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# Trade Liberalisation and Imported Inputs in Nigeria: Gains or Losses?

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**Abstract**
Nigeria, just like other nations exchange goods and services with different economies around the world. Tellingly, this exchange arose because countries discover that they do not have all the material resources they need; hence bilateral or multilateral engagement with regards to foreign purchase becomes unavoidable. This study investigated whether there was growth in the importation of indispensable raw materials in Nigeria, using annual data from 1970 to 2014 taken from the World Bank and the Central Bank of Nigeria. The annual time series were examined for unit root. To check for long run relationship, the Johansen cointegration test was applied. The study adopted Ordinary Least Squares (OLS) estimation technique and an error correction modelling (ECM) approach. Findings from the study indicate a statistically significant increase in the growth of raw materials importation both in the long run and short run. Therefore, the government is advised to remove any bottleneck that impedes the imports of invaluable raw materials required for local production. When this is sincerely done, productivity gains could be maximised.
**Keywords**: Trade Liberalisation, Imported Inputs, Raw Materials, Nigeria.

## 1. Introduction

The issue of unhindered movement of goods had always taken the spotlight in the economic activities of man since the time of Adam Smith. Despite the fact that there was less trading especially in magnitude, amongst countries of the world during the nineteenth and early parts of the twentieth century when contrasted contemporarily, the idea of exchange had always been with man. To support the preceding opinion, people engaged in trade by barter primarily, to have what they do not possess while those they are exchanging with will also have what they do not own; ultimately this sort of exchange suggests how important both people and nations could need each other with regards to trade. In a wider context, trade liberalisation is seen to promote and facilitate greater access to foreign markets which in turn could lead to increase in national welfare (Krugman *et al*. 2012). Lately, trade liberalisation has come under attack because evidence of its success had been rather mixed when low income countries are brought into perspective (Stiglitz, 2006). These differences emanated from the fact that the developed and developing world, view trade liberalisation from different standpoints.

At the onset, Nigeria embraced the in-ward looking import substitution industrialisation (ISI) strategy as a form of protection for the local industries from foreign competition (Kassim, 2013). However, tell-tale evidence has shown that for developing countries with immature industrial sector and weak institutions, ISI strategy had some negative effects on economies that adopted the policy (Rodrik, 1993; Soludo & Ogbu, 2004). Owing to small markets that cannot take advantage of economies of scale, developing countries, witnessed economic wastages in the form of heavy allocation of funds to protected industries with the sole aim to keep them afloat despite the industries chronic inefficiency (Bhagwati, 1988; Rodrik, 1993; Krugman *et al*. 2012). Added to this disadvantage, is the implied cost of importing raw materials that an economy may not have domestically. As observed by Klenow & Rodriguez-Clare (1997), exorbitant tariff arising from import restrictions could lead to lower imports or no imports at all since the upshot would be reduction in the availability of different input mix. According to Adenikinju & Chete (2002), Nigeria witnessed a massive decline in real output because of tight trade restrictions in the form of import controls which affected the importation of raw materials and some important intermediate inputs – this in turn led to substantial decline in capacity utilisation and closure of industries et cetera.

Furthermore, the absurdity of the impact of import and also exchange rate controls on the manufacturing sector in Nigeria has been debilitating. This was vividly reported by African Development Bank, Organisation for Economic Cooperation and Development and United Nations Development Programme (AfDB, OECD & UNDP, 2017) that "the manufacturing sector recorded a general decline in 2016, with an estimated 272 firms shutting down and industrial capacity utilisation dropping significantly from 51.4% in 2015 to 35.4% in 2016". The upshot of the gloomy manufacturing environment in Nigeria is not unconnected to the tinkering of the exchange rate which eventually caused manufacturers to import raw materials at exorbitant prices ('Interest rate regime worth giving a look' 2017). When firms are closed down, the greatest adverse impact on any economy is loss of income via unemployment.

