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Growth Evidence of Imports in Nigeria: A Time Series Analysis

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ABSTRACT

The role of international trade is very significant in a developing country like Nigeria. The relevance of export-led growth hypothesis in Nigeria has been the major issue of many empirical studies. However, the other aspect concerning the importance of imports in the economic growth of the country is often overlooked. This paper is an attempt to investigate the dynamics of the relationship between imports (factor inputs and finished goods) and economic growth in Nigeria for the period 1970 to 2011. Using an error correction model (ecm), this paper makes two major conclusions: importation of manufactured goods has adverse effect on economic growth while the importation of factor inputs leads to economic growth in Nigeria.

Keywords: International trade, economic growth, Nigeria

1. INTRODUCTION

Trade liberalization is an important issue that concerned policy-makers in the past, concern them today and will concern them in the future – in all economies, poor or rich. It offers the potential to raise economic growth rates significantly. But at the same time, it also exposes firms and countries to intense competitive pressures. Declining terms of trade can result, and in some circumstances, may lead to an increase in economic activities which deliver lower standards of living. In addition, it could widen the income gaps both between and within countries. These developmental pitfalls can be avoided if the productive sector develops the ability to withstand the intense competitive pressures that are associated with economic openness (Kaplinsky, 1998).

Generally, foreign trade is considered as an essential factor for accelerating the path of economic development and growth. Most countries are involved in foreign trade to create employment, raise propensity to save, increase foreign exchange earnings, and raise the propensity of investment to move from less productive use to high productive use.

In a developing country like Nigeria, the role of international trade is very significant. The Nigerian economy is characterized by high degree of interdependence with the rest of the world, particularly in the field of trade exchange. As a result, the country is heavily reliant on the exports of crude oil, as the main source of foreign exchange earnings.

However, a major objective of economic development plans in Nigeria is to diversify the local economy and to find other sources of income rather than oil. To achieve such growth in non-oil sector, intermediate goods imports and raw materials may play a crucial role in the economic development process.

Economic development activity can be thought of as the sum of the efforts by all economic agents, operating within an economy and institutional set of arrangements that define the economic system, to convert the resources available to the economy – labor, capital and natural resources – into the output (goods and services) required by the society. The relationship between input and output represents the productivity ratio, that is, output per unit of input. In an opened economy, inputs can be sourced both locally and from other economies (that is, foreign inputs).

According to Halpern, Koren, and Szeidl (2011), studies show that improved access to foreign inputs has increased firm productivity in several countries, including Indonesia (Amiti and Konings 2007), Chile (Kasahara and Rodrigue 2008) and India (Topalova and Khandelwal 2011). This paper therefore examines the following questions:

i.   Does growth evidence of foreign inputs exist in Nigeria?
ii.   Do imported finished goods effect Nigerian economic growth?

Therefore, the objectives of this paper are:

i.   To ascertain if economic growth evidence of foreign inputs exist in Nigeria
ii.   To determine the impact of imported finished goods effect Nigerian economic growth

To achieve these objectives, the following null hypotheses were tested:

i.   Economic growth evidence of foreign inputs does not exist in Nigeria
ii.   Imported finished goods do not effect Nigerian economic growth

Nigeria is a developing country endowed with natural resources, especially oil and gas. It relies heavily on a single exportable commodity, (i.e. crude oil), as the main source of government revenue (see fig. 1).
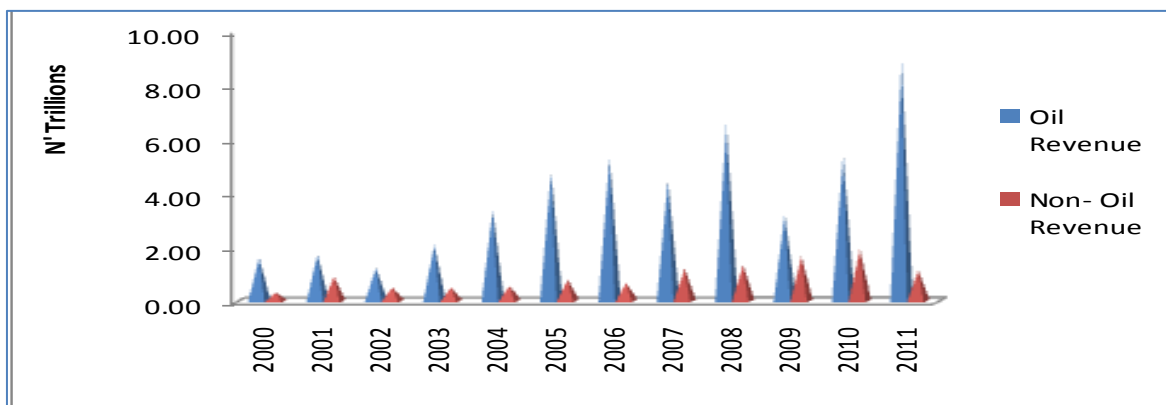

