Exploration of the impact of international trade on the growth of Nigeria’s manufacturing sector: 1975-2010

Sikiru O. Ashamu and James O. Abiola*

Lagos State University, Department of Accounting and Finance, Lagos State, Nigeria

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The study investigates the impact of International trade on Nigerian Manufacturing sector growth (MSGR). It employs cointegration and error-correction modeling techniques to explore the long-run dynamic relationship between some proxies of international trade on one hand, and Nigeria’s manufacturing sector growth on the other. The study shows that there is a long-run relationship between the two. Again, the findings show that despite the positive relationship between, exports and imports and the Nigerian manufacturing sector’s growth, both exports and imports do not have significant impact on the Nigerian manufacturing sector’s growth. In all, trade had a weak explanatory power of just 40% of the total variation in the MSGR. The findings further reveal that Nigeria’s manufacturing sector has not been benefitting from trade liberalization as the coefficient of trade openness is negative. The causality test confirms the weak influence of the Nigerian manufacturing sector on the major macroeconomic variables. The policy recommendation is that both export promotion and import substitution policies of the government should be made more vibrant in terms of implementation while making the country more investment friendly.

*Corresponding author. Email: joabiola@gmail.com

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INTRODUCTION

Output growth enhancement remains crucial to the drive for rapid industrialization and economic growth in all countries of the world. Output growth in an economic sense means the rate of an increase in the amount of goods and services that are being produced in an economy over a period of time. However, output growth in the manufacturing sector happens to receive greater attention. This is because the manufacturing sector has been regarded as the heart of an economy. Hence, the growth of the sector remains one of the major indices used in appraising the development of an economy (World Bank, 2002). Over the years, some developing countries, like Nigeria, have embarked on unilateral trade liberalization in recent years with very limited results in terms of increased growth and development. Based on these facts, several researchers, such as Analogbei (2000) and Oviemuno (2003), have made output growth concerns their priority.

Globally, the output growth rate of the manufacturing industry is seen as one of the crucial factors in determining the level of dependency of any economy. The manufacturing sector, which can be expressed as part of industrial sector that deals with the production of goods in large quantities for private and commercial use, has served a very important purpose in both human and capital development (World Bank, 1999). Therefore, all hands must be on deck to enhance output through accelerated investment in the industry.

International trade and output growth are both recognized as a catalyst for economic development. The contribution of trade to economic development is immense, owing largely to the obvious fact that most of essential elements of development, such as capital goods, raw materials and technical know-how, are almost entirely imported because of inadequate domestic supply especially in the developing countries.

The World Bank report of 2002 stresses that inability of many countries in sub-Saharan Africa to efficiently utilize the gains from trade contributes to their economic predicament. The report further emphasizes that the
A manufacturing sector of these countries should serve as the medium through which the benefits from trade is transformed to all-round economic development.

It is very clear from this report that empirical analysis of the relationship between international trade and output growth of the Nigerian manufacturing sector is necessary. This is because, despite the growth of international trade in Nigeria (one of the sub-Saharan African countries), the growth of the manufacturing sector has not been encouraging, which question the role of the manufacturing sector in the effective transformation of gains from trade to all-round economic development (World Bank Statistical Bulletin, 2003).

Over the years, many researchers centered their research work on trade and manufacturing growth have not examined the link between international trade and output growth of Nigeria’s manufacturing sector. For instance, Olomola (2003) examines empirically the link between foreign trade and economic growth; Craft (1992) and Nash (1993) assess the effects of the trade policy environment on productivity among others factors. The common feature of most of these studies is the fact that the manufacturing sector, which is the major catalyst through which the positive impact of trade can be felt, has not been given priority in their analyses. Again, the direction of causality between international trade and manufacturing output growth has been a source of concern, which requires special attention. For instance, Analogbei (2000) stresses that there will be a positive relationship between trade and output growth of Nigeria’s manufacturing sector if the problem of inappropriate implementation of industrial policies is put under control, while Lyoh and Ekanem (2002) is of the opinion that trade will cause manufacturing output to grow if properly managed.

On this note, it is very apparent that research work that examines empirically the link between international trade and manufacturing output growth is necessary. This is the major focus of this research work as it studies the impact of international trade on manufacturing sector output growth in Nigeria and expires the long-run relationship between the two from 1975 to 2007.

**LITERATURE REVIEW**

Olomola (2003) focuses on assessing the nature and direction of causality between foreign trade and economic growth in Nigeria. The study employs the use of co-integration and error-correction modelling after the estimation of his model which expresses economic growth (using Nigeria Gross Domestic Product (GDP)) as a function of foreign trade; he discovers a bi-directional causality between the two, that is foreign trade and economic growth during the trade and economic growth during the period under review.

