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MANUFACTURING PERFORMANCE IN NIGERIA: IMPLICATION FOR SUSTAINABLE DEVELOPMENT

Olorunfemi Sola

Department of Economics, Adekunle Ajasin University Akungba, Ondo State Nigeria

Tomola M. Obamuyi

Department of Banking and Finance, Adekunle Ajasin University Akungba, Ondo State Nigeria

Felix O. Adekunjo

Department of Economics, Lagos State University, Lagos Nigeria

E.O Ogunleye

Department of Economics, Ekiti State University, Ekiti State Nigeria

ABSTRACT

The study examined manufacturing performance for sustainable economic development in Nigeria, while the specific objectives are as follows: i) to look at the growth rate and contribution of manufacturing to GDP. ii) to examine trend in both manufacturing and employment. iii) to determine the structure of capacity utilization. iv) to determine factors influencing manufacturing performance. Panel data analysis was used on secondary data from 1980-2008 that was extracted from CBN Statistical Bulletin. The results indicate positive relationship between manufacturing and each of capacity utilization and import as 1 percent change in capacity utilization and import lead to 43081 and 3.8 percent change in manufacturing respectively. However, there is a negative relationship between manufacturing and each of investment, exchange rate, and export. A 1 percent change in investment, exchange rate and export lead to 0.04, 12729, 0.3 percent reduction in manufacturing respectively. The t-values for investment, capacity utilization and import were used to test the hypothesis that each coefficient is different from 0. This is rejected; since the t-value are lower than 1.96 (at 95% confidence level). This showed that investment, capacity utilization and import were major determinants of manufacturing performance for the period. The study concludes that the key to reversing the poor performance of Nigerian manufacturing is to provide incentives for firms to become more export oriented.

Keywords: Manufacturing, Development, Sustainable economic, Productivity.

JEL: O1

INTRODUCTION

In the development literature, industrialization has been accepted as the major driving force of the modern economy. In most modern economies, industrial sector serves as the vehicle for the production of goods and services, the generation of employment and the enhancement of incomes. Hence, Kayode (1989) described industry and in particular the manufacturing sub-sector, as the heart of the economy.

In the light of the above, Nigeria has employed several strategies which were aimed at enhancing the productivity of the sector in order to bring about economic growth and development. For instance, the country adopted the import substitution industrialization strategy during the First National Development Plan (1962-1968) which aimed at reducing the volume of imports of finished goods and encouraging foreign exchange savings by producing locally, some of the imported consumer goods (CBN, 2003). The country consolidated her import substitution industrialization strategy during Second National Development Plan period (1970-74) which actually fell within oil boom era. At this time, manufacturing activities were so organized to depend on imported inputs because of the weak technological base of the economy. However, as a result of the collapse of the world oil market in the early 1980s, there was a severe reduction in the earnings from oil exports. Consequently, the import-dependent industrial structure that had emerged became unsustainable owing to the paucity of earnings from oil exports which could not adequately pay for the huge import bills.

Various policy measures were adopted to ameliorate the above situation, such as the stabilization measures of 1982, the restrictive monetary policy and stringent exchange control measures of 1984, all proved abortive. This led to the introduction of the Structural Adjustment Programme (SAP) in 1986 (CBN, 2003). One of the main reasons for the introduction of SAP was to reduce the high dependence of the economy on crude oil as the major foreign earner, by promoting non-oil exports, particularly manufactured goods. But the contribution of the manufacturing sub-sector to GDP has declined steadily, due to a number of factors. As a result, government introduced many other economic policies. Despite these efforts of the government, the performance of the manufacturing sectors is still not clear. The study therefore seeks to determine the manufacturing performance in Nigeria for sustainable economic development. In the pursuit of this, the specific objectives are to: i) evaluate the growth rate and contribution of manufacturing to GDP. ii) examine trend in both manufacturing and employment. iii) to determine the structure of capacity utilization. iv) identifying factor influencing manufacturing performance. The sequence of the study is as follows: The literature review is discussed in Section 2 while Section 3 deals with the methodology. Section 4 presents and discusses the empirical results and Section 5 deals with the study's policy recommendations and conclusion.

LITERATURE REVIEW

Manufacturing sector is very germane to the development of any nation most especially the underdeveloped ones. And over the years, Economists have for a long time discussed the causes of economic growth and the mechanisms behind it. The theory of the growth of conventional economy began with the neoclassical proposition of Solow (1956), which basically highlights issues such as "constant returns to scale, diminishing marginal productivity of capital, exogenously determined technical progress and substitutability between capital and labour". Consequently, Solow's initiative foregrounds the elements of savings and investment as important factor responsible for immediate growth in economy. For the long- time experience, progress and sophistication in technology is identified to be core, even though the foregoing is seen as 'exogenous' to the economy concerned. Suffice to submit that even though the neoclassical growth approach favours labour and capital as indixes of growth in economy, other alternatives such as growth in technology, which is considered exogenous, have remained unexplored. This omission, as well as inconsistent practical evidence, has necessitated the quest for alternatives by researchers. Specifically, the contribution of progress in technology as an important stimulus to sustainable economic growth has been continuously adopted when regular and progressive returns to capital are emphasized.

