615.8	1,960,690.0	72.8	27668.8	20.48	716865.6	44559.0	108729406
1996	42,923.4	2,740,460.0	29.3	29814.2	203	617320.0	48000.0	114057147
1997	44003.1	2,834,800.1	15.1	31297.2	18.43	595913.9	115990.0	11964547
1998	na	2,721,510.0	7.9	na	19.88	633017.0	184,719.5	2359263
1999	na	2,931,411.00	14.1	na	20.6	643018.2	193,564.3	24583421
2000	na	2973452.00	14.0	na	19.7	705623.1	201,234.6	26345682

Source: CBN Statistical Bulletin various issues, FOS Annual Abstracts.

Nat Not available.

THE MODEL

We specify below a behavioural model of private investment spending in Nigeria's manufacturing sector.

$$IVM = b_0 + b_1 INC + b_2 Inf + b_3 Foc + b_4 R + b_5 ED + b_6 PI + b_7 MZ + u$$

Where

Ivm	=	Investment in manufacturing
Inc	=	Income
Inf	=	Inflation rate
Foc	=	Foreign capital
R	=	Interest Rate
ED	=	External Debt
PI	=	Public Investment
Mz	=	Market size
U	=	All other variables not included in the model.

And $b_1>0, b_2>0, b_3>0, b_4<0, b_5<0, b_6>0, b_7>0$

THE REGRESSION RESULT AND DISCUSSION

Table 3.2 Regression Results.

The regression result are presented as follows:

Ivm = 3.1 + 5.285 Inc 547.7 Inf + 1389.9 Foc + 263155.IR 36.614 ED 39.553PI + 0.323MZ

T(bi)	(-3.67)	(4.36)	(-0.33)	(8.52)	(4.08)	(-9.34)	(-1.76)	(3.09)
S(bi)	(8.56)	(1.21)	(16.79)	(1.63)	(6.45)	(3.92)	(22.52)	(0.12)

R = 0.999, R2 = 0.997, R 2 = 0.996, F-ratio = 6033.7, DW = 2.46

The regression result shows that the degree of correlation between the dependent (Ivm), and each f the independent variables (Inc, Inf, Foc, R, ED, PI, and Mz) is about 99 percent implying a strong relationship between the regress and the regressors. Also with the coefficient of determination R2 of 0.997 indicates that about 99 percent variation investment in the manufacturing sector in Nigeria is explained by the model during the period 1979 1998. the remaining less than 1 percent could be explained by other variables not included in the model. Hence variations in the level of investment in the manufacturing sector is greatly explained by variations in each of the repressors.

Apart from interest rate and public investment all the other regression coefficients appeared with their correct signs.

The regression coefficient of income (proxied by GDP) appeared with correct sign; this is in line with our apriori expectation that national income is positively related to investment. Also with a t-ratio of 4.35 national

income was statistically significant in explaining variations in investment. From the result of the regression, inflation has a negative relationship with investment because the regression coefficient appeared with negative sign (correct sign). The t-value of -0.33 shows that the coefficient of inflation variable is not statistically significant at the 5 per cent level hence the variable though it exact negatively on investment has no significant impact on investment in the Nigerian manufacturing sector within the period under review. The result is in agreement with Tobin Mundel model which states that high rates of inflation is expected to induce high real investment.

The regression result shows that foreign capital appeared with the correct sign (positive) and with a t-ratio of 8.52 the coefficient of foreign capital variable is statistically significant in explaining the variation in manufacturing investment in Nigeria within the reference period. However, the high t-ratio of foreign capital could be as a result of effect of multicollinearity between it and inflation, and interest rate. Since a high interest rate combined with low inflation rate could result in increased inflow of foreign capital.

Interest rate appeared with a positive sign. Implying that it has a positive relationship with investment this does not conform to economic theory. However, in recent times research has shown that the theory is true for advanced countries and does not work like that in the third world economies. This is not to say that a high interest rate attracts a high level of investment rather it can be inferred that it is not a major determinant of investment rather it can be inferred that it is not a major determinant of investment decision in the manufacturing sub-sector of the Nigerian economy. In fact, as long as the level of expected profit is high investors will be willing to invest the level of interest rate notwithstanding.

It is revealed from the regression result that debt service ratio has a negative sign which is in conformity with economic theory but the t-test shows that it is not statistically significant in explaining the variations in private investment in the manufacturing sector within the period under review.

The coefficient of public investment, a variable used as a proxy for government expenditure appeared with a negative sign and also was not statistically significant. Though the result does not conform to theory however it is in agreement with Bogunjoko's (1998) assertion that using "a single equation whereby public investment has a direct relationship with

private investment the former acts as a stimulant to the latter but given a recursive model public investment may adversely affect private investment through the credit rationing effect. and it is evident that within a recursive model the net contribution of public investment in Nigeria indeed crowds out provide investment". From the result, the coefficient of market size a variable used as a proxy for population appeared with correct sign (positive) indicating that population growth is positively related to investment hence the higher the population the higher the level of investment. This informs investor's willingness to invest in the Nigerian manufacturing sector because of the nation's high population which necessitates big market for goods and services.

4. SUMMARY, CONCLUSION AND RECOMMENDATION

4.1 SUMMARY AND CONLCUSION

In this study, we tried to estimate the relationship between investment demand and some selected macroeconomic variables income, inflation rate, foreign capital interest rate, external debt, public investment and market size.

