

*Full Length Research Paper*

# The effect of exchange rate fluctuations on the Nigerian manufacturing sector

Opaluwa David<sup>1</sup>, J. C. Umeh<sup>3</sup> and Abu A. Ameh<sup>2\*</sup>

<sup>1</sup>Department of Economics, Benue State University, Makurdi, Nigeria.

<sup>2</sup>Department of Agricultural Management, Benue State University, Makurdi, Nigeria.

<sup>3</sup>Department of Business Administration Kogi State University, Anyigba, Nigeria.

Accepted 24 September, 2010

**This paper examines the impact of exchange rate fluctuations on the Nigerian manufacturing sector during a twenty (20) year period (1986 – 2005). The argument is that fluctuations in exchange rate adversely affect output of the manufacturing sector. This is because Nigerian manufacturing is highly dependent on import of inputs and capital goods. These are paid for in foreign exchange whose rate of exchange is unstable. Thus, this apparent fluctuation is bound to adversely affect activities in the sector that is dependent on external sources for its productive inputs. The methodology adopted for the study is empirical. The econometric tool of regression was used for the analysis. In the model that was used, manufacturing output employment rate and foreign private investment were used as the explanatory variables. The result of the regression analysis shows that coefficients of the variables carried both positive and negative signs. The study actually shows adverse effect and is all statistically significant in the final analysis. Some recommendations for policy were made based on the findings. Amongst others is the need to strengthen the link between agriculture and the manufacturing sector through local sourcing of raw materials thereby reducing the reliance of the sector on import of inputs to a reasonable level.**

**Key words:** Nigeria manufacturing sector, exchange rate, fluctuations.

## INTRODUCTION

Following the fluctuation of the Naira in 1986, a policy induced by the Structural Adjustment Programme (SAP), the subject of exchange rate fluctuations has become a topical issue in Nigeria. This is because it is the goal of every economy to have a stable rate of exchange with its trading partners. In Nigeria, this goal was not realized in spite of the fact that the country embarked on devaluation to promote export and stabilize the rate of exchange. The failure to realize this goal subjected the Nigerian manufacturing sector to the challenge of a constantly fluctuating exchange rate. This was not only necessitated by the devaluation of the naira but the weak and narrow productive base of the sector and the rising import bills also strengthened it. In order to stem this development and ensure a stable exchange rate, the monetary authority

put in place a number of exchange rate policies. However, very little achievement was made in stabilizing the rate of exchange. As a consequence, the problem of exchange rate fluctuations persisted throughout the study period.

In macroeconomic management, exchange rate policy as an important tool derives from the fact that changes in the rate of exchange have significant implications for a country's balance of payments position and even its income distribution and growth. It is not surprising since its behaviour is said to determine the behaviour of several other macroeconomic variables (Oyejide, 1985). It is even more so for Nigeria which had embarked on a course of rapid economic growth with attendant high import dependency.

The manufacturing sector plays a catalytic role in a modern economy and has many dynamic benefits that are crucial for economic transformation. In an advanced country, the manufacturing sector is a leading sector in

\*Corresponding author. E-mail: [castroy2k2005@yahoo.com](mailto:castroy2k2005@yahoo.com).

many respects. It is an avenue for increasing productivity in relation to import substitution and export expansion, creating foreign exchange earning capacity, raising employment, promoting the growth of investment at a faster rate than any other sector of the economy, as well as wider and more efficient linkage among different sectors (Fakiyesi, 2005). But the Nigerian economy is under-industrialized and its capacity utilization is also low. This is in spite of the fact that manufacturing is the fastest growing sector since 1973/74 (Obadan, 1994). The sector has become increasingly dependent on the external sector for import of non-labour input (Okigbo, 1993). Inability to import therefore, can impact negatively on manufacturing production.

Oyejide (1985) posited that the breakdown of the Bretton woods System induced variability in the rate of exchange worldwide; Nigeria inclusive. Umubanmwun (1995) has noted the adverse consequence of this on ability to import. Devaluation which further aggravates the situation has not significantly affected economic performance in the positive direction in Nigeria (Ojo, 1990). The impact of fluctuations in exchange rate on manufacturing output had not received adequate attention. This paper attempts to give attention to the issue.

