Institutional Framework, Interest Rate Policy and the Financing of the Nigerian Manufacturing Sub-Sector

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Abstract

In this study, we set out to empirically investigate the impact of interest rates and other macroeconomic factors on manufacturing performance in Nigeria using co-integration and an error correction mechanism (ECM) technique with annual time series covering the period between 1970 and 2002. Some statistical tools are employed to explore the relationship between these variables. The analysis starts with examining stochastic characteristics of each time series by testing their stationarity using Augmented Dickey Fuller (ADF) test. Then, the study estimates error correction mechanism (ECM) model.

From the error correction model, several interesting conclusions are drawn from the study. First, interest rate spread and government deficit financing have negative impact on the growth of manufacturing sub-sector in Nigeria. Secondly, the study empirically reveals that liberalization of the Nigerian economy has promoted manufacturing growth between 1970 and 2002. Lastly, the findings are further reinforced by the presence of a long-term equilibrium relationship, as evidenced by the co-integration, and stability in the model.

1.0 Introduction

The question of how institutions and development outcomes are interlinked and affect each other has recently become a "hot topic" in the international debate on development (Johannes Jütting, 2003). A review of the cross-sectional studies shows that while there is a consensus in the literature that institutional quality matters for growth, the literature is quite ambiguous about the relative importance of "institutions" vis-à-vis other factors, including manufacturing growth, geography and trade (Sachs (2003).

There is an overall acknowledgement in literature that institutions matter and have a direct impact on growth. For example, Rodrik et al. (2002) found in a study that the "estimated direct effect of institutions on incomes is positive and large" (p. 11). Besides an observed direct impact, most studies also acknowledge an indirect impact on growth and economic development. Institutions can lead to an increase in investment, to a better management of ethnic diversity and conflicts, to better policies and to an increase in the social capital stock of a community. All these factors have a recognized positive influence on growth. Therefore, most of the studies suggest a strong and robust relationship between institutional quality and growth and development outcomes (Johannes Jütting, 2003).

However, in Nigeria, the role of institutions in the development of the Nigerian Manufacturing sub-sector has not been fully addressed and the impact has not been fully felt. Manufacturing sub-sector in Nigeria has been experiencing a stunted growth and its contribution to gross domestic product has remained low. For instance, the manufacturing sub sector as a whole remains small, accounting for only 6.6 per cent of GDP in 2000 and 12 per cent of employment (World Bank, 2002). The production indices {using 1990 as a base year (100)} also indicated that while agriculture and services experienced modest growth from 103.5 and 101.5 to 133.6 and 297.0 between 1991 and 1999 respectively, manufacturing sub sector recorded a decline from 109.4 to 92.3 in the same period. It is also sad to mention that capacity utilization in the manufacturing sub sector declined from about 70.1% in 1980 to just 44.3 per cent in 2002(CBN 2002).

Banks in Nigeria are highly liquid but they believe that lending to the manufacturing sub-sector is very risky and increasing credit to the manufacturing sector is not justified in terms of risk and cost (Olorunsola, 2001). The business environment, in

general, is very risky and uncertain so firms may not be able to service debt. Apart, the judicial system is reportedly inefficient and banks cannot easily enforce contracts. Consequently, banks charge high interest rates, demand high levels of collateral and make few loans of more than a year in term. In addition to the above, high interest rate in the Nigerian financial system is a reflection of the extremely poor infrastructural facilities and inefficient institutional framework necessary to bring about substantial reduction in the risk associated with financing an extremely traumatized economy (World Bank, 2002).

Against this background, the study attempts to establish an empirical relationship between manufacturing sub-sector and other macroeconomic variables, including interest rates and institutional reforms. The rest of the paper is structured as follow. Section two gives the theoretical background and literature review and it covers conceptual issues such as definition and classification of institutions, analytical framework for analyzing the linkage between institutions and manufacturing sub-sector. It also covers industrial finance and interest rate policy in Nigeria. Methodology and data source are discussed in section three. This section also explains error correction mechanism (ECM) model and the unit root tests employed. Empirical analysis and discussion are found in Section four, while summary and conclusions are contained in the last section.

2.0 Theoretical Background and Literature Review

2.0.1 What are Institutions?

Over recent years, the role of institutions in economic development has received steadily increasing attention from researchers, policy makers and development practitioners. Institutions are generally defined as "constraints that human beings impose on themselves" (North, 1990). Following this definition, institutions prohibit, permit or require specific type of behaviour, i.e. political, economic or social, that are important for reducing transaction costs, for improving information flows and for defining and enforcing property rights. However, this definition does not have universal acceptance.

Other scholars include in their definition of institutions organizational entities, procedural devices, and regulatory frameworks (Williamson, 2000). In most of the recent

articles, institutions are defined in a broader sense, linking various different measures of institutional quality to development outcomes from various angles and disciplines (Johannes Jütting, 2003).

In the literature, there exist various ways of classifying institutions. They can be regrouped into three approaches depending on: (1) the degree of formality; (2) different levels of hierarchy; (3) the area of analysis. Following North (1990), institutions include any form of constraint that human beings devise to shape human interaction. They are the frameworks within which human interactions take place. Institutions consist of formal written rules as well as typically unwritten codes of conduct that underlie and supplement formal rules. Formal rules and constraints are made up of: (1) constitutions, laws, property rights, charters, bylaws, statute and common law, and regulations; (2) enforcement characteristics (sanctions, etc.). Arising to co-ordinate repeated human interaction, informal rules are: (1) extensions, elaborations, and modifications of formal rules; (2) socially sanctioned norms of behaviour (customs, taboos and traditions); (3) internally enforced standards of conduct. People in both rich and poor countries rely on informal institutions to facilitate transactions, but these institutions are relatively more important in poor countries where formal institutions are less developed (World Bank, 2002).

Williamson (2000) offers an alternative to a classification of institutions. He proposes a classification scheme based on different hierarchical levels- levels one, two, three and four. Level one institutions are located at the social embeddedness level. Social norms, customs, traditions, etc. are located at this level. These traditional institutions often date back many centuries, are generally informal and can be regarded as exogenous to the economic system. This level is of utmost importance for people living in developing countries.

Level two institutions relate to the *rules of the game.* Their main purpose is to define and enforce property rights. Most of them are formal institutions like conventions or laws, but examples also exist of informal institutions, e.g. rules governing access to natural resources, that are not written down but are quite strongly binding and therefore fit under this umbrella. Beside the rules of the game in the "Williamson sense", the way

the game is played is equally important. Institutions that relate to *governance* are classified as Level three institutions. These institutions craft order and reshape incentives, thereby building the governance structure of a society and leading to the building of specific organizations like the local or national government, state agencies, Non Governmental organizations, etc. Level four institutions define the extent to which adjustment occurs through prices or quantities, and determine the resource allocation mechanism. Examples of this type of institutions are rules that are easy to change and that have an impact on resource allocation, employment, the social security system, etc.

Finally, a third alternative used in the literature to classify institutions is to differentiate between various areas of analysis. The four categories most commonly found in the literature are: economic institutions; political institutions; legal institutions and social institutions. Under economic institutions, authors usually place rules that define the production, allocation and distribution process of goods and services, including markets (Bowles, 1998). Studies of political institutions usually employ variables that provide details about elections, electoral rules, type of political system, party composition of the opposition and the government, measures of checks and balances and political stability (Beck ***et al.***, 2002). Studies related to law and institutions refer to the type of legal system, the definition and enforcement of property rights and legal origin. Studies on social institutions usually cover rules that have to do with access to health and education and social security arrangements, have an impact on gender balance and govern more generally the relationship between economic actors (Johannes Jütting, 2003).