Oviemuno (2003) makes use of a model that expresses the GDP of Nigeria as a function of export value, import value, exchange rate and inflationary rate. He used ordinary least square of the estimation technique and discovers that all the four regresses, that is exports, imports, exchange rate and inflationary rate do not have any impact on Nigeria’s economic growth.

Analogbei (2000) conducts a pure desk research on trade reforms and output growth in Nigeria. He undertakes an examination of different trade policies in Nigeria ranging from per-SAP trade policies, structural adjustment programmes (SAP) trade policies among others. He also appraises different output trends in Nigeria, that range from per-SAP output trend and output trend since SAP. In addition, he identifies the factors responsible for low output growth in Nigeria, taking into account that the assessment was carried out before and after the adoption of SAP. He, however, concludes that the growth in the manufacturing sector of Nigeria was hampered by inappropriate implementation of all these industrial policies.

Craft (1992) and Nash (1993) in similar studies examine the effects of trade policy environment on productivity in an economy. They make use of varieties of variables to capture the trade policy environment. Some of the variables used are imports growth rate, simple average tariff rate and concentration ratio, and all these are regressed on the growth rate of gross domestic product of the economy.

While Craft (1992) uses developing Asian countries as his case study, Nash (1993) uses developing countries in Africa as his case study. Craft (1992) observes that the trade environment has a significant positive impact on the output growth of the Asian countries, whereas Nash discovers that there has been no noticeable improvement in the growth of many African countries despite the increase in the volume of trade in these countries.

**METHODOLOGY**

Lucas (1988) makes use of the conventional production function to explain the relationship between output growth and trade liberalization in the model:

\[ y = F(K, L, H, TL) \] \[ \text{...1} \]

Where:
- \( Y \) = Output growth
- \( K \) = Capital input
- \( L \) = Labour input
- \( H \) = Human capital
- \( TL \) = Index of Trade Liberalization.

He further breaks down trade liberalization to include degree of openness (DOP) and real exports (RXT) Hence the modified version of Equation 1 is

\[ y = F(K, L, H, DOP, RXT) \] \[ \text{...2} \]
Other things being equal, Lucas, in his measure of the empirical relationship among the variables, is of the opinion that the real depreciation of domestic currency will raise the price of tradables relative to that of non-tradables and, thus, resources will move out of the non-tradables sector into the tradable sector. Consequently, real exports would rise. Also, the degree of openness enters positively into the model. With trade liberalization, a country with a high degree of openness tends to enjoy greater growth than a country with a low degree of openness.

**Model specification**

The model formulated for the purpose of assessing the impact of international trade on the Nigerian manufacturing sector’s growth follows the work of Oviemuno (2003). The model is a modified form of that used by Lucas (1988). In Lucas’s model the index of trade liberalization only includes real exports and degree of openness but in our model, real imports and the exchange rate are added so as to complete the major variables of international trade.

\[ \text{MSGR} = f(\text{REXPT}, \text{RIMPRT}, \text{EXR}, \text{TOP}) \]

It is stated in log-linear form as

\[ \text{MSGR} = a_0 + a_1 \ln \text{REXPT} + a_2 \ln \text{RIMPRT} + a_3 \ln \text{EXR} + a_4 \ln \text{TOP} + u \]

Where: \( \text{MSGR} \) = Nigerian Manufacturing Sector Growth, \( \text{REXPT} \) = Real Export, \( \text{RIMPRT} \) = Real import, \( \text{EXR} \) = Exchange rate and \( \text{TOP} \) = Trade Openness.

**Estimating technique**

The first step is to examine whether the time series contained in the equation has a unit root. In the cointegration literature, the more frequently used tests for a unit root are the Augmented Dickey-Fuller (1979 and 1981) Philips – Perron (1988) and Perron (1986 and 1988) test. These tests agree in their treatment to the intercept parameter. Thus, the null hypothesis model to test for unit root has the following form:

\[ X_t = \mu + \theta X_{t-1} + \varepsilon_t \]

And the model under the alternative hypothesis: \( \varepsilon_t \) is the of the time series, and under the null hypothesis; \( \mu = 1 \) and \( \theta = 0 \). \( \varepsilon_t \) represents the number of observations. In this paper, we use the Augmented Dickey-Fuller (ADF) to test for the stationarity of the time series. The ADF test can be obtained by applying OLS to estimate the coefficients of the following relation:

\[ \Delta X_t = \mu + \theta X_{t-1} + \sum_{i=1}^{n} \lambda_i \Delta X_{t-i} + \varepsilon_t \quad \ldots 5 \]

\( n \) is chosen to eliminate the autocorrelation. If a unit root exists, then \( \varepsilon_t = a - 1 \) would not be statistically different from zero. The ADF test can be conducted by comparing the t-value on the coefficient of \( X_{t-1} \) with critical values.