Fig.1. Nigeria: Total Federally Collected Revenue, 2000 – 2011 (Data source: CBN, 2011)

The benefits of foreign trade have made it an integral part of every country. For developing countries, trade is the primary vehicle for realizing the benefits of globalization. Import brings additional competition on the local firms and variety of products into the domestic markets. Foreign trade gives firms access to improved capital inputs such as machines, tools, as well as technological learning which boost productivity. Foreign trade encourages the redistribution of labor and capital to relatively more productive sectors. In particular, it has contributed to the ongoing shift of some manufacturing and service activities from industrial to developing countries providing new opportunities for growth (WDR 1999/2000 as cited in Sharma and Bhandari, 2005).

Currently, Nigeria imports mainly industrial supplies, transport equipment and parts, capital goods, food, beverage and consumer goods. Nigeria's main import partners are China, Albania, United State, France, and Belgium (CBN, 2012).

In many developing countries, export-led growth hypothesis has been the major issue of many empirical studies. However, according Mishra (2012), the other aspect concerning the importance of imports in the economic growth of the country is yet a mute-point. He therefore investigated the dynamics of the relationship between imports and economic growth in India for the period 1970–1971 to 2009–2010 using vector error correction estimates and

Granger causality tests. His result shows the existence of a two-way relationship between import growth and income growth in the long run.

On other hand, Mafizur and Shahbaz (2013) investigated the impacts of imports and foreign capital inflows on economic growth of Pakistan over the period 1990 to 2010. They applied the structural break autoregressive distributed lag (ARDL) bounds testing approach to co-integration to examine the long-run relationship between the variables. Their empirical analysis confirms the long-run relationship between imports and economic growth. The results indicate that imports have positive and significant effect on economic growth in case of Pakistan.

Fan and Nie (2013) studied China's import and export growth rate using VAR Model. They considered the total amount of imports and exports in the period of 1979 – 2007 as sample. They established linkage between China's import and export growth rate. They concluded that the impact of imports improves export growth rate in China. Of course, that means more income to the Chinese economy.

Goldberg, Khandelwal, Pavcnik and Topalova (2008) studied imported intermediate inputs and domestic product growth in India. They used detailed trade and firm-level data and established the existence of substantial gains from trade through access to new imported inputs in India.

Halpern, Koren, and Szeidl (2011) estimated a model of importers in Hungarian using micro data. They found that importing all foreign varieties would increase firm productivity by 12 percent.

Akeen (2011) examined the performance of foreign trade and economic growth in Nigeria for the period 1970 to 2008. Using linear multiple regression model, he concluded that both import and export are negatively related to real output in Nigeria. He, however, used aggregate imports rather than finished goods and factor inputs separately. This observation is a recurring decimal among similar studies on imports in Nigeria (Ajayi, 1975; Ozo-Eson, 1984; and Olopoenia, 1991 as cited in Egwaikhide, 1999). This paper seeks to contribute to literature in this regard.

2. METHODS

The theoretical basis for this study is that foreign trade is a fundamental determinant of economic growth. This was hypothesized by the neoclassical model (Solow, 1956 and 1995). According to Solow's model, international trade can change an economy's growth. An application of Solow's Model to international trade by Baldwin (1992) as cited in Mazmdar (1996) suggests that capital importing economies might gain more growth from international trade than other economies. Based on this theory, this paper sets out that economic growth (Y) is a function of imports and other macroeconomic variables such as exchange rate (E), interest rate (T), inflation rate (F), and trade openness (Opn).