Analytical framework to explain the role of institutions on development are adopted, but modified, from the work of Johannes Jütting (2003). In designing this framework, the specific local setting, the behaviour of human actors, and the endogeneity of an institution are carefully taken into consideration. The framework differentiates between exogenous and endogenous factors that influence development. The framework consists of five variables: one is exogenous and the other four are endogenous. The first question the framework answers is whether the institution of interest can be treated as exogenous or endogenous to the development outcome or not. The study discovers that in

Nigeria, some institutions are exogenous, particularly, the informal institutions, while other are endogenous, mostly the formal ones. The informal institutions in Nigeria are not properly integrated with the framework of government policy. Thus, implementation of policies, in most of the time, fails due to the lack of proper integration between formal and informal sector.

The framework also differentiates between the variable of interest, particularly the institutional arrangement and other variables influencing the outcome. The study discovers that local setting, including taboos, traditions and the existence of natural resources in Nigeria exerts a direct influence on development outcomes as well as an indirect one vis-à-vis the endogenous institutional arrangements. For instance, the discovery of crude oil in Nigeria has negatively influenced the development of the real sector of the economy, including manufacturing sub-sector. While government policies have been detrimental to the growth of the real sector, the harsh environment in which manufacturing firms are operating has worsened the situation.

Besides the local setting, the study considers the "area of interaction". In this area, incentives and disincentives are sent out by institutional framework for specific actions by human actors. Depending on the distribution of power and interest, actors (governments) undertake activities, at times, that undermine or promote the outcome and this invariably determines the wellbeing of the people. In Nigeria, most of our leaders are corrupt. Corruptions are caused by the weaknesses of the formal and informal institutional system. For instance, in Nigeria politicians and civil servants accumulate wealth by stealing from the public money or improperly using public assets without any penalties. This is done through the reimbursement of fake expenses or other methods of illegally obtaining public funds (Falola, 1998; pp. 140-1). Instead of politicians pursuing appropriations laws that allocate resources effectively, they pass laws that increase their personal wealth. Thus, the government of Nigeria is perceived by many as a predatory government model or grabbing-hand model.

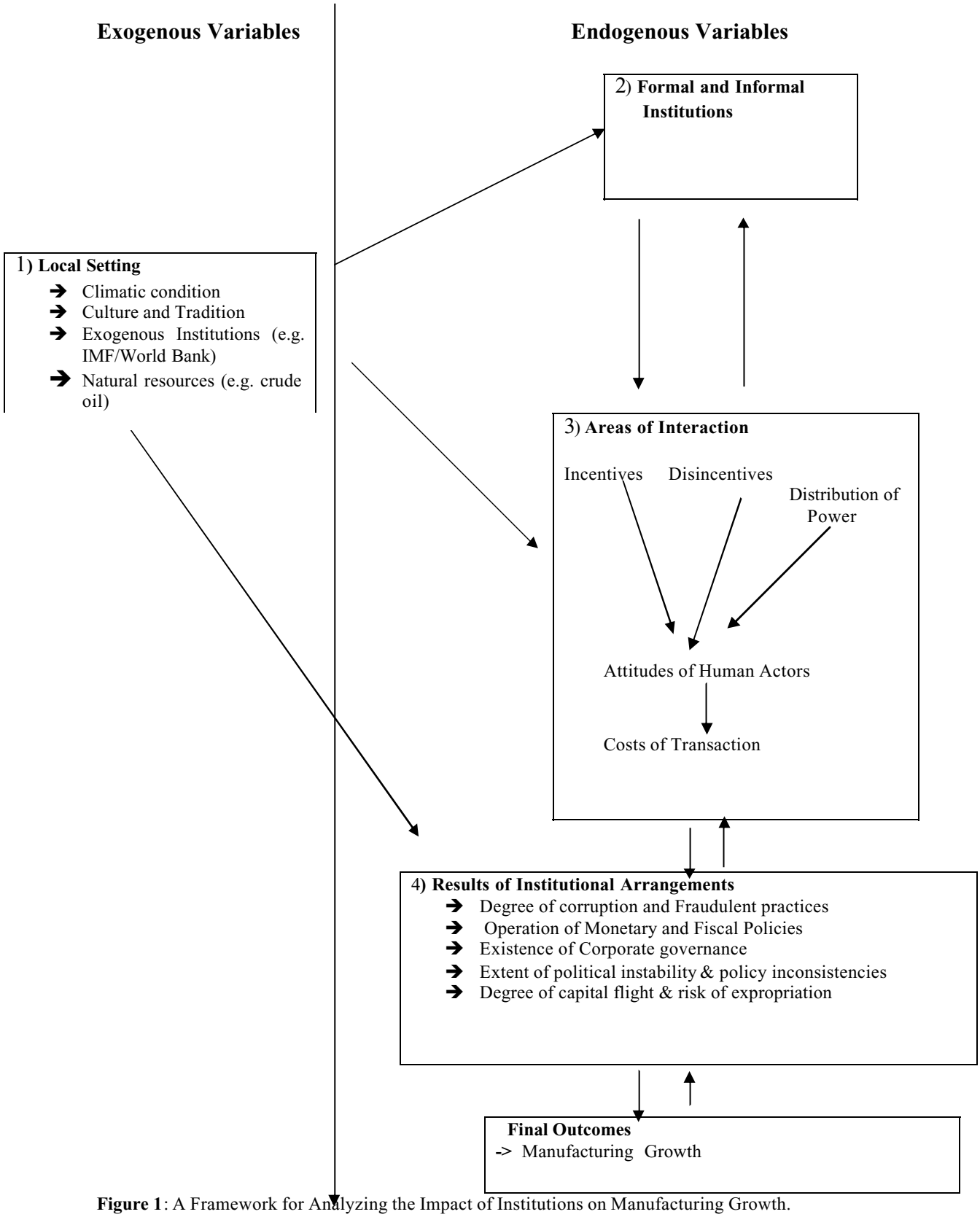


Figure 1: A Framework for Analyzing the Impact of Institutions on Manufacturing Growth.
Source: Johannes Jütting, 2003

Another outcome of weal institutional arrangement is capital flight. A substantial amount of capital flight occurs through different designs. A number of imports coming into Nigeria are estimated to have been over-invoiced, by at least 30 per cent. That means, on average, for every dollar in imports, 30 cents is estimated in the form of capital flight. The situation is worsened by the level of official transfer of Nigerian funds to foreign banks by our past leaders, which has impacted negatively on the growth of manufacturing sub-sector in Nigeria.

Thus, the framework, in general, stresses the fact that institutions do not stand in isolation but are embedded in local settings that are influenced by historical trajectories and culture. Also, institutions play a vital role in the development of the manufacturing sub-sector. In considering the important factors that determine manufacturing growth, emphasis should not be placed on macroeconomic variables alone but other factors like institutional reforms, local settings, human actors, rule of the game, among others are very important.

2.0.2 Industrial Financing in Nigeria

The role of manufacturing in any economy cannot be overemphasized. However, this role cannot be effectively carried out without capital. Penrose (1963) in explaining the growth of small firm raised the issues of capital and entrepreneurial ability. In his own view, the ability of a small firm to grow by raising capital depends on its entrepreneurial ability. He has this to say: "many small firms without adequate initial financial resources do succeed, do raise capital, do grow into large firms. And they do this, for the most part, by virtue of a special entrepreneurial ability, P.37". The type of entrepreneurial service needed to raise capital, according to him, may not be closely related to the type of services needed to run a firm efficiently, for successful raising of capital depend on an entrepreneur's ability to create confidence. According to him, raising capital is embedded in entrepreneurial ability. If a firm has entrepreneurial ability to create confidence on the part of financial institutions, it will not be difficult to raise capital.

However, this is not the case with most manufacturing firms in Nigeria where potential lenders have little or no knowledge about the managerial capabilities such enterprises. Peterson and Rajan (1992) observe that small enterprises (in Nigeria) are most likely to face credit rationing because most potential lenders have little information on the managerial capabilities or investment opportunities of such firms and are unlikely to be able to screen out poor credit risks, or to have control over borrowers' investment.