These approaches, called endogenous growth theories, posits that the application of novel accumulative indixes will engender self –sustaining economic growth. These indexes include knowledge, innovation etc. Romer (1986) and Lucas (1988) have made reliable inputs along the line being pursued. Romer presents a formal model that yields positive, long run growth rates on the basis of technological progress driven by the role of externalities, arising from learning by doing and knowledge spillover. Lucas suggests a model where human capital is believed to be highly supportive of economic growth that is devoid of redundant physical capital accumulation. The works of the duo of Romer and Lucas have signalled the impact of technological advancement on economic growth. Based on the above, new knowledge (Romer, 1990; Grossman and Helpman, 1991) innovation (Aghion and Howitt, 1992) and public infrastructure (Barro, 1990) are recognized as important sources of growth. As a result, and in contrast to the neoclassic counterpart, policies are deemed to play a substantial role in advancing growth on a longrun basis. Dwelling on the polemic of convergence/ divergence, the endogenous growth approach offers that notwithstanding the appreciable returns to scale, convergence would not take place. The adaptation of endogenous growth theory has gone beyond the national sphere to regional space (Magrini, 1997). One thing that is central to neoclassical and endogenous growth models is investment. However, whereas the former influences periods of transition, the latter produce more enduring results. The emphasis placed on investment by these approaches has resulted into huge practical enquiries targeted at unpacking the connection of investment and economic growth. However, we have interwoven results. Kormendi and Meguire (1985), examining 47 countries in the period 1950-1977, have found that investment-to-income ratio is critical for economic growth. De-Long and Summers (1991) provided cross-country evidence that high levels of equipment investment for the period 1960-85 are linked to high levels of GDP per worker growth over this period, while non-equipment investment does not seem to relate to economic growth. In order to handle the problem of causality, the above researchers have used instrumental variables suggesting that investment drives growth. Levine and Renelt (1992) have concluded that investment is one of the few robust factors affecting growth. The robustness of investment in cross-country regressions has also, been shown by Sala-i-Martin (1997). This positive and significant relationship has been found in a wide range of studies using both cross-section and panel analysis (e.g. (Mankiw *et al.*, 1992; Barro and Sala-i-Martin, 1995; Caselli *et al.*, 1996)). However, such findings have been criticized for several reasons. Auerbach *et al.* (1994) criticize De Long and Summers's work on the grounds of empirical robustness problems, while Blomstrom *et al.* (1996) suggest that the causality link runs in the opposite direction for a sample of 101 countries. Podrecca and Carmeci (2001), using panel data, show that causality between investment and growth runs in both directions, while Easterly and Levine (1997) finds an ambiguous role for investment using panel data analysis.

Macroeconomics variables and economics policies have been seen as determinants of economic performance since they can set the framework within which economic growth takes place. Economic policies can influence several aspects of an economy through adequate capacity utilisation, appropriate exchange rate, trade policies for export and import and improvement of political and legal institutions and so on, although there is disagreement in terms of which policies are more conductive to growth. Macroeconomic variables are taken to be important but not the only cause of economic growth (Fischer, 1993). However, in general terms, a stable macroeconomic environment may favour growth, especially, through reduction of uncertainty. Many macroeconomics variables that influenced growth have been mentioned in the literature. Much attention has been placed on inflation since it is considered that it may have important adverse effects on long-run economic performance. Government fiscal policy is another macroeconomic factor that has been acknowledged in the literature. Large budget deficits or heavy tax burdens are capable of retarding growth by decreasing the private capital accumulation. In addition, macroeconomic instability may have a negative impact on growth through its effects on productivity and investment (e.g higher risk). Finally, financial systems may have strong impact on growth through different channels. For example, a well-functioning and efficient financial system may promote economic growth influencing the efficiency with which savings are transformed into investment and leading to increased productivity and faster growth (Levine and Zervos, 1993). Some of the most frequently used measures in empirical analysis are government size, price (in)stability, cyclical volatility of GDP, external imbalances and risk of balance-of-payments crises.Several studies have sought to quantify the effect of governmental policies and macroeconomic factors on economic growth. Kormendi and Meguire (1985) using data from 47 countries in the period 1950-77, found a negative effect of both inflation growth and of the monetary variance on economic growth, and no evidence that growth in the ratio of government consumption to output adversely affects economic growth. Grier and Tullock (1989) have indicated a significant negative correlation between growth of government consumption and GDP growth. Similarly, Barro (1991) found that price distortions and the share of government spending (excluding defence and education) in total GDP are negatively related to growth while government investment has no statistically significant effect on it. Fischer (1993), applying cross-sectional and panel regressions, showed that growth is negatively associated with inflation, black market premium on foreign exchange and government deficits. He also concluded that a stable and sustainable fiscal policy is crucial for the development of a robust macroeconomic framework. King and Levine (1993) using a sample of 80 countries show a significant link between the level of financial development and the level of growth. Levine and Renelt (1992) showed that high growth is associated with lower inflation, while Barro (1991) reaffirmed the strong and negative link between inflation and economic growth. Furthermore, Levine and Zervos (1993) showed that a negative relationship exists between government consumption to GDP and growth, though it is insignificant. Easterly and Rebelo (1993) employing both cross-section data for 100 countries in the period 1970 to 1988 and historical data for 28 countries in the period from 1870 to 1988, made evident that investment in transport and communication and the government's budget surplus are consistently correlated with growth while the effects of taxation are difficult to isolate empirically. Finally, Barro and Sala-i-Martin (1995) concluded that educational expenditures by governments have a very strong positive impact on growth. Finally, it is worth emphasizing that due to the lack of a unifying theory on economic development, a substantial volume of empirical research has multi-theoretical bases. The implication of this is that many studies have several theoretical underpinning and consider factors that are gotten from many sources. Given this, the outcomes are most of the times confusing and making it difficult to have conclusion. The results from the various studies have so far yielded mixed results that are inconclusive and contradictory in nature. Research also shows that most of the studies on manufacturing performance that have been reported were carried out on developed nations. The fallout from this is that there is a major gap in the relevant literature on developing countries including Nigeria which we need to cover by research. This study attempts to fill the gap by studying the situation in Nigeria and providing more empirical evidences on the performance of the manufacturing sector.