The model is specified as follows:

$$Y = \varphi_0 + \varphi_1 imports + \varphi_2 E + \varphi_3 T + \varphi_4 F + \varphi_5 Opn + \omega \dots\dots\dots 1$$

Following the objectives of this paper, imports is the core endogenous variable in the model. To achieve the objectives, imports was considered in terms of manufactured goods (MG) and factor inputs (capitals). The components of factor inputs considered are chemicals (Chm), machinery and transport equipment (Mte), and crude materials inedible (Cmat). Thus, replacing imports with its components, equation 1 translates to equation 2.

$$Y = \varphi_0 + \varphi_{11} MG + \varphi_{12} Chm + \varphi_{13} Mte + \varphi_{14} Cmat + \varphi_2 E + \varphi_3 T + \varphi_4 F + \varphi_5 Opn + \omega \dots\dots 2$$

where Y is the dependent variable, φ_i are the parameters of the exogenous variables, and ω is the stochastic variable. In most cases, macroeconomic variables require time lag before their impacts become significant. As a result, equation 2 was estimated in its dynamic form. However, during simulation, the lags that did not fit into the model were eliminated in conformity to parsimonious principle. Eview software was used for the analyses.

Unit Root Test

To enhance the predictive power of the model, all variables were logged. Also, seasonal variation was eliminated from all the affected variables. To examine the level of seasonal variation in each variable, stationarity test was carried out using unit root test at 1% level of significant. The variables lacking stationarity at its level (i.e. zero) integration were differenced to achieve stationarity. In other words, all the variables were used at their levels of stationarity. The unit root test, according to Gujarati (2004), is specified as follows:

$$\Delta Y_t = \beta_1 + \beta_{2t} + \delta Y_{t-1} + \alpha_1 \sum_{i=1}^{m} \Delta Y_{t-1} + et ....3$$

Where

Δ = Difference operator

ΔY_t = change in the logarithm of the time series.

ΔY_{t-1} = change in the lagged values of the dependent variables

m = chosen to eliminate the autocorrelation

Note that there is evidence of unit root if δ= 0.

Data sources and Description

All variables used in this paper were obtained from the Central Bank of Nigeria, Annual Statistical Bulletin 2011. The basic descriptive statistics of the core independent variables are presented in table 1 below.

Table 1: Descriptive Statistics of Variables (1970 – 2011)

	CHM	CMAT	MG	MTE
Mean	205993.3	62792.84	305515.0	383087.0
Median	10392.80	1373.000	22775.70	18221.00
Maximum	1297451.	1010404.	1712635.	3762611.
Minimum	88.50000	16.60000	227.0000	285.3000
Std. Dev.	323421.3	164320.0	494104.4	855349.6
Skewness	1.677073	4.805141	1.635062	3.050051
Kurtosis	5.004589	27.76950	4.397659	11.53593
Jarque-Bera	26.72019	1235.300	22.13253	192.6282
Probability	0.000002	0.000000	0.000016	0.000000
Observations	42	42	42	42

Among other things, table 1 shows that all the core independent variables are normally distributed. Fig. 2 reveals that imported manufactured goods as well imported machinery and transport equipment maintained upward trend between 1994 and 2011. Imported chemicals also had upward trend but not as much as the aforementioned. Crude inedible materials did not show significant upward trend over the period.
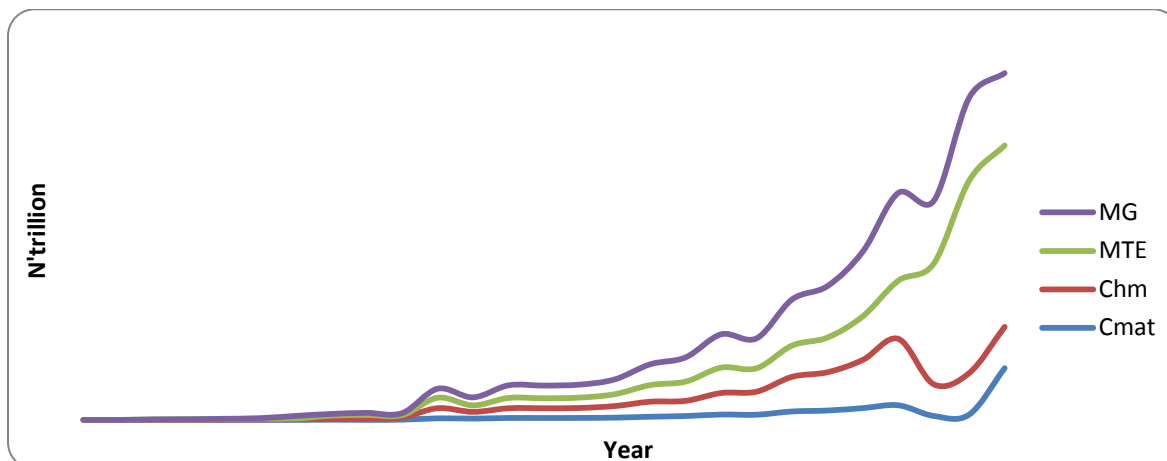
Fig. 2. Nigeria: Imported Manufactured Goods and Factors Inputs, 1985 - 2011 (Data source: CBN, 2011)

3.   RESULTS

The estimated results are discussed below.