McKinnon (1973) and Shaw (1973) emphasized the importance of internal and external finances in the development of manufacturing sub-sector in developing countries, including Nigeria. While McKinnon emphasizes the significance of internal finance, where investors have to accumulate savings before obtaining lumpier capital goods, Shaw stresses the importance of external finance and the development of financial institutions in capital accumulation. In Nigeria, accumulation of savings for investment is hindered by poverty. Eyraud, (2002) reveals that Sub-Saharan Africa houses 290 million people in dire poverty and many of them are surviving far below the poverty line of US$ 1 a day.

With regard to external finance in Nigeria, harsh environment hinders financial institutions in developing manufacturing sub-sector. Commercial banks' ability to pool risks across many investment projects promotes growth by promoting higher and safer returns to individual investors. If the risk from sectoral shocks is efficiently shared, portfolio diversification may also encourage specialization, and thus productivity growth (Saint-Paul 1992). Furthermore, the presence of banks or insurance companies reduces the need to hold savings in liquid and thus secures additional funds for investment in productive capital (Bencivenga and Smith 1991; Levine 1991). These roles are not fully exploited in Nigeria by financial institution due to underdevelopment of money and capital markets, including harsh environment in which these institutions operate.

Schatz (1964) saw the importance of capital in different perspective. He raised the issue of capital shortage in the finance of manufacturing sub-sector in Nigeria. Most of the Nigerian businessmen believe that inadequate capital is their main business handicap. Schatz refuted this idea and revealed that what really existed in Nigeria was the shortage of viable projects and not that of capital. He provided empirical evidence using loans

operations of the Federal Loans Board (FLB), which gave loans only to firms that had been well established.

He introduced the concept of effective demand (for capital) where he mentioned that 'those with projects which the potential lenders adjudged unworthy have a desire for capital but not effective demand for capital… The security rejectees have a desire but not an effective demand for capital'. In his analysis he showed that "the large false demand for capital creates the illusion that there is a shortage of capital. But the record indicates that true situation is the converse of capital shortage. Instead of a large number of viable projects vainly seeking capital, the situation has been one of capital vainly seeking viable private projects" (p.97). He concluded by generalizing the thesis and applying it to the country (Nigeria) as a whole by saying that the prevalence of a false demand for capital throughout the entire country is virtually beyond dispute" (p.102).

However, Diaku (1972) could not reason with Schatz in this direction. He pointed out that the problem facing manufacturing industries in Nigeria is that of shortage of capital and not "capital vainly seeking viable private projects" as demonstrated by Schatz. He gave four assumptions under which Schatz's thesis could hold and he showed that all the assumptions could not be upheld. He developed another concept of effective demand and in the conclusion of his analysis he said: "we must discard the thesis (Schatz' thesis)… as providing no satisfactory operational foundation for either evaluating the capital situation in Nigeria or in any other developing country. At best it is an appealing but misleading empirical hypothesis which, by the logic of the author's methodology, is incapable of proof." (p.141).

Diaku (1972), in explaining alternative sources of capital surplus illusion, showed that there was an error in fact and logic in Schatz's thesis, and that he placed more emphasis on effect rather than causation. For example, Diaku said, "with regards to viable projects, Schatz argues: 'the shortage could be caused by a lack of entrepreneurial capacity, using this term to refer to experience, training, knowledge and everything else that goes to make up the ability of the business man himself '. Diaku explained that the significant shortages in the Nigerian private industrial sectors are entrepreneurial training and knowledge, managerial skill and infrastructure and that once these shortages are

removed most viable projects will be revealed. He, therefore, concluded that it was not viable project per se that are in short supply in Nigeria, but the factors preventing the detection of viable projects, and these factors were in themselves broader aspects of capital shortage.

2.0.3 Interest Rates and Manufacturing Sub-sector in Nigeria

The 1970s saw different interest rates for different sectors through to mid 1980s. The preferential interest rates were based on the assumption that the market rate, if universally applied, would exclude some of the priority sectors. Interest rates were, therefore, adjusted periodically to promote increase in the level of investment in the different sectors of the economy. For example agriculture and manufacturing sectors were accorded priority, and the commercial banks were directed (by the central bank) to charge a preferential interest rates (vary from year to year) on all loans and advances to small-scale industries.

Currently, the government of Nigeria is pursuing a market-determined interest rate regime, which does not permit a direct state intervention in the general direct of the economy. The market demand and supply is the driving force of resource allocation. Thus current formal lending policy does not give special interest rate concession to the manufacturing sub-sector. The interest on loans is based on the risk factor of the sub-sector that the loan is meant for.

From Table 1, the average nominal lending rate rose from 8% in 1973-1979 to 25.3 per cent in 2002 and the corresponding inflation rates were 16.8 % and 9.3% respectively. Real lending rates were negatives in most of the years except 2002, which is a reflection of high inflation rates. This shows that high inflation rate is a contributing factor to high lending rates in Nigeria (Adebiyi, 2001).

Table 1: Interest Rates and Manufacturing Sub-Sector in Nigeria (1973-2002)

Indicators	1973- 79	1980-85	1986-89	1990-93	1994-1998	2002
Inflation Rate	16.8	17.8	23.7	30.6	35.5	9.3
Interest Rates						
-*Nominal Lending Rate*	8.0	10.6	17.9	29.5	21.5	25.3
-*Real Lending Rate*	- 8.8	-7.2	-5.8	-1.1	-14.0	16.0
- *Nominal Deposit Rate*	6.0	7.7	12.7	16.4	2.6	14.9
- *Real Deposit Rate*	-10.8	-10.1	-11.0	-14.2	-22.9	5.6
Exchange rate (N / $)	0.3	0.7	4. 2	14.3	21.9	120.5*
Growth rate of						
Manufacturing (%)	55.7	13.6	9.2	6.7	5.0	2.9
Share of manufacturing						
in GDP (%)	9.2	8.5	8.3	8.0	6.9	6.0
Manufacturing						
Capacity utilization (%)	67.4	58.9	40.2	39.5	33.4	41.3
Bank credit to the						
Private Sector (% GDP)	15.2	14.9	14.2	8.8	2.6	11.8

Notes: The figures are computed.

Sources: International Financial Statistics, various years; Central Bank of Nigeria (CBN) *Statistical Bulletin*, 2002, and CBN*, Annual Report and Statement of Accounts*, various years.

* In year 2002, dual exchange rates, which include official and parallel market rates, were abolished. A single exchange rate was allowed, which was market-determined.

Similarly, bank credit to the private sector (expressed as a percentage of GDP) declined from 15.2 % to 2.6% between the periods 1973-79 and 1994-98 respectively and later rose to 11.8 per cent in 2002. Similar trends were also revealed using other indicators such as manufacturing capacity utilization, share of manufacturing in GDP,

growth rate of manufacturing (in Percentage). It can be deduced from the Table that manufacturing performance in Nigeria during the deregulation era was not encouraging.

The rather high lending rate, coupled with the general perception of manufacturing enterprise lack of the traditional bank collateral requirement, meant that the manufacturing sector access to formal bank loans is limited. This explains the reason for the creation of special financial schemes for the growth and development of the manufacturing sub-sector in Nigeria. The evaluation of these institutions revealed that most of them were faced with problems arising from weak institutional arrangement and corrupt practices (Adebiyi, 2004).

Commercial Banks in Nigeria are highly liquid but they perceive that lending to the manufacturing sub-sector is very risky and increasing credit to the sector is not justified in terms of risk and cost. The high risk arises from difficulties in obtaining information on a firm's true financial condition and performance coupled with weak and inefficient institutions makes it difficult for banks to enforce contracts. Also, the business environment in Nigeria is very risky and uncertain coupled with poor infrastructural facilities necessary to bring about substantial reduction in the risk associated with financing an extremely traumatized economy. Consequently, banks charge high interest rates, demand high levels of collateral and make few loans of more than a year in term (World Bank, 2002).

Development finance institutions (DFIs) have been established to contribute to the development of specific sectors of the economy. They consist of the Nigeria Industrial Development Bank (NIDB), Nigeria Bank for Commerce and Industry (NBCI), Community Banks, Nigerian Agricultural and Co-operative Bank (NACB), Urban Development Bank (UDB) and Bank of Industries (BOIs) (Adebiyi, 2004).