THE CONCEPT OF SUSTAINABILITY IN MANUFACTURING SECTOR

Sustainable manufacturing is the part of a larger concept, sustainable development, which emerged in the early 1980's in response to increase awareness and concern over the environmental impact of economic growth and global expansion of business trade. As put forward by World Commission on Environment and Development (2012), "sustainable development is the one that does not compromise how the future generation gets satisfied with their needs. It contains within it two key concepts; the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs."

At the 1992 UNCED Conference held in Rio de Janerio, sustainable production was introduced and adopted as one of the guiding principles for business and government in transitioning towards and achieving sustainable development. Sustainability is now an expected practice by both large and small companies and is defined, developed and implemented by manufacturing companies, including their suppliers and customers. Various definitions abound for sustainable manufacturing. According to the US Department of Commerce (www.trade.gov), sustainable manufacturing is defined as the creation of manufactured products that uses processes that minimize negative environmental impact, conserve energy and natural resources that are safe for employees, communities, and consumers and are economically sound. Lowell Centre for Sustainable Production (www. Sustainableproduction.org) described sustainable production as the creation of goods and services by using process and systems that are: Non-polluting, conserving of energy and natural resources, economically viable, safe and healthfully for workers, communities, consumers and socially and creatively rewarding for all working people. Also, Julian (2005), describe "sustainable manufacturing as a way of developing technologies to transform materials without emission of greenhouse gases, use of non-renewable, use of toxic material or generation of waste.

METHODOLOGY

Data Source

Data were extracted mainly from publications of the Central Bank of Nigeria CBN (2011) supplemented with data from other secondary sources such as internet. The analysis covered the period of 1980-2008.

Model Specification

The theoretical basis for this study is that investment is a fundamental determinant of economic growth (manufacturing performance). This was hypothesized by both the neoclassical model (Solow, 1956) and the endogenous growth model (Romer, 1986). This is combined with the economic postulation that economic policies and macroeconomic conditions are major determinants of economic performance since they can set the framework within which economic growth takes place (Kormendi and Meguire, 1985; Fischer, 1993; Levine and Zervos, 1993). Economic policies can influence several aspects of an economy through adequate capacity utilization, appropriate exchange rate, trade policies for export and import. From this theory, the study set out that manufacturing performance will be the function of investment, capacity utilization, exchange rate, export and import. In this study, we made use of cross-sectional time-series data as used by Baltagi (2008). This is a dataset in which the behavior of entities are observed across time. The model is specified as follows;

$$Y_{it} = \psi_1 + \sum_{j=2}^{k} \psi_j X_{jit} + \sum_{p=1}^{s} \lambda_p W_{pi} + \varphi_t + \eta_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots 1$$

where Y is the dependent variable, the Xj are observed explanatory variables, and the are unobserved explanatory variables. The index "I" represents the unit of observation, "t" stands for the time period; "j" and "p" stand for the difference between observed and unobserved explanatory variables. is an error term or a random variable that had well-defined probabilistic properties to satisfy the usual regression model conditions.

The Xj variables are usually the variables of interest, while the variables are responsible for unobserved heterogeneity and as such constitute a nuisance component of the model. The following discussion will be confined to the (quite common) special case where it is reasonable to assume that the unobserved heterogeneity is unchanging and accordingly the variables do not need a time subscript. Because the variables are unobserved, there is no means of obtaining information about the ∑sp=1

component of the model and it is convenient to rewrite equation 1 as

$$Y_{it} = \psi_1 + \sum_{j=2}^{k} \psi_j X_{jit} + \alpha_i + \varphi_t + \eta_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots 2$$

Where

$$\alpha_i = \sum_{p=1}^{s} \lambda_p W_{pi} \quad \ldots\ldots\ldots\ldots\ldots\ldots 3$$

αi, known as the unobserved effect, represents the joint impact of the on

Yi. Conveniently, the unit of observation will now be referred to as an

individual, and to the αi as the individual-specific unobserved effect, but it should be borne in mind that the individual in question may actually be a household or an enterprise, etc. If αi is correlated with any of the Xj variables, the regression estimates from a regression of Y on the Xj variables will be subject to unobserved heterogeneity bias. Even if the unobserved effect is not correlated with any of the explanatory variables, its presence will in general cause Ordinary Least Square (OLS) to yield inefficient estimates and invalid standard errors. To overcome this problem, the two main approaches to the fitting of models using panel data, known as fixed effects regressions, and random effects regressions are employed. For the fixed effects approach, the first differences regression model, the unobserved effect is eliminated by subtracting the observation for the previous time period from the observation for the current time period, for all time periods. The model may be written for individual "i" in time period "t" as

$$Y_{it} = \psi_1 + \sum_{j=2}^{k} \psi_j X_{ijt} + \varphi_t + \alpha_i + \eta_{it} \quad \text{...4}$$