The Granger representation indicates that if \( X_t \) and \( \lambda_i \) are integrated, then they will have an error correlation representation as follow:

\[ a(L)\Delta y_t = a_0 - \lambda(y_t - aX_t) + b(L)\Delta \lambda + c(L)E_t \]

Where \( a(L), b(L) \) and \( c(L) \) are stable and invertible polynomials respectively. Such models provide a more attractive way of presenting and modeling cointegrating series. The error correction models combine long-run \( (y_t - aX_t) \) and short-run dynamics.

The second step of the Engle and Granger methodology is to estimate the following regression:

\[ \Delta y_t = a + \sum a^\tau \Delta y_{t-\tau} \sum \beta_j \Delta X_{t-\tau} + bE_{t-1} \quad \ldots 7 \]

Where \( A \) denotes the first difference and the EC represents the error term. The estimated error term coefficient must have a statistically significant negative sign. This coefficient indicates the percentage of the disequilibrium in the dependent variable that would be adjusted from one period to another. It is widely recognized that the Engle and Granger test for cointegration would be enough if we want to examine the effect of the error correction mechanism on the dependent variable for two sequences periods such as \( t \) and \( t - 1 \).

The maximum likelihood procedure (Johansen’s test), suggested by Johansen (1988 and 1991) is particularly preferable when the number of variables in the study exceeds two variables due to the possibility of the existence of multiple cointegrating vectors. The advantage of Johansen’s test is not only limited to multivariate case, but it is also preferable to the Engle-Granger approach even with a two-variable-model (Gonzalo, 1990).

To determine the number of cointegrating vectors,
Table 1. Unit root test result.

<table>
<thead>
<tr>
<th>Variable</th>
<th>ADF Statistics</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSGR</td>
<td>-4.5152</td>
<td>I (1)</td>
</tr>
<tr>
<td>ln REPR</td>
<td>-5.7062</td>
<td>I (1)</td>
</tr>
<tr>
<td>ln RIMPRT</td>
<td>-4.5255</td>
<td>I (1)</td>
</tr>
<tr>
<td>ln EXR</td>
<td>-3.5672</td>
<td>I (1)</td>
</tr>
<tr>
<td>ln TOP</td>
<td>-5.1213</td>
<td>I (1)</td>
</tr>
</tbody>
</table>

ADF critical value

Table 2. Test for cointegration using Johansen procedure.

<table>
<thead>
<tr>
<th>Trace</th>
<th>Amax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ho</td>
<td>H1</td>
</tr>
<tr>
<td>r = 0</td>
<td>r = 1</td>
</tr>
<tr>
<td>r ≤ 1</td>
<td>r = 2</td>
</tr>
<tr>
<td>r ≤ 2</td>
<td>r = 3</td>
</tr>
<tr>
<td>r ≤ 3</td>
<td>r = 4</td>
</tr>
</tbody>
</table>

* indicates statistical significance at the 5% level.

Results and Discussion

Augmented Dickey Fuller tests for stationarity result is shown in Table 1.

Augmented Dickey Fuller test for stationarity indicates that all the variables are integrated of order 1. The univariate analysis of the non-stationary series indicates that these variables can be characterized as (1).

The result of the Johansen Cointegration test is presented in Table 2.

Table 2 is a summary of results of cointegration analysis using the Johansen maximum likelihood approach, that is the cointegration likelihood ratio tests based on trace of the stochastic matrix and maximal eigenvalues. In the cointegration test for the variables, both the trace and maximal eigenvalues were carried out. The first line of the table tests the hypothesis r = 0, that is there is no cointegration relations. This is rejected at 5 percent level by both the maximum eigenvalue (λ_max) and trace statistics.

Therefore, there is a long-run relationship. Again the result further confirms the existence of at least two cointegration vectors.

After using the cointegration test to establish the long-run relationship, the long-run regression analysis was carried out for the manufacturing output growth rate and variables of international trade. The cointegration regression result is presented thus:

\[
MSGR = 95.17 + 11.64 \ln \text{REXPRT} + 8.32 \ln \text{RIMPRT} + 6.32 \ln \text{EXR} - 8.21 \ln \text{TOP} \\
(26.82)^* + (3.95)^* + (4.36) + (2.22)^* + (2.17)^*
\]

\[
R^2 = 0.42 \quad \overline{R}^2 = 0.35 \quad D.W. = 2.23 \quad ( )^* \quad \text{Standard error in parenthesis F (4,33) 6.0809 (0.001)}
\]