However, most of these institutions performed below expectations due to some factors. Some of these constrained affect the institutions responsible for financing manufacturing sub-sector, while some affect the sub-sector itself. These constrained can be summarized as followed. First, the nature of small-scale enterprises limits its accessibility to financial institutions. Due to their organisational structure, size and operations, manufacturing sub-sector, particularly the small and medium enterprises (SMEs) portray a high-risk, high-failure-rate group. They are typically sole-proprietors or

family-owned partnerships, and there is no separate legal personality attributable to the SME other than its proprietor(s). For this purpose, the existence and continuance of an SME in business is limited to the life span of its proprietor. This perception adversely affects its ability to secure short-term finance since their capital base is usually very small and not adapted to sustain any meaningful loan fund from the Nigerian banks. Occasionally, only SMEs that are involved in merchandising importation can afford to undertake commercial short-term financing of 60 days or less.

Second, inadequate infrastructure, such as communications, roads, water and electricity is responsible for the failure of development institutions from adequately financing manufacturing sub-sector. It has also impeded the activities of the both the operators of the scheme and their clientele. There is, also, high rate of loan default due to poor loan appraisal, monitoring, incidence of diversion and absence of collaterals (Adebiyi, 2004). Consequently, the volume of loanable funds is depleted and the institutions are discouraged from giving further loans. For Instance, Small Scale Industries Scheme (SSICS) was largely unsuccessful due to dearth of executive capacity to appraise, supervise and monitor projects. As a result, many unviable projects were funded which led to massive loan repayment default. The SSICS, which was meant to be revolving loan scheme, became progressively starved of funds such that it had to be discontinued in 1979 and NBCI was set up in its place to fund SMEs (Olorunisola, 2001).

Third, there is also the problem of poor funding and under-capitalization. Most of the development banks and the schemes lack sufficient equity and many of them rely on government subvention for their funds. For instance, Nigerian Banks for Commerce and Industries (NBCI) failed to achieve its objectives due to operational and liquidity problems. The bank continued to operate with huge negative position and high proportion of long-term borrowings and unclassified liabilities. The need to reinvigorate the bank to ensure its continued relevance and survival led to the merging of NBCI with NIDB and the National Economic Reconstruction Fund (NERFUND) in 2000 to form Bank of Industry (Adebiyi, 2004).

Lastly, inadequate staffing and overlapping of functions are responsible for the poor performance of development institutions in financing manufacturing sub-sector. Some development institutions misallocate their limited resources by building sophisticated edifices instead of employing qualified professional and training their existing staff. Most of the institutions appear to operate at cross-purposes. For instance, the establishment of the NERFUND appears to have adversely affected NBCI's operation (Olorunsola, 2001).

3.0 Data and Methodology

This section explains the data set, unit root tests employed and error correction mechanism procedure.

3.0.1 The Data Set

The data set for this paper consists of annual time series spanning 1970 through 2002. The variables under consideration are: interest rate spread (IRS); institutional reforms dummy variable (DUM), which takes care of the period of Structural Adjustment Programmes (SAPs) and it takes the value of one during reforms and zero otherwise; government deficits financing (DGF); bank credit to manufacturing sub-sector (CMS); inflation rate (INF); index of manufacturing production (IMP) and exchange rate (ER). Exchange rate is obtained from International Financial Statistics (IFS), the publication of World Bank while interest rate spread was computed lending and deposit rates. The rest variables are obtained from the Nigerian *Federal Office of Statistics* and Central Bank of Nigeria publications including *Statistical Bulletin, Central Bank of Nigeria (CBN) Annual Report and statement of Account;* and CBN: *Economic and Financial Review*, various years.

3.0.2 Model Specification

There are different indicators to measure the performance of manufacturing sub-sector. These include index of manufacturing production, contribution of manufacturing to gross domestic product, employment in the manufacturing sub-sector, capacity utilization in the manufacturing sub-sector, and manufacturing value-added. This study takes index of

manufacturing production (IMP) as the dependent variable because changes in the manufacturing sub-sector, arising from government monetary and fiscal policies, can easily be observed in this variable. The explanatory variables include: interest rate spread (IRS); institutional reforms dummy variable (DUM); banks' credit to the manufacturing sub-sector (CMS); government deficit financing (DGF); inflation rates (INF); and exchange rate (ER). These variables are essential for the following reasons.

In Nigeria, the performance of manufacturing sub-sector has been hindered by high interest rates, particularly the interest rate spread. Interest rate spread (IRS) is the difference between lending and borrowing rates. It is alleged that this rate is partly responsible for high cost of production in the Nigerian manufacturing sub-sector (Adebiyi, 2001).

Moreover, in Nigeria, government expenditure is characterized by deficit financing through the Ways and Means of Central Bank of Nigeria (CBN). The implication of these developments is that the fiscal operations of the Federal government in most of the years have usually resulted in large and growing overall deficits, which have been largely financed through CBN credit, as CBN is statutorily required to underwrite un-subscribed debts issues, as well as grant direct credit in the form of Ways and Mean Advances. This mode of deficit financing directly increases the monetary base and increases the level of excess liquidity with adverse effect on exchange rate and price level (Ojo, 2001).

Looking at the financing deficits through the money market, one can adduce some negative impart on the banking industry and the Nigerian economy. The way it affects banking industry is that once government get the money from Treasury bills (TBs), through mopping the liquidity in the system, it deprives the private sector from having loanable funds. This, in turn makes the cost of the fund very high for manufacturing firms.

The impact of institutional reforms on manufacturing growth is proxied with dummy variable. It is alleged that economic regulation in developing countries has hindered growth and development through high interest rate (McKinnon 1973; Shaw, 1973). Deregulation of interest rate, according to them, will, not only raise the real returns on savings but, promote investment and economic growth in developing countries. On this

basis, the study uses dummy variable one for the period of economic reforms and zero for the other periods.

Against this background, the model for the study is specified as follow:

$IMP = a_1 + a_2IRS + a_3ER + a_4DGF + a_5CMS + a_6DUM + a_7INF + V$…… (1)

Where $a_1 > 0$; $a_2 < 0$; $a_3 < 0$; $a_4 < 0$; $a_5 > 0$; $a_6 > 0$; $a_7 > 0$; .

3.0.3 Methodology

This paper employs co-integration technique (Komolafe, 1996) and Granger causality tests suggested by Granger (1969, 1986) to estimate the model, and the causality between index of manufacturing production and the explanatory variables. However, in order to avoid spurious regression results, stationarity of variables and cointegration among them should be tested prior to estimation of error correction model and Granger causality regressions.

Papers by Granger (1969), and Engle and Granger (1987) show that for nonstationary and cointegrated variables, a comprehensive test of causality between two variables should allow for an additional channel through which causality could emerge. Formally, we may have to use the information from the cointegration regression between two or more variables via the error correction model. Therefore, prior to performing Granger causality tests, the long-run behavior of the variables should be examined using cointegration tests. However, co-integration tests for stationary variables would be meaningless because variables have to be integrated individually in order to be co-integrated.

Thus, before explaining this test in detail, we examine the stationarity of variables. If the variables are non-stationary, we can induce stationarity by performing unit root test.

3.0.4 Data Processing, Model Transformation and Estimation

Annual time series data for the period between 1970 and 2002 are used in the present study. We start the empirical analysis by examining the characterization of the variables used. Table 1 reports the unit root test results using Augmented Dickey Fuller (ADF) test.

To proceed with the test, graph of each series is first visually examined to see whether a trend is present or not as shown in Figure 1.