For the former time period, the relationship becomes.

$$Y_{it-1} = \psi_1 + \sum_{j=2}^{k} \psi_j X_{ijt-1} + \varphi(t-1) + \alpha_i + \eta_{it-1} \quad \text{.....................................5}$$

Subtracting (5) from (4), one obtains

$$\Delta Y_{it} = \sum_{j=2}^{k} \psi_j \Delta X_{ijt} + \varphi + \eta_{it} - \eta_{it-1} \quad \text{...6}$$

$$Y_{it} = \psi_1 + \sum_{j=2}^{k} \psi_j X_{jit} + \alpha_i + \varphi_t + \eta_{it} \quad \text{..7}$$

$$= \psi_1 + \sum_{j=2}^{k} \psi_j X_{jit} + \varphi_t + \varpi_{it} \quad \text{....................................8}$$

Where

$$\varpi_{it} = \alpha_i + \eta_{it} \quad \text{..9}$$

Consequent upon this, we have dealt with the unobserved effect by subsuming it into the disturbance term.

The second condition is that the variables are distributed independently of all of the Xj variables. If this is not the case, α, and hence , will not be uncorrelated with the Xj variables and the random effects estimation will be biased and inconsistent. Despite the fact that the first condition seems to be satisfied, yet, we would have to use fixed effects estimation.

If the two conditions are satisfied, we may use (equation 8) as our regression specification, but there is a complication.   needs to be tested for autocorrelation, therefore, we make use of an estimation technique to account for this. First, we will check the other regression model conditions relating to the disturbance term. Given our assumption that   satisfies the usual regression model conditions, we can see that satisfies the condition that its expectation be zero, since

$E(\varpi_{it}) = E(\alpha_i + \eta_{it}) = E(\alpha_i) + E(\eta_{it}) = 0$ for both in "i" and "t" 10

Here we are assuming without loss of generality that E(αi) = 0, any nonzero component being absorbed by the intercept, β1.   will also satisfy the condition that it should have constant variance, since

$$\sigma^2_{\varpi_{it}} = \sigma^2_{\alpha_i + \eta_{it}} = \sigma^2_{\alpha} + \sigma^2_{\eta} + 2\sigma_{\alpha\eta} = \sigma^2_{\alpha} + \sigma^2_{\eta} \text{ for all i and t} \ldots\ldots 11$$

The term is zero on the assumption that αi is distributed independently of. will also satisfy the regression model condition that it be distributed independently of the values of Xj, since both αi and are assumed to satisfy this condition.

In both equations 6 and 8

Y= manufacturing (man); i = entity; and t =time

X= Independent variables which are, investment(invest), capacity utilitsation (cap_ut), exchange rate(exch_ra), export and import.

= coefficient of explanatory variable.

RESULTS

Table 1 presents the results of the means and standard deviation for the panel data analysis in the study. The standard deviation was decomposed into between and within components. The between figures refers to the standard deviation, minimum and maximum of the averages for each individual ( ) (for manufacturing, investment, capacity utilization, exchange rate, export and import). The within figure calculates the statistics for the deviations of each individual from his own average ( ) which is 299 for manufacturing observations. The panels 1 and 2 of Figure 1 show the percentage of manufacturing value-added to GDP for year 1980 to 2008. In panel 1 the value of manufacturing and export were very high towards the end of the periods covered by the study. Panel 2 confirmed that the contribution of manufacturing sector to the GDP started to increase as from 2001 and was very high in the year 2008.

Figure 2 shows an improvement in the contribution of manufacturing to GDP (MAN_GDP) and Other manufacturing (OMAN_GDP) to GDP as from 2000. This is seen in the trend of these two figures in layer 1 and 4 of Figure 2. The major explanation for this slight upward movement in the contribution of manufacturing sector may be as a result of the workability of the government policies, which may coincide with the improvement in the demand for output of manufacturing and the increase in manufacturing export.

Figure 3 shows that between junior and senior category of workers, there are large wage differentials across major sectors of the economy, such as, agriculture, manufacturing sector and building and construction. The wage in the manufacturing sector was high for the senior category of workers towards the end of 2008 but low for junior workers.

Figure 4 shows the scatter plot matrices between contribution of manufacturing to GDP, export, import, exchange rate and GDP. This is used to look at the relationships between all these variables. In each plot, the variable to the side of the graph is used as the Y Variable, and the variable above or below the graph is used as the X Variable (Ulrich and Franke, 2009). In the first line of Figure 4 are scatter plots of manufacturing GDP against exchange rate, export import, and GDP.

Figure 5 measures the time profile of the various manufacturing sector captured in the study. The first row show the trend of manufacturing sectors for food, foot wares, glass, and industrial chemical. Food sector exhibits no growth rate throughout 1980 to early 2000, but slightly rose thereafter. The footwear, glass and industrial sector did not show any growth during the periods covered in the study.

The second row of the panel represents the trend in leather, other chemical, paper and plastic manufacturing industries. However plastic manufacturing industries had prolonged positive growth but fell at the end of the 2008 year period. Other chemical had slight positive growth toward the end of year 2008.

The third row panel represents the growth trend for printing, textile and wood manufacturing industry. It is clear that both printing and wood manufacturing industry seem to have permanent neutral growth. However textile had early slight positive growth towards the end of the period covered in the study.