Both the exchange rate and exports exert a positive and significant relationship on the manufacturing sector growth rate in Nigeria. A positive but insignificant relationship exists between import and manufacturing sector growth rate. A trade openness has a negative but significant relationship with the manufacturing sector growth rate. The R^2 of 0.4243 is relatively low as it showed that international trade indicators explain about 42% change in the manufacturing sector growth rate in Nigeria. The overall regression model is statistically significant by considering the F statistics. The Durbin Watson value of 2.23 is evidence of absence of auto
correlation problem. Considering the interpretation of the empirical result, it is apparent that Nigeria has not maximized its gains from international trade with special reference to the manufacturing sector growth. According to the result, Nigerian imports have not impacted significantly on the manufacturing sector’s growth. This might not be unconnected with the position of Obadan and Odusola (2000) who stresses that excessive importation of goods that can be produced locally will affect the growth of the Nigerian manufacturing sector. This is an indication that the long-term import substitution policy of the federal government in Nigeria has not yielded any significant results since the results have shown that imports are not making any significant impact on the Nigerian manufacturing sector’s growth. This situation is corroborated by the coefficient of trade openness in the result, which is negative. The evidence from this result shows that the degree of openness has an inverse relationship with the Nigerian manufacturing sector’s growth, it shows that the rate at which Nigeria opens its border for trade with other countries is not bringing the expected benefits to the manufacturing sector. In fact the other countries that are Nigeria’s trade partners are benefiting more than Nigeria from their trade relationship. Again, the result shows that an increase in the exchange rate will promote the growth of the manufacturing sector. This is because a high exchange rate discourages the importation of goods, and more importantly, goods that can compete with the locally manufactured products are discouraged through this means hence it will accelerate the growth of the Nigerian manufacturing sector.

The result in Table 3 for the causality test show that only exports and the manufacturing sector growth rate has bidirectional causality. In other words, exports can Granger cause manufacturing sector growth and vice versa. For other variables, there is a unidirectional causality between each of them and the manufacturing sector’s growth. The unidirectional causality for all the variables show that manufacturing sector growth does Granger cause all the variables, that is exchange rate, imports and trade openness. This follows the rejection of all hypotheses that manufacturing sector growth does not Granger cause each of these variables. This is evidence that manufacturing sector growth has little or no influence on all these variables used as indicators of international trade except exports.

### CONCLUSION AND RECOMMENDATIONS

The empirical result shows that there is long–run positive relationship between manufacturing sector growth and exports. The same relationship goes for imports and the exchange rate while trade openness has a long–run negative relationship. The causality tests have revealed the weak influence of the manufacturing sector in Nigeria on key macroeconomic indicators such as exchange rate, imports and trade openness. It affirms the moribund nature of the manufacturing industry in Nigeria. Evidence from various empirical works like Fabayo (2000) have shown that a good number of manufacturing firms are folding up daily while some are leaving the country for other neighboring countries in their bid to survive. The most worrisome aspect of this scenario is the fact that Nigeria’s trading partners are benefiting more than Nigeria from their trade relationships; hence, trade liberalization measured by trade openness has not positively influenced the Nigerian manufacturing sector’s growth. Excessive importation of finished goods that can be produced locally is a colossal setback for the growth of the Nigerian manufacturing sector. This has over the years killed the skill and initiative of many entrepreneurs in the country. Recently, the federal government reopened the borders for the importation of cement, a product that the country has abundant raw materials to produce. This may have a long-term negative effect on the manufacturing sector as shown by the findings in this research work.

Finally, if Nigeria is to maximize its gains from international trade an effort must be made to revitalize the implementation of export promotion and import substitution policies. These two policies are just “paper tigers” going by the findings in this research work, that is they have not made the expected impact on the Nigerian

<table>
<thead>
<tr>
<th>Hypotheses:</th>
<th>F Statistics</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export does not Granger cause manufacturing growth rate.</td>
<td>2.0090</td>
<td>0.092</td>
</tr>
<tr>
<td>Manufacturing sector growth rate does not Granger case export</td>
<td>7.5017</td>
<td>0.000</td>
</tr>
<tr>
<td>Import does not Granger cause manufacturing Growth rate</td>
<td>1.7582</td>
<td>0.1391</td>
</tr>
<tr>
<td>Manufacturing sector growth rate does not Granger cause import</td>
<td>7.3876</td>
<td>0.000</td>
</tr>
<tr>
<td>Exchange rate does not Granger cause Manufacturing Growth rate</td>
<td>1.3227</td>
<td>0.2791</td>
</tr>
<tr>
<td>Manufacturing growth rate does not Granger cause exchange rate</td>
<td>181.5965</td>
<td>0.000</td>
</tr>
<tr>
<td>Trade openness does not Granger cause manufacturing growth rate.</td>
<td>1.6470</td>
<td>0.1671</td>
</tr>
<tr>
<td>Manufacturing growth rate does not Granger cause trade openness.</td>
<td>150.1680</td>
<td>0.000</td>
</tr>
</tbody>
</table>
manufacturing sector. Again, effort must be made to make the production environment in Nigeria friendlier by ensuring security of life and properties as well as improving power generation, roads and other infrastructural facilities. This will limit the alarming exit of manufacturing firms from the country.

REFERENCES