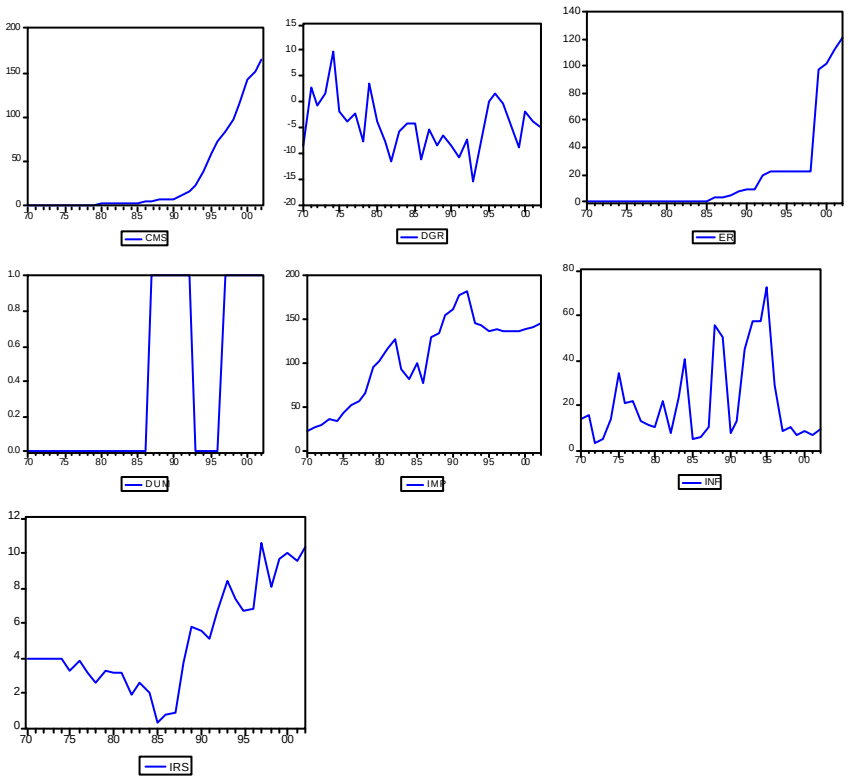


Figure 1(a): Variables are shown at levels, 1970-2002.

Notes: IMP stands for index of manufacturing production; IRS represents interest rate spread; DUM denotes institutional reforms dummy variable; CMS is the banks' credit to the manufacturing sub-sector; DGF stands for government deficit financing; INF represents inflation rates; and ER denotes exchange rate of naira to dollar.

Sources: Central Bank of Nigeria, *Statistical Bulletin*, various issues; *Central bank of Nigeria: Annual Report and Statement of Accounts*, December, 2002; and *International Financial Statistics*, various years.

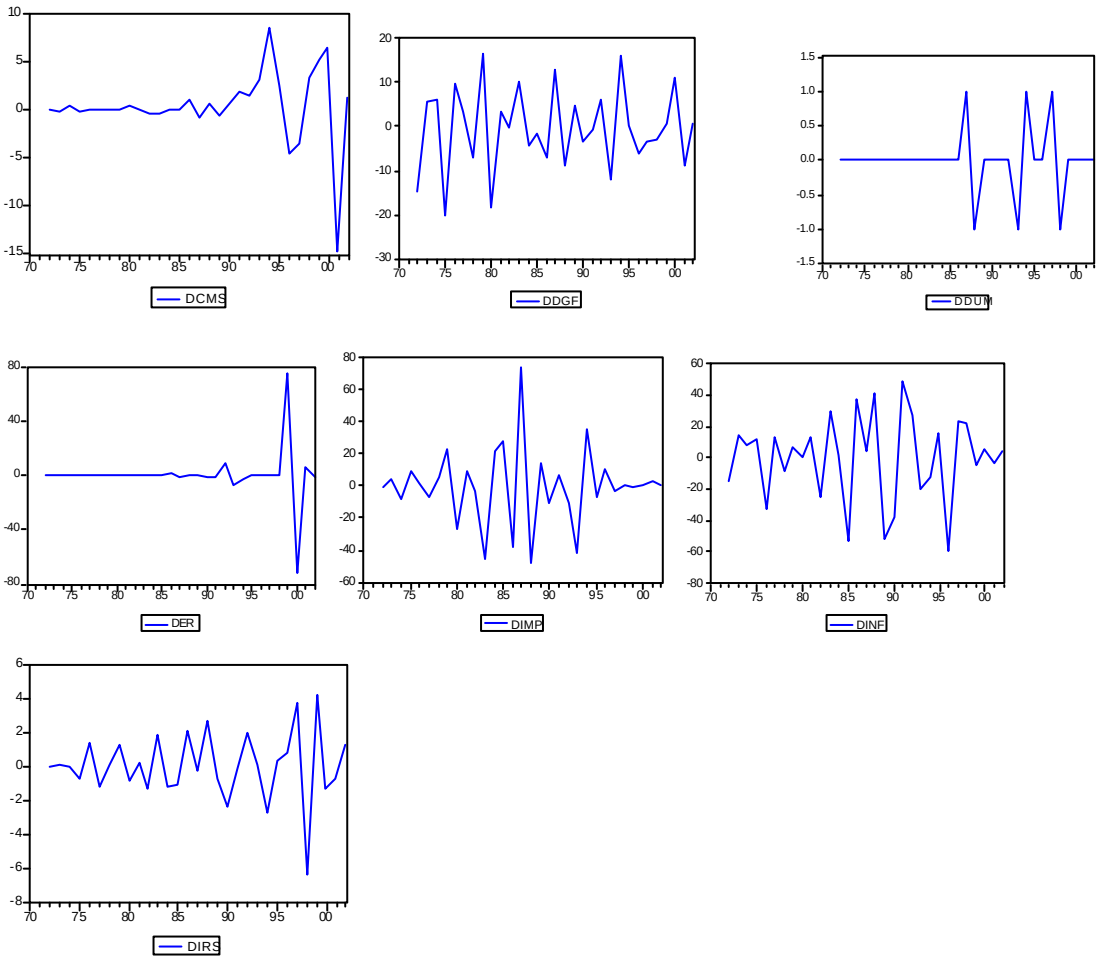


Figure 1(b): Variables are as defined in Figure 1 (a) and are shown at second difference, 1970-2002

A trend variable is necessary in the ADF regression if trends are present in the series. In the absence of a trend in the series, only an intercept is included in testing for unit roots. Figure 1(a) shows that only exchange rate (ER) and bank credit to manufacturing sub-sectors (CMS) are trended.

In literature, most time series variables are non-stationary and using non-stationary variables in the model might lead to spurious regressions (Granger and Newbold 1977). The first or second differenced terms of most variables will usually be stationary (Ramanathan 1992). All the variables are tested at levels, first and second differences for stationarity using the augmented Dickey-Fuller (ADF) test. All the variables except

inflation rates are not stationary at levels but all are stationary at first or second-order first difference (see Table 1).

Table 1: Augmented Dickey-Fuller Unit Root Test: 1970- 2002.

Variables	*Trend*	*At Level*	*1st Difference*	*2nd Difference*
CMS	with	-2.09	-2.68	-5.04*
DGF	without	-2.80	-5.35*	-7.40*
DUM	without	-1.74	-3.74*	-6.24*
ER	with	-0.17	-4.12**	-6.22*
IMP	without	-1.66	-3.28**	-6.49*
INF	without	-3.47**	-5.66*	-6.59*
IRS	without	-020	-4.54*	-6.91*
MCU	without	-1.32	-2.59	-4.61*

*Significant at 1 per cent level

**Significant at 5 per cent level

Critical value with trend:	1 per cent	-4.31
	5 per cent	-3.57
Critical Value without trend:	1 per cent	-3.66
	5 per cent	-2.96

Note: Variables are as defined in Figure 1(a)

Co-integrating Results

Johansen procedure is used to identify a long-run manufacturing growth amongst the co-integrating vectors.

Table 2 reports the estimates of Johansen procedure and standard statistics. In determine the number of co-integrating vectors we used degrees of freedom adjusted version of the maximum eigenvalue and trace statistics, since the existence of small samples with too many variables or lag Johansen procedure tends to over estimates the number of co-integrating vectors (see Civcir, 2003). These test statistics strongly rejects the null hypothesis of no co-integration in favour of three co-integration relationships.