To further measure the performance of manufacturing sector in Nigeria for the period, we made use of panel data to explore the relationship between predictor and manufacturing variables within an entity, as each entity has its own individual characteristics that may or may not influence the predictor variables; we made use of least square dummy variable (ols_dum), areg, fixed effect and random effect. Each of these methods removes the effect of those time-invariant characteristics from the predictor variables so that we were able to assess the predictors' net effect. A good way to grasp fixed effects is the least square dummy variable model (LSDV). The effect of explanatory variable is mediated by the differences across different manufacturing industries. By adding the dummy for each manufacturing industry we are estimating the pure effect of explanatory variable (by controlling for the unobserved heterogeneity). Each dummy is absorbing the effect that is particular to each manufacturing industry. The result of the panel data is shown in Table 2.

From the results the fixed effect coefficients of the regressors indicate how much manufacturing sector changes when each of investment, capacity utilization, exchange rate, export and Import increases by one unit. The results indicate positive relationship between manufacturing and each of capacity utilization and import. A 1% change in capacity utilization and import lead to 43081 and 3.8 percent change in manufacturing respectively. However, there is a negative relationship between investment, exchange rate, and export. A 1% change in investment, exchange rate and export lead to 0.04, 12729, 0.3 percent reduction in manufacturing respectively.The t-values for investment, capacity utilization and import test the hypothesis that each coefficient is different from 0. This is rejected as the t-value are lower than 1.96 (for a 95% confidence level). Therefore, variables have significant influence on the manufacturing performance for the period.

LSDV (ols_dum) regression coefficients indicate how much manufacturing changes when dependent variables increases by one unit. The t-values are used to test the hypothesis that each coefficient is different from 0; the result here is similar to the result under fixed effect. The coefficients of the random effect include both the within-entity and between-entity effects. The coefficients also indicate positive relationship between manufacturing and each of capacity utilization and import. This result indicates that a 1 % change in capacity utilization and import will lead to 44036 and 3.9 percent change in manufacturing respectively.

The two-tail p-values test shows that coefficient is different from 0. From the result, capacity utilization and import are statistically significant. This result accords Soderbom and Teal (2002). The overall regression is equally significant as the F statistics has P-value less than 0.05. To decide between fixed or random effects we run a Hausman test where the null hypothesis is that the preferred model is random effects against the alternative that the fixed effects is preferred. This is in line with Greene (2008). It basically tests whether the unique errors (ui) are correlated with the regressors, the null hypothesis is that they are not. The results of the Hauseman test in Table 3 show that prob>chi2 =0.8578 is greater than 0.05, so we use random effect. The LM test in Table 4 also helps to decide between random effects regression and simple OLS regression in the study. The null hypothesis from the LM test carried out in the study demonstrated that variances across entities are zero. The result shows that there is no significant difference across units. This means there is no panel effect. Therefore, in the study we reject the null and conclude that random effect is appropriate. This is evidence of significant differences across entities.

According to Baltagi (2008), cross-sectional dependence is a problem in macro panels with long time series (over 20-30 years). The evidence that residuals across entities are not correlated is shown in the LM test of independence. Table 5 further supports the use of random effect for this study. The pr= 0.0000 shows that there is cross-sectional dependence. Therefore the fixed effect method is not good.

POLICY RECOMMENDATION AND CONCLUSION

This study analyzed the performance of Nigerian manufacturing, using data extracted from CBN (2011). Categorical findings of the studies are summarized as follows: Aggregate statistics for the Nigerian macroeconomic and its manufacturing sector show that performances in the early period covered by the study was a relatively static period. The end of the period covered by the study witnessed moderate economic recovery and growth in the manufacturing sector.

- The survey data show large wage differentials across major sectors of the economy. Taken together, the evidence on wage differentials indicate that the building and construction have relatively high wage when the minimum wages and salaries among the major sectors such as agriculture, manufacturing and building and construction considered in the study. The wage in the manufacturing sector was high for the senior category towards the end of the 2008.
- There is a positive association between manufacturing performance and capacity utilization. As the capacity utilization is high the level of manufacturing will also increase. This accords the result of Soderbom and Teal (2002).

The survey data show export is negatively related to manufacturing performance. This is an implication that domestic manufacturing product seems not attracting foreign market. A major problem for Nigerian manufacturing has been identified as lack of exports. In view of what has been discussed above, the key to reversing the poor performance of Nigerian manufacturing is to provide incentives for firms to become more export oriented. The benefits of exporting are numerous: it is well-known from the macro data that rapid income growth often is associated with expansion of manufactured exports.

The study concludes by arguing that the key to reversing the poor performance of Nigerian manufacturing is an increase in its investment, adequate capacity utilization, importation of technology to boost local manufacturing, export and exchange rate. The study also agrees with Soderbom and Teal (2002) that more efficient manufacturing firms are more likely to export, more likely to invest and pay their workers more. A major ingredient in the successful transformation of most economies where there are sustained rises in per-capita incomes has been the growth in manufacturing output. An important policy issues facing Nigerian government is understanding and addressing factors that will enable efficiency of firms and their competitiveness to increase. According to Collier and Gunning (1999), a sound economic policy is enormously important for economic development and that poor policy results in a nexus of constraints from which escape is difficult, but not impossible. Finally, increased production should be sought through sustainable manufacturing by developing technologies to transform materials using process and systems that are non-polluting, conserving of energy, economically viable and socially rewarding for all working people (Julian, 2005).