Stationarity Test (Unit Root Test)

Since fairly good estimates of parameters of time series are obtained only if the series is stationary, stationarity test was conducted to examine the nature of time series. Augmented Dickey Fuller (ADL) unit root test was employed at 1% for this examination. Results of the tests are presented in table 2 below:

TABLE 2: Augmented Dickey-Fuller Unit Root Test of the variables: 1970 – 2011

Variable	Critical value (1%)	Adf-stat	Order of Integration
LnChm	-3.6067	-4.148643**	I(1)
LnCmat	-3.6067	-6.125267**	I(1)
LnE	-3.6067	-3.757742**	I(1)
LnMG	-3.6019	-4.121983**	I(1)
LnF	-3.6171	-4.638792**	I(0)
LnMte	-3.6067	-4.711481**	I(1)
LnY	-3.6067	-4.095478**	I(1)
LnOpn	-3.6067	-5.327942**	I(1)
LnT	-3.6067	-5.570841**	I(1)

**significant at 1 percent level

As shown in table 2, all the variables were affected by seasonal variation aside log of inflation rate (F). However, all the affected variables achieved stationarity after the first difference. Given that all the exogenous variables, apart from inflation rate, are integrated to the same order with the endogenous variable (growth), co-integration was tested for using the residue (resid04) of the regression between the endogenous variable (Y) and the exogenous variables (apart from F). The summary of the result is presented in table 3.

TABLE 3: Augmented Dickey-Fuller Unit Root Test of the Residue

Variable	Critical value (1%)	ADf-stat	Order of Integration
Resid04	-3.6067	-5.363858**	I(0)

**significant at 1 percent level

Table 3 shows that co-integration problem occurred in the model. To correct this problem, error correction mechanism (ecm) was introduced in the dynamic model in table 4.

Table 4: Dynamic model

Dependent Variable: D(lnY)			
Method: Least Squares			
Sample(adjusted): 1974 2011			
Included observations: 38 after adjusting endpoints			
Variable	Coefficient	t-Statistic	Prob.
C	0.124713	3.981148	0.0004
D(lnMTE(-3))	0.108804	1.489106	0.1476
D(lnCMAT(-2))	0.039980	0.882924	0.3848
D(lnCHM)	0.449614	5.377463	0.0000
D(lnMG)	-0.145685	-2.055923	0.0492
D(lnMG(-3))	-0.141068	-2.137305	0.0414
D(lnE(-3))	0.181484	2.392196	0.0237
D(lnOPN(-1))	0.250155	2.691300	0.0119
D(lnT)	-0.098316	-0.780808	0.4415
ECM(-1)	-0.104501	-0.544675	0.5903
R-squared	0.667816	F-statistic	6.254528
S.E. of regression	0.124563	Prob(F-statistic)	0.000081
Sum squared resid	0.434447	Durbin-Watson stat	1.571564

The regression result in table 4 shows that the Distributed Lag Model (DL) achieved about 67 percent goodness of fit. See fig.3 for the actual and fitted trends.
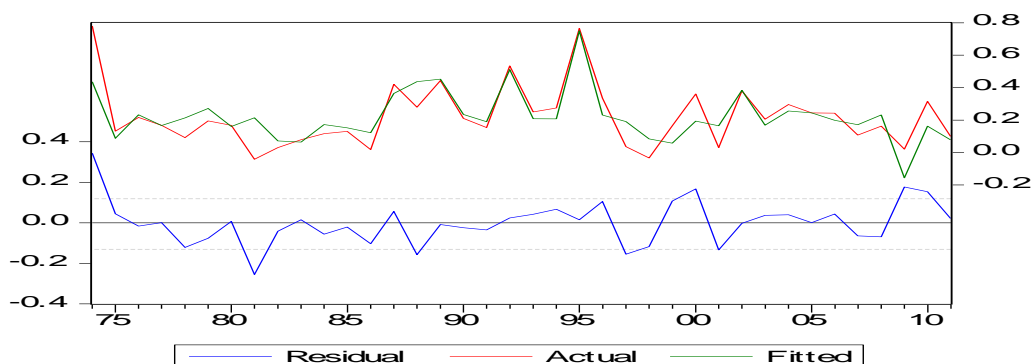