The result shows that we able to explain about 99.9 percent (R =99.9%) of the systematic variations in manufacturing investment in the Nigeria economy during the reference period. The R2 of 99.7 percent (which reinforces the multiple R) also shows a strong relationship between the dependent and independent variables. In this case it shows that there is a very strong relationship between investment in the manufacturing industry and the selected explanatory variables. Again, the F-ratio of 603.4 is highly significant implying that the entire model is significant in explaining variations in manufacturing investment demand in Nigeria within the reference period thus the hypothesis of a significant linear relationship between the seven regressors and the regressand is validated. The Durbin-Watson statistic of 2.46 indicates a minimal serial correlation.

Out of the seven independent variables five of them appeared with correct signs with the exception of interest rate and public investment which appeared with wrong signs. Moreover, the result shows that with the exception of inflation rate. external debt and public investment all other regressors in the model exact significant influence on investment demand in the Nigerian manufacturing sector.

It is evident from the result that the influence of interest rate on investment

behaviour is rather exaggerated this confirms Isegbeoma's (1996) result that interest rate is no longer a basic consideration in investment decision making and that previous policies made in Nigeria based on interest rate theory with respect to investment is a misconception and should be reviewed.

The study also confirms that the contributory effect of public investment on private investment may have been exaggerated with the accelerator theory. as Bagunjobo puts it that "within a recursive model the net contribution of public investment in Nigeria crowds our private investment".

Finally, we used stepwise technique to precisely measure the negative importance of each of the independent variables in explaining the variability in manufacturing investment within the reference period. The stepwise result reveals that of all the regressors; the income variable proxied by GDP accounts for about 96 percent (R2 = 96 percent) variation in manufacturing investment within the period under review, the other regressors explain about 3.9 percent of the variation while the remaining 0.1 percent could be explained by other variables not included in the model.

The study therefore concludes that the model developed provides a good understanding of investment demand in the manufacturing sub-sector in Nigeria.

4.2 RECOMMENDATION

Based on the result obtained, we recommend that:

i. Since income impacts much on investment, the government should fashion out measures to alleviate the poverty level in Nigeria and increase the real income of the populace by creating more job opportunities for the citizenry which will raise aggregate demand and invariably investment demand will be equally raised via the multiplier.

ii. Government should endeavour to identify those macroeconomic policies that are capable of reducing inflection; a cautious approach to external borrowing, a reallocation of public expenditure towards investment project supportive of private sector activity. Moreover, the government should de-emphasize the overwhelming role of interest rate in her policy formulation and rather embark on policies that would not only reduce inflationary rate but such that would attract more foreign private investment into the domestic

economy.

iii. The result of this research mainly explains variations in the manufacturing sub-sector in Nigeria. it is important that the time frame should be extended to cover a longer period as this will go a long way to authenticate the result.

References

Anyanwu, J.C. and Oaikhenam H.E. (1995) "Investment Expenditures and Income Determination". Modern Macroeconomics: theory and Applications in Nigeria. Joanee publishers Ltd.

Ajayi S.I (1995). "Capital flight and External Debt in Nigeria". African Economic Research Consortium, Research paper 35.

Atkinson, L.C (1991). Economics: The Science of Choice. Cambridge Irvin publications.

Bogunjoko, J.O (1998). "Private and Public Investment Nextus. Growth and Policy Reforms in Nigeria". Rekindling Investment for Economic Development in Nigeria. NES Publication.

Brooman, F.S. (1977). Macroeconomics (6th ed). London. George Allen and Unwin.

Ekpo A.H. and Egwaikhide F. (1998): "Private Investment and External Debt. The Nigeria Journal of Economic and Social Studies. NES vol 40, No 1.

Greene and Villanueva (1990). Determinates of Private Investment in LDCs". Finance and Development. publication of the IMF and World Bank. December 1990. pp 40-42.

Clahe F.R (1977). Macroeconomics Theory and Policy. Harcourt Brace Jovanovich publishers. 3rd Edition.

Healey J. (1977): "The Economic Policy toward LDCs". London. Georgen Allen and Unwin Ltd.

Isegboma D.T (1996). "Some Determinants of Investment in the

Manufacturing Industry in Nigeria 1970-1994)" Unpublished M.Sc. Thesis. University of Port Harcourt, Choba.

Jorgenson, D.W. (1967); "The theory of Investment Behaviour. In: Determinants of Investment Behaviour. Farber, R.ed. New York: National Bureau of Economic Research.

Lall and Streeten P. (1977), "foreign Investment" Transnational and Developing Countries. London. Macmillan Press.

Mirakhor, A. and Montiel P. 91987), "Import Intensity of Output in Developing Countries; 1970-85" Staff Studies for the World Economic Outlook; World Economic and Financial Survey Washington, IMF, August 1987.

Onuchukwu O. (1998) "An Econometric Study of Public Investment Behaviour in Nigeria (1970-1994), Unpublished Ph.D Thesis university of Port Harcourt, Choba.

Oshikoya T. (1994) "Macroeconomic Determinants of Domestic Private Investment in Africa". An Emperical Analysis, Economic Development and Cultural Change, vol. 42 No.3.

Rahman A. (1968), "Foreign Capital and Domestic Savings: A Test of Haavehomo's hypothesis with cross-country data". Review of Economics and Statistics. 50pp13.