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Table-1. Descriptive Statistics for Macroeconomics Indicators

Variable		Mean	Std. Dev.	Min	Max	Observations
man	overall	20806.69	81216.85	-1417.75	789153.8	N = 299
	between		48394.14	-254.7748	164022.4	n = 11
	within		68383.2	-143211.5	645938	T-bar = 27.1818
invest	overall	1671464	3715568	0	2.48e+07	N = 319
	between		1754531	29822.38	5422404	n = 11
	within		3316342	-3626496	2.28e+07	T = 29
cap_ut	overall	44.34601	17.20182	0	96	N = 286
	between		3.354256	39.14214	49.01444	n = 11
	within		16.8933	-1.10806	101.2039	T = 26
exch_ra	overall	47.86805	53.45112	.5464	134.0378	N = 319
	between		0	47.86805	47.86805	n = 11
	within		53.45112	.5464	134.0378	T = 29
export	overall	1800303	2764847	7502.5	9774511	N = 319
	between		0	1800303	1800303	n = 11
	within		2764847	7502.5	9774511	T = 29
import	overall	1001440	1454770	5983.6	5921450	N = 319
	between		0	1001440	1001440	n = 11
	within		1454770	5983.6	5921450	T = 29

Figure-1. Performance of Manufacturing and other Economic Indicators

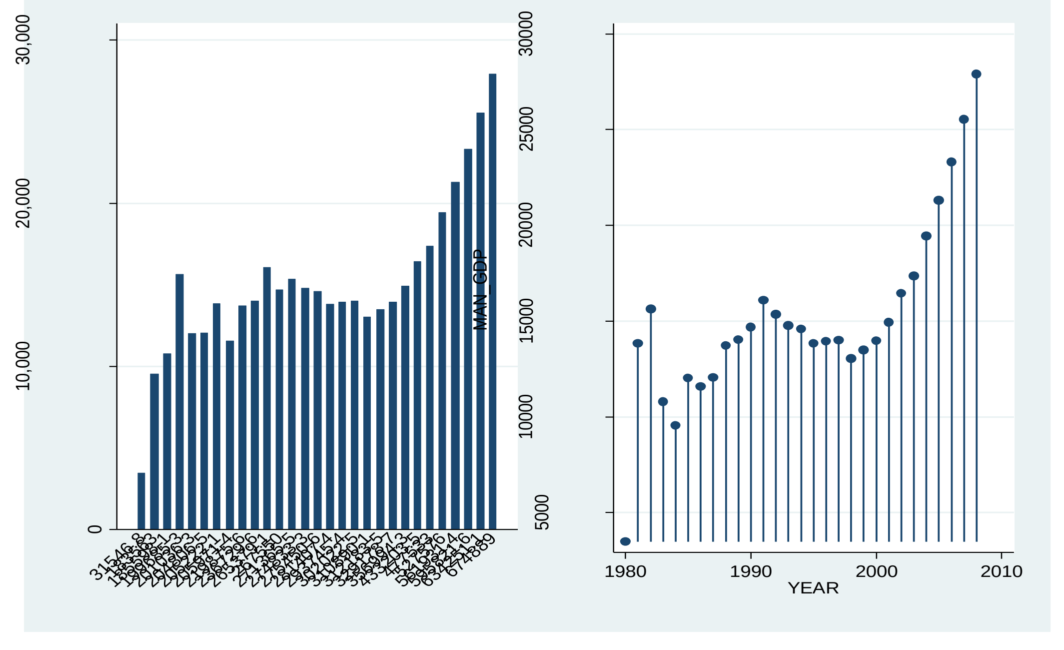

Figure-2. The Trend of Manufacturing and Other Macroeconomics Composite of GDP

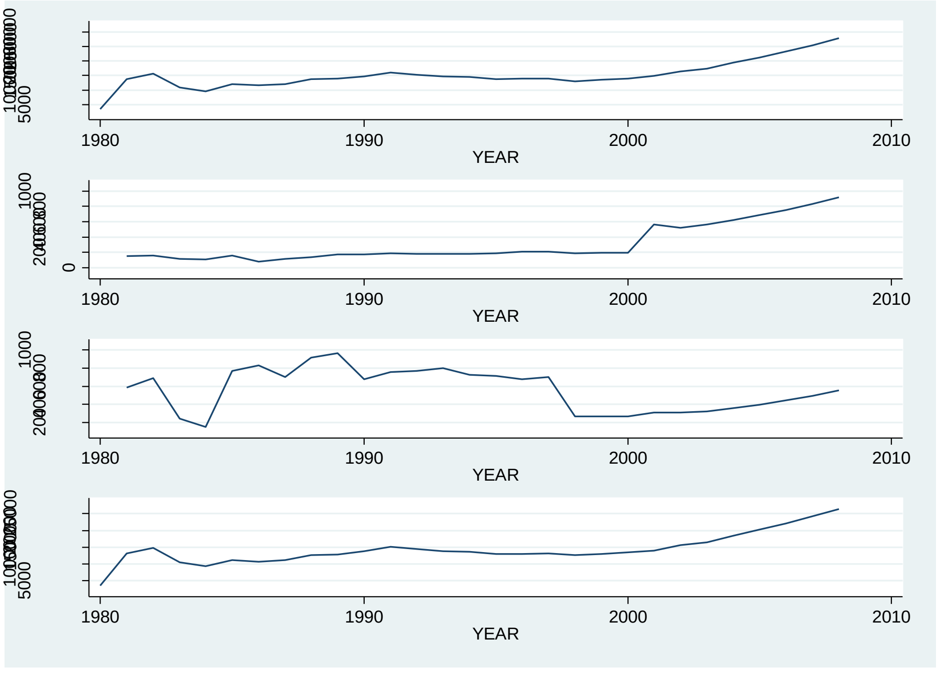

Figure-3. Average Minimum Wages and Salaries in Major Sectors of the Economy (1993-2008)