## **THEORETICAL FRAMEWORK FOR EXCHANGE RATE FLUCTUATIONS AND MANUFACTURING OUTPUT**

The monetary and traditional flow theory serves as the theoretical basis for this study. The monetary approach to exchange rate determination postulates that the relative supply of and demand for money between two countries is the basis for the determination of exchange rate. It views increase in the supply of money as being able to generate inflation, hence, resulting in exchange rate depreciation. The model opines that a situation of falling prices with a given nominal money supply results in exchange rate depreciation, while the traditional flow model is essentially based on the principle of the interplay of demand and supply. The forces of the market (interaction between demand and supply) determine the rate of exchange. However, when there is speculation or expectation of a change in the rate of exchange, this could lead to the disequilibrium even without any change in the initial determined factors.

Exchange rate can adversely affect the ability to import and therefore manufacturing output. Fluctuations in exchange rate will cause instability in purchasing power and hence, negatively impact on investment in import of manufacturing inputs. On the other hand, the effect on manufacturing output and overall income level will also affect investment in import of inputs and invariably the exchange rate. This is because among the determining factors of the rate of exchange are the demand for foreign exchange, the supply itself being influenced by an economy's productivity level.

## **LITERATURE REVIEW**

Perhaps one of the greatest development challenges that have confronted Nigeria since 1986 when the fixed exchange rate system was abolished and replaced with the flexible exchange rate system is the designing of policy measures to enhance exchange rate appreciation in Nigeria. This is particularly the case after the abysmal failure of the Structural Adjustment Programme (SAP) devaluation policy package designed to aggressively promote export in Nigeria.

Nigeria being an import dependent nation particularly for here capital goods and considering the centrality of the rate of exchange of such a country's currency to her trading partner's currency, a good number of writers have expressed their interest and position on this important subject. Interest in this area has significantly increased over the years as being generated by the fluctuations and the depreciating nature of such an important economic variable as well as its effect on other sectors of the economy. More recent data provided by Ekanem (1997) show that manufacturing companies are operating below 40% capacity and they are import dependent. For several years, the manufacturing sector has concentrated basically on the import of raw materials. This seems to be attributable to the overcrowding of this important sector of the Nigerian economy by multinational corporations. As a result, this sector has been deviled by high interest rates, rising inflation, naira depreciation, foreign shortages and consumer's strong resistance to local products. Olisadebe (1991) expressed that the naira exchange rate given its macroeconomic impact especially Nigeria is perhaps one of the most widely discussed topic today. According to Olisadebe (1991), one worrisome development in the naira exchange rate in recent years, especially since the introduction of the Structural Adjustment Programme (SAP) in 1986 is that it has continued to depreciate as a result of which some people have called for fixing of the exchange rate even at par with the United States dollar. On the equilibrium of exchange rate, the author remarked that such rate ensures the simultaneous attainment of internal and external balance.

## **THE MODEL**

Neither foreign exchange nor the rate of exchange, stable or otherwise can influence output of the manufacturing sector alone. Two other variables: Manufacturing's employment rate and foreign private investment play important role. The model in its implicit form is given as:

$$MGDP = f(MER, MFPI, EXR) \dots \dots \dots (1)$$

$$MGDP = a_0 + a_1 MER + a_2 MFPI + a_3 EXR + e_1 \dots \dots \dots (2)$$

Where MGDP is Manufacturing's Gross Domestic Product (output, Q); MER is Manufacturing's Employment Rate; MFPI is Manufacturing's Foreign Private Investment (Manufacturing Sector's share of Foreign Private Investment), and EXR is

**Table 1.** Regression result.

| Variable                      | Coefficient | Std. error    | t-statistic | Probability |
|-------------------------------|-------------|---------------|-------------|-------------|
| MER                           | 0.313976    | 0.042444      | 7.397509    | 0.0000      |
| MFPI                          | -0.014803   | 0.011924      | -1.241484   | 0.2335      |
| EXR                           | -8.79000    | 8.95007       | -0.982238   | 0.3416      |
| R <sup>2</sup> = 0.785329     |             | DW = 1.924676 |             |             |
| S. E = 0.722545 of regression |             | F = 18.29     |             |             |

Dependent variable: MGDP.