Table 2: Co-integrating Tests

Co-integrating Tests						
Eigenvalues	0.794	0.725	0.632	0.308	0.192	0.069
Hypothesis	r=0	r=1	r =2	r=3	r=4	r=5
Maximum Eigenvalue	47.420*	38.704*	30.000*	11.035	6.378	2.138
95% critical value	40.078	33.877	27.584	21.132	14.265	3.842
Trace Test	135.676*	88.255*	49.551*	19.551	8.515	2.138
95% critical value	95.7546	69.819	47.856	29.797	15.495	3.841

Notes: VAR include two lags on each variables and a constant term. The estimated period is 1970-2002. None of the deterministic variable is restricted to the co-integration space and maximum eigenvalue and trace test statistics are adjusted for degrees of freedom. The critical values are taken from MacKinnon-Haug-Michelis (1999). The * indicates rejection of likelihood ratio tests at 5% significant level.

Having explained the unit root and co-integration tests, the co-integrated equation 1 is re-specified as an ECM using Engel-Granger two-step method (lagged residual as error correction term). The economic model (Eq. 1) is transformed into an econometric model under ECM framework in Equation 2.

$$?(IMP)_t = h_0 + h_{1i}\sum_{i=0}^{1} ?IRS_{t-i} + h_{2i}\sum_{i=0}^{1} ?ER_{t-i} + h_{3i}\sum_{i=0}^{1} ?DGF_{t-i} + h_{4i}\sum_{i=0}^{1} ?CMS_{t-i} + h_{5i}\sum_{i=0}^{1} ?DUM_{t-1} + h_6\sum_{i=0}^{1} ?INF_{t-1}$$

$$? \quad h_7 ECM_{t-1} + E_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(2)..$$

where ECM is the error correction term (lagged residual of static regression) and '?' stands for first difference. All the variables (second order first differenced) in the equation are stationary and therefore ordinary least square (OLS) method gives consistent and valid estimates (Enders 1995). The model is estimated by OLS method and the residual is tested for autocorrelation error. The model makes use of annual time series data and has lagged dependent variable as explanatory variable. A series of diagnostic tests are conducted to verify stability and to evaluate the predictive accuracy of the model. These tests are essential to judge the validity and acceptability of the conclusions drawn from the model estimates.

4.0 **Empirical Results and Discussion**

The results of model estimation and the various diagnostic tests are presented below. Equation (2) is estimated using the index of manufacturing production as the dependent variable. The results of over-parameterized and parsimonious models are reported in Tables 3 and 4. The parameters estimate along with the standard errors, t-values and the corresponding critical values are given in the Tables. The signs of all estimated coefficients are as expected in the parsimonious model in Table 4. The parameters of all variables in Table 4 are significant at 5 per cent.

Table 3: The Over-parameterized Error Correction Model.

Dependent Variable: D(IMP,2)
Method: Least Squares
Sample(adjusted): 1973 2002
Included observations: 30 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IMP(-1),2)	-0.305075	0.184545	-1.653120	0.1167
D(CMS,2)	0.182862	0.719799	0.254046	0.8025
D(CMS(-1),2)	0.180429	0.716456	0.251835	0.8042
D(DGF,2)	-0.309598	0.408558	-0.757782	0.4590
D(DGF(-1),2)	-0.51130	0.375651	-1.361115	0.1912
D(DUM,2)	42.8284*	7.564706	5.661613	0.0000
D(DUM(-1),2)	22.8889**	9.557820	2.394787	0.0284
D(INF,2)	-0.047402	0.118197	-0.401044	0.6934
D(INF(-1),2)	0.27714**	0.114061	2.429820	0.0265
D(IRS,2)	-3.13008***	1.786610	-1.751970	0.0978
D(IRS(-1),2)	-1.848533	1.531777	-1.206790	0.2440
ECM(-1)	-0.34610*	0.125427	-2.759432	0.0134
(R)	0.945025	2.358295	0.400724	0.6936
R-squared	0.850755			
Adjusted R-squared	0.745406			
S.E. of regression	12.54754	Akaike info criterion		8.195609
Sum squared resid	2676.492	Schwarz criterion		8.802794
Log likelihood	-109.9341	F-statistic		8.075569
Durbin-Watson stat	2.331671	Prob(F-statistic)		0.000075

Source: Computed

Note *significant at 1 per cent

** Significant at 5 per cent

*** Significant at 10 per cent

In Table 3, interest rate spread has a negative but significant relationship with index of manufacturing production. A one per cent rise in the interest rate spread decreases index of manufacturing production by 3 per cent. This is not surprising in Nigeria since high lending rate without corresponding increase in deposit rate (i.e. high interest rate spread) has been identified as a principal factor responsible for high cost of production in manufacturing sub-sector. World Bank (2002) revealed that high interest rate in the Nigerian financial system is a reflection of the extremely poor infrastructural facilities and inefficient institutional framework necessary to bring about substantial reduction in the risk associated with financing an extremely traumatized economy. Olorunsola (2001), also, showed that the business environment in Nigeria in general is very risky and uncertain, coupled with inefficient judicial system, which makes it difficult for banks to easily enforce contracts.

Government deficit financing has a negative and insignificant relationship with index of manufacturing production at level and at first difference. A one per cent increase in government deficit financing at level, in Table 4, reduces index of manufacturing production by 0.31 per cent. The implication of this finding is that the fiscal operations of the Federal government up to 2003 have usually resulted in large and growing overall deficits, which have been largely financed through CBN credit, as CBN is statutorily required to underwrite un-subscribed debts issues, as well as grant direct credit in the form of Ways and Mean Advances (Ojo, 2001). This mode of deficit financing directly increases the monetary base and increases the level of excess liquidity with adverse consequences on exchange rate, price level, and manufacturing performance.

Banks' credit to the manufacturing subsector has a positive but insignificant relationship with index of manufacturing production. The reason for this finding may be attributed to the negligence of commercial bank in lending to this sector. The development institutions which are expected to finance manufacturing sub-sector in Nigeria have failed due to harsh environment in which they are operating (Adebiyi, 2004).

Institutional and economic reforms are proxied using dummy variable. It has a positive and significant relationship with index of manufacturing production at level and first

difference. This implies that the deregulation of the Nigerian economy has a positive impact on the manufacturing performance in Nigeria. This may be true from the perspective of local sourcing of raw materials and the growth of small-scale industry.

Inflation rate has positive and significant relationship with index of manufacturing production. A one percent rise in inflation rate, in Table 4, raises index of manufacturing production by 0.2 per cent. The implication of this finding is that high inflation rate exerts a substantial impact on index of manufacturing production and, thus, one must interpret the growth in the index with caution. From the over-parameterized error correction model, inflation rate exert negative impact on index of manufacturing sub-sector. This is usually true in developing countries, like Nigeria, where the public has no confidence in the government and policy announcements cannot influence public expectations.

Co-integration is revealed in the index of manufacturing production model. That is to say that there is a long-run relationship between the dependent variable and its explanatory variables. The speed of adjustment to equilibrium in its current period is 41 percent. The parameter of the error correction term is significant at 1 per cent. This result justifies the use of an ECM specification of the model.

Table 4: The Parsimonious Error Correction Model.

Dependent Variable: D(IMP,2)
Method: Least Squares
Sample (adjusted): 1973 2002
Included observations: 30 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IMP(-1),2)	-0.4392*	0.130044	-3.377820	0.0025
D(DUM,2)	38.4598*	6.639197	5.792848	0.0000
D(DUM(-1),2)	22.4032*	7.018512	3.192018	0.0039
D(INF(-1),2)	0.21748**	0.101369	2.145434	0.0422
ECM (-1)	-0.4088*	0.103308	-3.958062	0.0006
C	1.398202	2.312931	0.604515	0.5512
R-squared	0.789574			
Adjusted R-squared	0.745735			
S.E. of regression	12.53943	Akaike info criterion		8.072490
Sum squared resid	3773.695	Schwarz criterion		8.352729
Log likelihood	-115.0873	F-statistic		18.01084
Durbin-Watson stat	2.258838	Prob(F-statistic)		0.000000

Source: Computed

Note *significant at 1 per cent

** Significant at 5 per cent

We test for stability properties of the model using Cumulative Sum of the residuals (CUSUM) and Cumulative Sum of Squares of the residuals (CUSUM Squares) tests. The results of the tests are provided in Figures 2 and 3. The existence of parameter instability is established if the Cumulative Sum of the residuals and Cumulative Sum of the Squares of residuals go outside the area between the two critical (dotted) lines. It is estimated at 5 percent critical level. From Figures 2 and 3 it can be inferred that, for the period under review, stability is established. However, in 1991 and 1992, element of instability is noted using Cumulative Sum of the Squares of residuals.