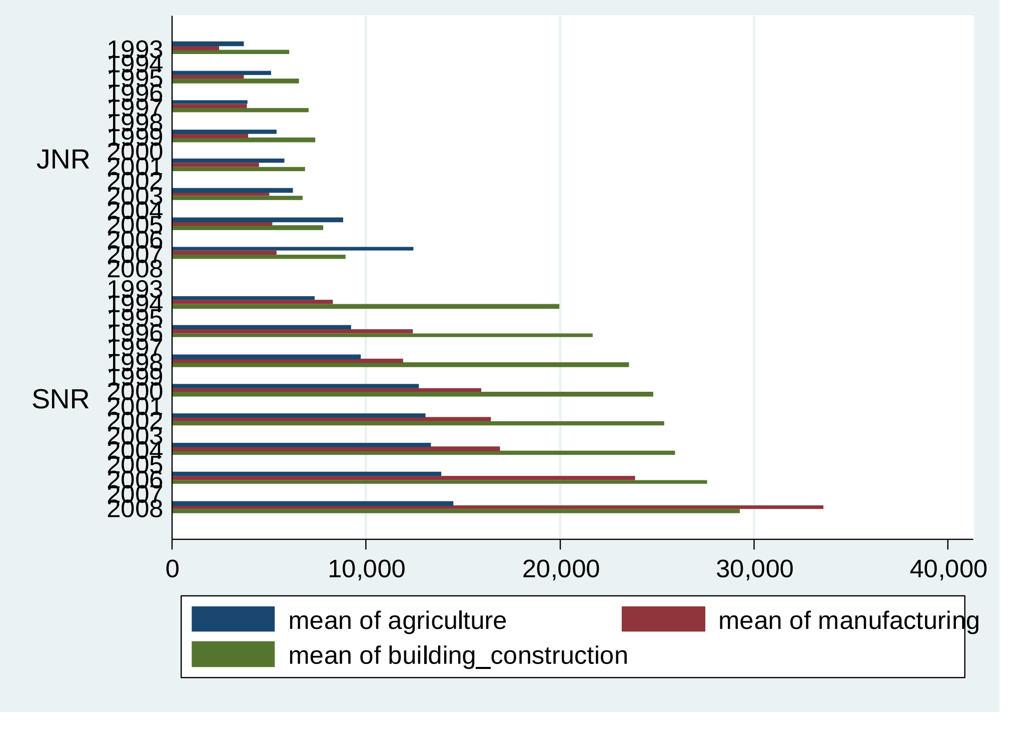

Figure-4. Scatterplot Matrix showing the Relationship among Important Economic Indicators