Exchange Rate (parallel).

It is therefore, expected that

$$MGDP = b_0 + b_1 \text{ MER} + b_2 \text{ MFPI} - b_3 \text{ EXP } e_2 \dots \dots \dots (3)$$

Where the variable remains as previously defined.  $b_0$ ,  $b_1$ ,  $b_2$  and  $b_3$  are parameters to be estimated.

The signs attached to the parameters are informed by theoretical consideration. Employment rate and foreign private investment are expected to impact positively on manufacturing output and exchange rate and the attendant fluctuations leave a negative effect.

## ANALYSIS OF RESULTS

Using data from 1986 to 2005, the model specified above has been estimated using e-views software package. The initial result appeared spurious and suggested the presence of autocorrelation. A satisfactory result was obtained from first difference MGDP (output) using the Augmented Dickey – Fuller (ADF) test of stationary at 1% critical value. The estimated result is presented in Table 1.

The DW shows that the autocorrelation has been removed at the second order auto regression. The signs attached to the parameter estimates conform with the a prior expectation and are statistically significant. The coefficient of determination ( $R^2$ ) at 79% indicates a high causal relationship between the dependent and independent variables. This suggests that 79% of the changes in the manufacturing's GDP are explained by changes in the manufacturing's employment rate, foreign private investment and exchange rate. The remaining 21% are explained by variables not included in the model. The standard error is 0.72 showing that some level confidence can be placed on the estimates. The F-value is 18.29 showing a significant difference between the variance of estimates and the variance of the independent variables. The t – value for regression coefficient is negative except employment rate and is statistically significant. With regards to employment rate in manufacturing, it shows that manufacturing output (GDP) changes by as much as 0.31 units in response to a unit change in employment rate. In elasticity terms,

manufacturing output's responsiveness to change in employment is less than unity. In other words, it is not highly employment elastic. One reason for this low degree of elasticity may be explained by the fact that Nigeria is blessed with a large pool of human resources but not properly utilized in terms of human skills.

As for manufacturing's foreign private investment, it shows that a unit change induced 0.01 unit reduction in output of the sector. The increase in investment during the study period did not help improve the manufacturing output due to low capacity utilization at an average of 30%. The exchange rate with its attendant fluctuations exerted the expected negative impact on the manufacturing output. A unit fluctuation induces 8.80 unit reductions in the output of the sector. Manufacturing output response to changes in exchange rate but it is such that a fall in output of the sector results. This is to say that the attendant fluctuation in the rate of exchange create the problem of uncertainty which leaves a negative impact on the sector.

The effects of the findings of this study are obvious. Fluctuations in the rate of exchange are not favourable to economic activities in the manufacturing sector. It was discovered that the performance of the manufacturing sector was affected by factors such as high cost of foreign exchange for procuring raw materials and machineries required for production, availability of financial capital, technological underdevelopment, inadequate socio-economic infrastructure, shortage of technical manpower and foreign domination; following the implementation of exchange rate devaluation; the manufacturing sector has not performed any better because of the influence of the earlier mentioned factors which affect the manufacturing sector performance. There is an inverse relationship between exchange rate fluctuations and the manufacturing sector performance. As exchange rate reduced nominally, the exchange value of the naira appreciates and the manufacturing sector performs better (Table 2).