Fig. 3. Actual versus Fitted Trends

Prob(F-statistics) indicates that the exogenous variables are simultaneously significant in relation to their joint impact on growth. Using 5 percent level of significant, the result shows little or no evidence of positive autocorrelation since calculated Durbin-Watson statistic (1.571564) lays between the lower-limit Durbin-Watson statistic (0.970) and upper-limit Durbin-Watson statistic (2.098). Fig. 4 shows that, as expected, the residual (μ) is normally distributed – Jarque-Bera (probability) is less than 5 percent.
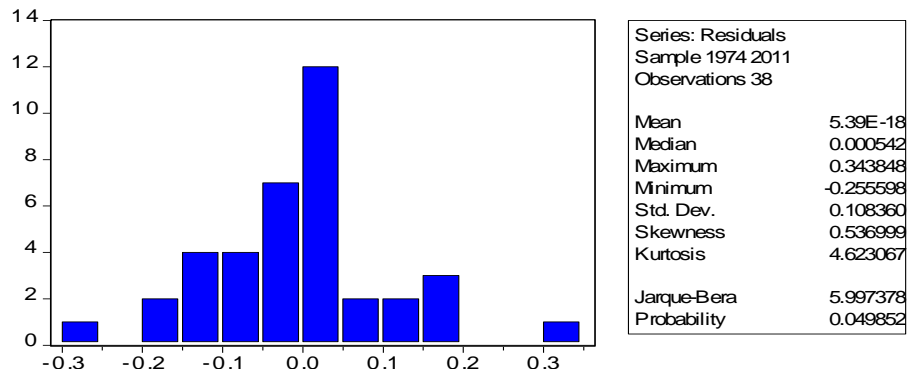

Fig. 4. Residual normal distribution

4. DISCUSSION

At 5% level of significant, two of the core exogenous variables show significant impacts on growth while two did not. Those imports that impact significantly on growth are chemicals (Chm) and manufactured goods (MG). The variables that did not show evidence of significant impact on growth are machinery and transport equipment (Mte), and crude materials inedible (Cmat); however, they both have positive coefficients. In other words, though machinery and transport equipment (Mte), and crude materials inedible (Cmat) have potential for positively impact, they do not significantly contribute to growth in Nigeria. On the other hand, chemicals (Chm) and manufactured goods (MG) significantly impact growth in Nigeria; however, while chemical (Chm) has positive impact, manufactured good (MG) has negative impact.

Although this paper could not establish evidence of significant impact of machinery and transport equipment (Mte), and crude materials inedible (Cmat) on growth; it establishes their growth potentials. On the other hand, it shows that imported Chemicals (Chm) as factor input impacts growth in Nigeria significantly. For instance, the result shows that a percent increase in imported chemical inputs will increase growth by about 0.5 percent. On the contrary, a percent increase in imported manufactured goods will reduce growth by about 0.15 percent. This result agrees with previous researchers who opine that the importation of manufactured goods is detriment to growth; while the importation of factor inputs enhances economic growth (Krugman, 1979; Grossman and Helpman, 1991; Keller, 2004; Amiti and Konings, 2007; Kasahara and Rodrigue, 2008; Goldberg, Khandelwal, Pavcnik and Topalova, 2008; Jones, 2008; and Halpern, Koren, and Szeidl, 2011).

5. CONCLUSION

In this paper, econometric estimation of Nigeria's economic growth in the light of imported factor inputs and imported manufactured goods has been performed. To improve the degree of accuracy of the estimates, the unit root test was conducted. Again, co-integration problem that would have affected the estimates was corrected with the introduction of error correction mechanism (ecm). The general finding of this paper has indicated that importation of manufacture goods is detriment to growth in Nigeria; on the contrary, imported factor inputs have significant economic growth potential. This result agrees with earlier researchers (Peng and Almas, 2010; Atoyebi, Akinde, Adekunjo, and Femi 2012; and Seyed, 2013). The importation of factor inputs can enable technological learning which drives productivity growth; hence, a long-run growth driver. This finding therefore suggests that government policies towards downsizing imported manufactured goods would enhance growth in Nigeria. In addition, public policy that offers low cost of

importing factor inputs – especially, the removal of unnecessary bureaucratic bottle-necks, levies and tariffs – will also enhance Nigeria's growth.

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