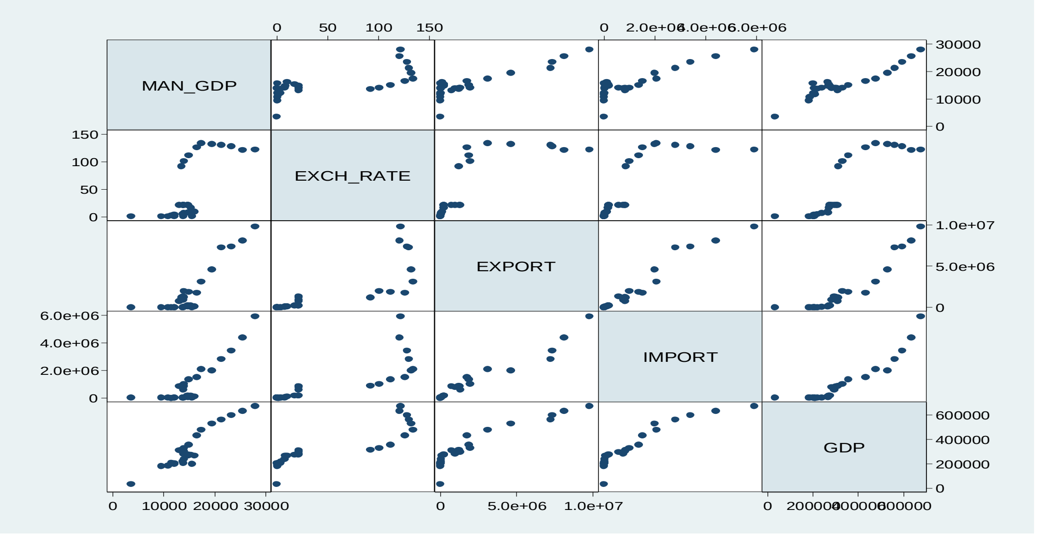

Figure-5. Trends in Some Macroeconomics Indicators Used in the Panel Analysis

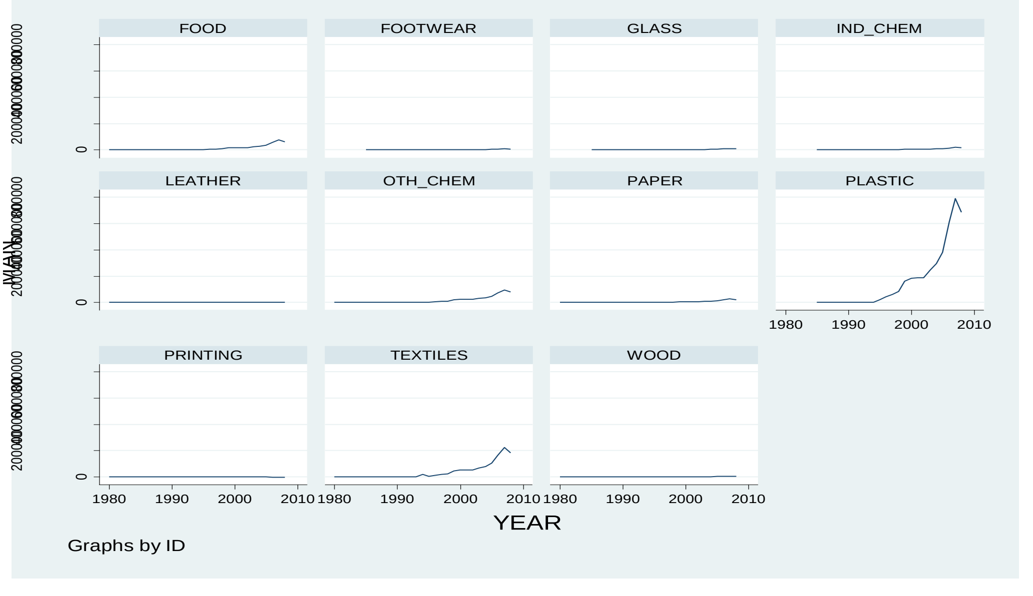

Table-2. Panel Results for the Macroeconomic Variables

Variable	stacked_ols	ols_dum	areg	fixed_effect	random_effect
invest	-.00003283	-.00038425	-.00038425	-.00038425	-.00035091
cap_ut	546.90667*	430.81226*	430.81226*	430.81226*	440.36015*
exch_ra	-122.00715	-127.25804	-127.25804	-127.25804	-126.9474
export	-.004322	-.00305924	-.00305924	-.00305924	-.00315831
import	.04105337*	.03829403*	.03829403*	.03829403*	.03850008*
_Iid1_2		-14058.669			
_Iid1_3		-11530.793			
_Iid1_4		-11238.79			
_Iid1_5		-8718.6189			
_Iid1_6		-590.74371			
_Iid1_7		-6940.9734			
_Iid1_8		123249.3***			
_Iid1_9		-14766.927			
_Iid1_10		19116.375			
_Iid1_11		-9280.4275			
_cons	-27595.06*	-26855.168	-21307.585*	-21307.585*	-21452.628
N	272	272	272	272	272
r2	.19451201	.44438468	.44438468	.23618879	
r2_a	.17937126	.41182909	.41182909	.19143423	

legend: * p<0.05; ** p<0.01; *** p<0.001

Table-3. Hausman Test

	-Coefficients-			
	(b)	(B)	(b-B)	sqrt (diag(v_b-v_B)
	Fixed	random	difference	S.E.
<				
invest	_.0003842	-.0003509	-.0000333	.000298
cap_ut	430.8123	440.3601	-9.547885	17.904
exch_ra	-127.258	-126.9474	-3106358	8.80712
export	-.0030592	-.0031583	.0000991	.0003658
import	.038294	.0385001	-.0002061	.0011117

b= consistent under Ho and Ha; obtained from xtreg

B=inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho; difference in coefficients not systematic

chi2(2) = (b-B)1 (V_b-V_B)^(-1)(b-B)

= 0.31

Prob>chi2 = 0.8578

Table-4. Lagrangian Multiplier Test

Breusch and pagan lagrangianmultiplier test for random effects

Man (idl, t) = xb + u (idl) + e(idl,t)

Estimated results:

	Var	sd =sqrt(var)
Man	5.47e+09	73964.51
e	3.22e+09	56725.09
u	1.63e+09	40398.53

Test: Var(u) = 0

chi2(1)= 215.88

prob> chi 2 = 0.0000

Table-5. Correlation matrix of residuals:

	_e1	_e2	_e3	_e4	_e5	_e6	_e7	_e8	_e9	_e10	_e11
_e1	1.0000										
_e2	0.5854	1.0000									
_e3	0.8243	0.8637	1.0000								
_e4	0.8401	0.8901	0.9819	1.0000							
_e5	0.8922	0.8222	0.9533	0.9467	1.0000						
_e6	0.7195	0.8086	0.7895	0.8267	0.7629	1.0000					
_e7	0.7163	0.9158	0.9421	0.9362	0.8819	0.8828	1.0000				
_e8	-0.6183	-0.9048	-0.9341	-0.9050	-0.8711	-0.6651	-0.9158	1.0000			
_e9	0.7502	0.9196	0.9786	0.9680	0.9311	0.7892	0.9491	-0.9555	1.0000		
_e10	-0.3348	-0.7176	-0.7319	-0.6693	-0.6455	-0.3335	-0.6925	0.9015	-0.7607	1.0000	
_e11	0.8434	0.8601	0.9389	0.9504	0.9166	0.8972	0.9467	-0.8387	0.9121	-0.5581	1.0000