A comprehensive analysis of Nigerian manufacturing sector would indicate that the sector lacks high-level technological contents. The severe infrastructure problems faced by the country have been singled out as the main factor threatening the sustainability of economic recovery. Among core infrastructure, power is the sector

**Table 2.** Foreign exchange budget/disbursement and manufacturing sector's electricity generation/consumption, value of import of machinery/transport equipment.

| Year | Foreign exchange budget (\$million) | Foreign Exchange Disbursement | Value of import of machinery and transport equipment (NM) | Total electricity generation (mega Watt/h) | Manufacturing sector's electricity consumption | Percentage of total |
|------|-------------------------------------|-------------------------------|-----------------------------------------------------------|--------------------------------------------|------------------------------------------------|---------------------|
| 1986 | 6,844.3                             | 6,481.9                       | 2,277.8                                                   | 1,228.9                                    | 280.5                                          | 33.3                |
| 1987 | 4,974.0                             | 5,270.3                       | 6,827.7                                                   | 1,286.0                                    | 294.1                                          | 34.5                |
| 1988 | 7,104.0                             | 6,306.8                       | 8,900.6                                                   | 1,330.4                                    | 291.1                                          | 34.1                |
| 1989 | 6,479.0                             | 6,729.5                       | 12,362.7                                                  | 1,462.7                                    | 257.9                                          | 26.4                |
| 1990 | 7,489.2                             | 9,076.9                       | 18,515.8                                                  | 1,536.9                                    | 230.1                                          | 25.6                |
| 1991 | 10,369.2                            | 12,427.6                      | 17,926.2                                                  | 1,617.2                                    | 253.7                                          | 26.8                |
| 1992 | 8,998.0                             | 12,328.6                      | 62,158.3                                                  | 1,693.4                                    | 245.3                                          | 24.7                |
| 1993 | 2,232.5                             | 1,855.4                       | 74,579.1                                                  | 1,655.8                                    | 237.4                                          | 20.8                |
| 1994 | 8,130.8                             | 7,792.8                       | 46,232.0                                                  | 1,772.9                                    | 233.3                                          | 21.3                |
| 1995 | 10,697.2                            | 8,096.0                       | 206,905.0                                                 | 1,810.1                                    | 218.7                                          | 20.3                |
| 1996 | 15,500.0                            | 9,763.9                       | 129,404.0                                                 | 1,854.2                                    | 235.3                                          | 22.8                |
| 1997 | 15,266.0                            | 9,995.3                       | 202,956.0                                                 | 1,839.8                                    | 236.8                                          | 23.5                |
| 1998 | 16,036.0                            | 8,591.0                       | 195,956.0                                                 | 1,724.9                                    | 218.9                                          | 22.5                |
| 1999 | 12,139.2                            | 7,818.9                       | 204,392.3                                                 | 1,859.8                                    | 191.8                                          | 21.9                |
| 2000 | 3,034.8                             | 3,589.2                       | 232,075.8                                                 | 1,738.3                                    | 223.8                                          | 22.0                |
| 2001 | 0.0                                 | 14,737.2                      | 327,206.6                                                 | 1,689.9                                    | 241.9                                          | 21.9                |
| 2002 | 0.0                                 | 13,110.2                      | 378,826.5                                                 | 2,237.3                                    | 146.2                                          | 11.5                |
| 2003 | 0.0                                 | 16,314.4                      | 198,815.9                                                 | 6,180.0                                    | 196.0                                          | 12.9                |
| 2004 | 0.0                                 | 15,342.2                      | 458,917.1                                                 | 2,763.6                                    | 398.0                                          | 2.8                 |
| 2005 | 0.0                                 | 24,307.5                      | 543,882.2                                                 | 2,779.3                                    | 182.3                                          | 9.7                 |

Note: Foreign Exchange Budget was discontinued from 2001. Source: National Bureau of Statistics (NBS), 2005; CBN Statistical Bulletin, 2006 and; Power Holding Company of Nigeria (PHCN).

significant impediments to the expansion of manufacturing output. Moreover, weak social infrastructure leading to a lack of skilled labour may be another factor limiting productivity of manufacturing sector in Nigeria. Despite the relative simplicity of their operations, their performances are further exacerbated by lack of auxiliary or feeder industries that could efficiently produce intermediate inputs and spare parts for manufacturing. Feeder industries are particularly important because the potential economies of scale of a new technology are left unexplored because the needed cooperating inputs are unavailable locally or constrained by foreign exchange. On the whole, the manufacturing sector in Nigeria is yet to make a significant impact on the economy by way of its contribution to GDP. Necessary steps need to be taken so as to enable the sector to satisfy national aspiration in the shortest possible time.