Figure 2: Cumulative Sum of Residuals (CUSUM) Test

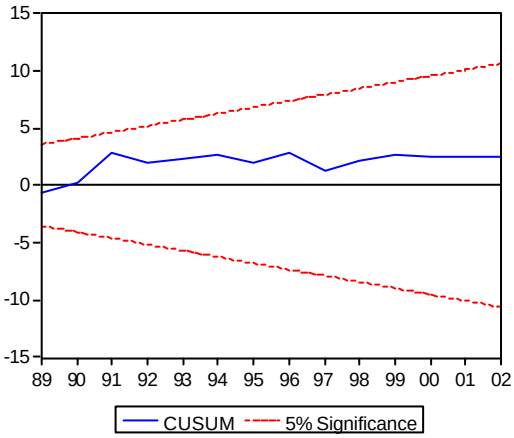
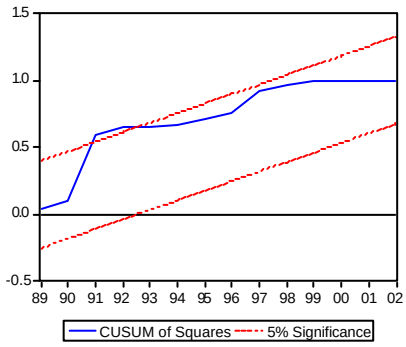


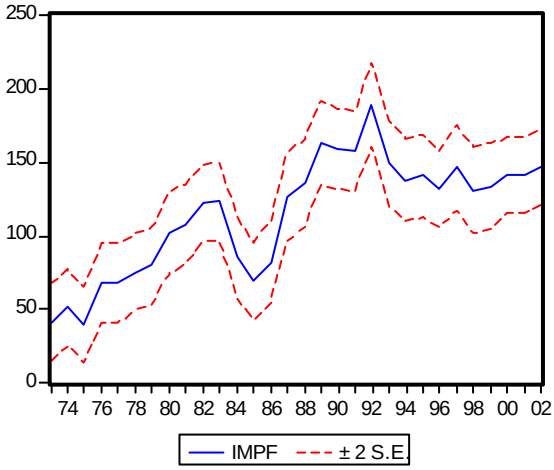
Figure 3: Cumulative Sum of Squares of Residuals (CUSUM of Squares) Test



The three common measures of predictive accuracy (root mean square error (RMSE), mean absolute error (MAE) and Theil's inequality coefficient (U)) are used to evaluate its predictive performance. The values of RMSE, MAE and U are reported in Figure 4. These results are satisfactory and the model is reasonably accurate in prediction.

Finally, the coefficient of determination (R_2 and adjusted-R_2) is used to measure the goodness-of-fit of the estimated model. The results in Tables 3 and 4 are also satisfactory.

Fig.4: Predictive and Forecast Test

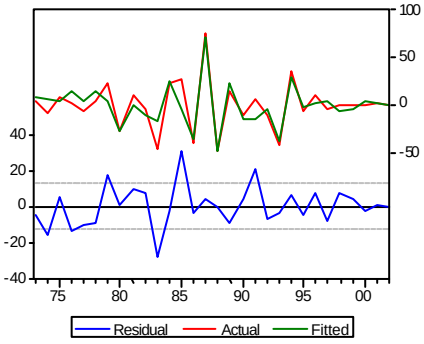


Forecast: IMPF
Actual: IMP
Forecast sample: 1970 2002
Adjusted sample: 1973 2002
Included observations: 30

Root Mean Squared Error	11.21561
Mean Abs. Percent Error	8.266213
Mean Absolute Percentage Error	9.502770
Theil Inequality Coefficient	0.046116
Bias Proportion	0.000000
Variance Proportion	0.028758

An in-sample forecast of the endogenous variable (IMP) is made and the actual and forecast values are reported in Figure 5. As could be seen from Figure 5, the model is capable of tracking the historical values of endogenous variables with reasonable accuracy. The fiscal indiscipline in the 90s, leading to a deteriorating external balance, depreciation of the naira and the implementation of a structural adjustment programme in 1987 to date, have not probably altered the equilibrium behaviour of the variables. The fits were quite impressive and they did track the actual dates. The ability of the model to capture turning points was remarkable**.** The model does forecast the actual variable well. That is, the model has a good predictive ability.

Figure 5: Index of Manufacturing Production Function in Nigeria: Actual and Predicted Values



5.0 Summary, Conclusion and Policy Recommendations.

In this study, we set out to empirically investigate the impact of interest rates and other macroeconomic factors on manufacturing performance in Nigeria using co-integration and an error correction mechanism (ECM) technique with annual time series covering the period between 1970 and 2002. Some statistical tools are employed to explore the relationship between these variables. The analysis starts with examining stochastic characteristics of each time series by testing their stationarity using Augmented Dickey Fuller (ADF) test, and then estimate error correction mechanism model.

From the error correction model, several interesting conclusions are drawn. First, interest rate spread and government deficit financing have negative impact on the growth of manufacturing sub-sector in Nigeria. This collaborates with other earlier studies on manufacturing performance. Second, the study shows that rising in the index of manufacturing sub-sector is a reflection of high inflation rate and it cannot be interpreted to mean a real growth in the sector. Thirdly, the study empirically reveals that liberalization of the Nigerian economy has promoted manufacturing growth between

1970 and 2002. Lastly, the findings are further reinforced by the presence of a long-term equilibrium relationship, as evidenced by the co-integration, and stability in the model.

The coefficient of the error correction term is negative, significant and less that one, which is appropriate. This result justifies the use of an ECM specification of the model.

On the basis of these findings, the following recommendations are made. First, government must avoid deficit financing as much as possible. In case it becomes necessary to budget for deficit, it should not be finance through the Ways and Means of Central Banks to avoid inflation. Second, since high interest rate in the Nigerian financial system is a reflection of the extremely poor infrastructural facilities and inefficient institutional framework, government must create "enabling environment" in the areas of infrastructures, financial legal and property rights. Institutional reforms that encourage savings mobilization should be pursued.

Third, since most of the past development institutions, which are expected to finance manufacturing sub-sector in Nigeria, have failed due to harsh environment, the establishment of Small and Medium Industries Equity Investment Scheme (SMIEIS) and Bank of Industry should be strengthened. They should avoid the pitfalls of the past development institutions. Bankers Committee should ensure that manufacturing firms are adequately considered in the disbursement of the SMIEIS' fund.

Fourth, in order to reduce inflationary expectation, government should promote policy transparency. Transparency tends to lower inflationary expectations by providing an implicit commitment mechanism on the part of the Central Bank. This makes the policy to become more credible and the public can form expectations that are closer to the policy targets. Lastly, high cost of borrowing is due to high interest rate spread. The reduction of the margin between lending and deposit rate to 7.5% is in the right direction. However, deposit rate should be encouraged to rise in line with Treasury bill rate so as not to encourage institutional savers substituting Treasury bill for deposits.