## RECOMMENDATIONS FOR POLICY

In order to address the problem of exchange rate fluctuations in the manufacturing sector, and for the sector to meet expectations and contribute significantly to economic growth and development, the following

recommendations will be useful: The need for local sourcing of raw materials and input through agriculture should be intensified. A technological policy aimed at developing a local engineering industry is advocated. By so doing, the link between agriculture and the manufacturing sector will be established, leading to expansion of export base which would attract more foreign exchange into the country. This could culminate into high external reserves build –up and reduce adverse pressure on balance of payment.

Manufacturing activities should be encouraged by government by giving incentives and subsidies to local manufacturers and improving the technological and infrastructure development so as to increase the sector's contribution to Gross Domestic product and employment within the country.

Change in exchange rate management strategy should be allowed to run a reasonable course of time. Jettisoning strategies at will and on frequent basis has implication for exchange rate and obvious consequence for a sector that depends on foreign inputs.

The monetary authority (the Central Bank of Nigeria) should monitor the unethical practices of some commercial bank which have resulted in much fluctuation in the rate of exchange. More stringent punitive measures

have to be taken against the culprit banks.

## Conclusion

The study empirically verified the effect of exchange rate fluctuations on the manufacturing sector. This is against the backdrop of the fact that exchange rate is a crucial variable and the manufacturing sector is expected to be the moving force in the drive towards industrialization. It is observed that the fact that Nigeria is highly dependent on the external sector for import of inputs has made the effect of exchange rate devaluation worse especially in manufacturing because capacity to import was constrained by the depreciating currency leading to a corresponding decline in output. It is pertinent to note that the devaluation of exchange rate in association with factors such as technology and human skills are necessary for a country to be established in the export market which are lacking in the case of Nigeria. The country should therefore, embark on improving basic amenities like electricity, transportation, water supply, telecommunication, human resource development, instead of implementing policies in an unhealthy economic and social structure.

## REFERENCES

- Central Bank of Nigeria (2006). CBN Statistical Bulletin, Vol.8 No.2, December.
- Central Bank of Nigeria (2006). CBN Annual report and Statistical of Account December.
- Ekanem (1997). "Corporate Strategy in the Manufacturing Sector: A survey of selected Companies in Nigeria" Unpublished Ph.D Thesis, River State University of Science and Technology, Port Harcourt.
- Fakiyesi O, Akan'O (2005). "Issues in Money, Finance and economic Management" University Press Lagos.
- Gujarati DN (2005). Basic Economics, McGraw-Hill, India, 5<sup>th</sup> Edition.
- Obadan MI (1994). "Nigeria's Exchange RATE Policy and Management" National Centre for Economic Management and Administration (NCEMA) Monographs Series. No.5, NCEMA Publication, Ibadan
- Ojo MO (1990). The Management of Foreign Exchange Resources in Nigeria CBN Economic and Financial Review, Vol.28, No.3.
- Okigbo PM (1993). "Essays in Public Philosophy of Development, Lectures on The Structural Adjustment Programme, Vol.4, Enugu, Fourth Edition.
- Olisadebe EU (1991). "Appraisal of Recent Exchange Rate Policy Measures in Nigeria", CBN Economic and Financial Review. Vol.29, No.2.
- Opaluwa D (2008). "The Effect of Exchange Rate Fluctuations on the Nigerian Manufacturing Sector 1986 – 2005". An M.Sc Thesis Presented to the Department of Economics, Benue State University, Makurdi.
- Oyejide TA, Ogun O (1995). "Structural Adjustment Programme and Exchange Rate Policy" in Macroeconomic Policy Issues in an Open Developing Economy: A case study of Nigeria. NCEMA Publications, Ibadan.
- Umubanmwun A (1995). Impact of SAP on Nigeria's Industrial Sector, The Nigeria Economic and Financial Review, Vol.1, No.2.