Appendix 1: Co-Integration Test

Sample (adjusted): 1973 2002
Included observations: 30 after adjustments
Trend assumption: Linear deterministic trend
Series: CMS ER IMP INF IRS DGF
Lags interval (in first differences): 2 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.794164	135.6755	95.75366	0.0000
At most 1 *	0.724769	88.25525	69.81889	0.0009
At most 2 *	0.632124	49.55091	47.85613	0.0343
At most 3	0.307772	19.55064	29.79707	0.4539
At most 4	0.191519	8.515450	15.49471	0.4120
At most 5	0.068771	2.137502	3.841466	0.1437

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.794164	47.42021	40.07757	0.0063
At most 1 *	0.724769	38.70433	33.87687	0.0123
At most 2 *	0.632124	30.00027	27.58434	0.0240
At most 3	0.307772	11.03520	21.13162	0.6438
At most 4	0.191519	6.377947	14.26460	0.5652
At most 5	0.068771	2.137502	3.841466	0.1437

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

CMS	ER	IMP	INF	IRS	DGF
-0.076468	0.040075	0.012202	-0.023465	-0.313992	0.132644
0.077217	-0.028239	-0.011761	0.002177	-0.416808	0.003705
0.100396	-0.049255	0.027613	0.020108	-0.025222	0.211677
-0.029931	0.054507	0.000910	-0.031815	0.324991	0.092130

-0.023883	0.009863	-0.021454	0.034056	0.128892	0.066211
-0.013183	0.087484	0.001757	0.054831	-0.430241	0.066305

Unrestricted Adjustment Coefficients (alpha):

D(CMS)	-3.300708	-1.286031	0.890631	0.390511	-0.543356
D(ER)	-3.350051	5.967509	3.021975	-1.088042	-1.565609
D(IMP)	-1.408972	3.270441	-4.572126	-1.052818	2.405430
D(INF)	2.798452	-1.301394	-2.597143	5.043963	-5.303294
D(IRS)	0.380991	0.140062	0.132918	-0.285587	-0.425036
D(DGF)	-2.563242	-0.594738	-3.118999	-0.984108	-0.507650

1 Cointegrating Equation(s): Log likelihood -551.3528

Normalized cointegrating coefficients (standard error in parentheses)

CMS	ER	IMP	INF	IRS	DGF
1.000000	-0.524075	-0.159568	0.306857	4.106189	-1.734634
	(0.12802)	(0.05370)	(0.10667)	(1.06861)	(0.39658)

Adjustment coefficients (standard error in parentheses)

D(CMS)	0.252399
	(0.04821)
D(ER)	0.256172
	(0.14886)
D(IMP)	0.107741
	(0.24370)
D(INF)	-0.213992
	(0.25519)
D(IRS)	-0.029134
	(0.01917)
D(DGF)	0.196006
	(0.07659)

2 Cointegrating Equation(s): Log likelihood -532.0006

Normalized cointegrating coefficients (standard error in parentheses)

CMS	ER	IMP	INF	IRS	DGF
1.000000	0.000000	-0.135564	-0.615286	-27.34426	4.164321
		(0.24590)	(0.42710)	(4.46037)	(1.67903)
0.000000	1.000000	0.045803	-1.759563	-60.01134	11.25594
		(0.52809)	(0.91722)	(9.57885)	(3.60579)

Adjustment coefficients (standard error in parentheses)

D(CMS)	0.153095	-0.095960
	(0.06169)	(0.02783)

D(ER)	0.716967	-0.302768
	(0.16012)	(0.07223)
D(IMP)	0.360276	-0.148817
	(0.33795)	(0.15246)
D(INF)	-0.314482	0.148898
	(0.36142)	(0.16304)
D(IRS)	-0.018318	0.011313
	(0.02706)	(0.01221)
D(DGF)	0.150082	-0.085927
	(0.10798)	(0.04871)

3 Cointegrating Equation(s): Log likelihood -517.0005

Normalized cointegrating coefficients (standard error in parentheses)

CMS	ER	IMP	INF	IRS	DGF
1.000000	0.000000	0.000000	-0.630210	-28.07954	5.249374
			(0.41559)	(4.53123)	(1.40147)
0.000000	1.000000	0.000000	-1.754521	-59.76291	10.88933
			(0.87507)	(9.54110)	(2.95099)
0.000000	0.000000	1.000000	-0.110088	-5.423856	8.003988
			(0.29003)	(3.16220)	(0.97804)

Adjustment coefficients (standard error in parentheses)

D(CMS)	0.242511	-0.139828	-0.000556
	(0.07915)	(0.03718)	(0.01733)
D(ER)	1.020359	-0.451614	-0.027617
	(0.19604)	(0.09208)	(0.04293)
D(IMP)	-0.098745	0.076382	-0.181907
	(0.43691)	(0.20522)	(0.09568)
D(INF)	-0.575224	0.276819	-0.022262
	(0.48517)	(0.22789)	(0.10625)
D(IRS)	-0.004974	0.004766	0.006672
	(0.03660)	(0.01719)	(0.00801)
D(DGF)	-0.163051	0.067698	-0.110406
	(0.10923)	(0.05131)	(0.02392)

4 Cointegrating Equation(s): Log likelihood -511.4829

Normalized cointegrating coefficients (standard error in parentheses)

CMS	ER	IMP	INF	IRS	DGF
1.000000	0.000000	0.000000	0.000000	10.34353	0.331684
				(3.22147)	(1.01230)
0.000000	1.000000	0.000000	0.000000	47.20792	-2.801649
				(9.88692)	(3.10681)
0.000000	0.000000	1.000000	0.000000	1.288076	7.144942

				(3.06569)	(0.96334)
0.000000	0.000000	0.000000	1.000000	60.96867	-7.803256
				(9.59056)	(3.01368)

Adjustment coefficients (standard error in parentheses)

D(CMS)	0.230822	-0.118543	-0.000201	0.080136	
	(0.07977)	(0.04667)	(0.01713)	(0.02347)	
D(ER)	1.052926	-0.510920	-0.028607	0.186983	
	(0.19692)	(0.11522)	(0.04228)	(0.05793)	
D(IMP)	-0.067233	0.018996	-0.182865	-0.018261	
	(0.44447)	(0.26006)	(0.09544)	(0.13075)	
D(INF)	-0.726196	0.551749	-0.017671	-0.281197	
	(0.46763)	(0.27361)	(0.10041)	(0.13757)	
D(IRS)	0.003574	-0.010800	0.006412	0.003124	
	(0.03619)	(0.02117)	(0.00777)	(0.01065)	
D(DGF)	-0.133596	0.014058	-0.111302	0.027443	
	(0.10685)	(0.06252)	(0.02294)	(0.03143)	

5 Cointegrating Equation(s): Log likelihood -508.2939

Normalized cointegrating coefficients (standard error in parentheses)

CMS	ER	IMP	INF	IRS	DGF
1.000000	0.000000	0.000000	0.000000	0.000000	2.850816
					(0.89110)
0.000000	1.000000	0.000000	0.000000	0.000000	8.695678
					(2.59926)
0.000000	0.000000	1.000000	0.000000	0.000000	7.458648
					(0.96706)
0.000000	0.000000	0.000000	1.000000	0.000000	7.045457
					(2.67994)
0.000000	0.000000	0.000000	0.000000	1.000000	-0.243547
					(0.06733)

Adjustment coefficients (standard error in parentheses)

D(CMS)	0.243799	-0.123902	0.011456	0.061631	1.606840
	(0.07879)	(0.04582)	(0.02004)	(0.02885)	(0.32411)
D(ER)	1.090317	-0.526361	0.004981	0.133665	-2.067035
	(0.19274)	(0.11208)	(0.04902)	(0.07058)	(0.79281)
D(IMP)	-0.124681	0.042720	-0.234471	0.063658	-0.837537
	(0.44312)	(0.25768)	(0.11270)	(0.16226)	(1.82275)
D(INF)	-0.599539	0.499443	0.096105	-0.461806	0.684936
	(0.44079)	(0.25632)	(0.11211)	(0.16141)	(1.81316)
D(IRS)	0.013725	-0.014992	0.015530	-0.011351	-0.328957
	(0.03392)	(0.01972)	(0.00863)	(0.01242)	(0.13953)
D(DGF)	-0.121472	0.009051	-0.100411	0.010154	0.746141
	(0.10690)	(0.06216)	(0.02719)	(0.03915)	(0.43974)

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