 

Nigeria liberalised its trade formally in the year 1986 through the structural adjustment programme (SAP) during the Ibrahim Babangida military administration. The policy was adopted as the viable solution to energise and kick-start the ailing economy after the botched ISI strategy. According to Analogbei (2000) the idea for the introduction of SAP was to 'radically restructure the economy' and to correct the apparent distortions the economy experienced pre-SAP. Many economists and researchers hint at trade liberalisation or less restrictive international trade as a working tool that could aid economies achieve productivity and access to important inputs not available in the home country (Markusen, 1989; Dornbusch, 1992; Rodrik, 1994; Romer, 1994; Klenow & Rodriguez-Clare, 1997; Eaton & Kortum, 2001; Driffield & Kambhampati, 2003; Amiti & Konings, 2007; Fernandes, 2007; Kasahara & Rodrigue, 2008; Goldberg *et al.* 2010) and some argue that it provides a channel for seeming effective reallocation of resources from less efficient to more efficient industries (Thirlwall, 2000; Krugman *et al.* 2012); and many more have attributed its good impact on economic growth, however, infinitesimal the effect might appear (Krueger, 1998; Onafowora *et al.*, 1998; Greenaway *et al.* 2002; Winters, 2004; Foster, 2008; Kneller *et al.* 2008).

From the perspective of international trade, having access to new imported inputs/raw materials reduces the cost of innovation and stimulates the production of different types of goods (Goldberg *et al.* 2009). This ultimately, will promote the gains from trade. This study is not an attempt to look at how trade liberalisation has affected the Nigerian economy via growth in exports or imports of produced consumer goods; it is also not an exercise to find out if trade liberalisation has influenced the Nigerian economy in a negative or positive manner. This study determines to know how trade liberalisation has affected the growth of raw materials importation in Nigeria within the period under review (1970 – 2014). The recent economic challenges facing the country revealed a phenomenon that led to closures of a number of industries, and a major problem linked to that was lack of access to imported raw materials used by these industries. There is also no denying that the weak naira made importation of foreign raw materials that cannot be done without in the manufacturing process a difficult task to accomplish. Goldberg *et al.* (2009) affirmed that access to variety of imported inputs/raw materials, showed 'higher unit values relative to existing imports' since most are imported from industrialised nations. In the light of the above, the policy implication of this study cannot be far-fetched when the quagmire the Nigerian government is confronted with, is put into consideration. This study is divided into 7 sections; section 2 discusses the conceptual issues; section 3 reviews the theoretical issues; section 4 deals with the empirical literature; section 5 shows the methodology; section 6 discusses the results while the conclusions are presented in section 7.

## 2. Conceptual Issues

### 2.1 *Trade Liberalisation*

Trade liberalisation has been a difficult concept to be pinned down to a particular acceptable expression. This happens to be caused by the manner in which countries are affected by the term. Bhagwati (1988) defined it as the point where effective exchange rate for exports is equal to the effective exchange rate for imports –at this point the bias against exports would have been eliminated. This definition presupposes that any practice that is highly in disfavour of exports might be much in favour of ISI strategy. However, Bhagwati cautions that we ought to remove sentiments when defining outward oriented trade strategy (i.e. trade liberalisation) since elimination of ambiguity in the definition is not an easy task. In another aspect, Michaely *et al.* (1989) defined trade liberalisation as any change which makes a country's trading system more neutral –neutrality here implies a trading system without government interference. According to Michaely *et al.* (1989), "any movement toward neutrality is thus defined as trade liberalization whereas a change which increases the deviation from neutrality is seen as a reversal of liberalization". Although this definition appears to be absolute in that any government intrusion weakens the meaning of trade liberalisation; nevertheless, to pick out a country with such trading system would be a hard task. There is always a form of protection from every country in the world; the only difference is to what degree. What might not be in doubt is that trade liberalisation may have latent growth opportunities, but making the growth to manifest requires some complementary number of policies (Bouzas & Keifman, 2003).

### 2.2 *Raw Materials*

Raw materials, as the name implies, are not-yet-processed material. The classification belongs to material still in its raw or natural form but serve as input for production of goods. Microsoft Encarta Dictionary (2009) defined raw materials as a natural unprocessed material used in the manufacturing process. Oxford Dictionary (n.d.) in its own definition expressed raw material as the basic material from which a product is made. In addition, the Merriam Webster Dictionary (n.d.) explained raw material as crude or processed material that can be converted by manufacture, processing or combination of both into a new and useful product. Although none of the preceding definitions are out of place, raw materials may also include the following: semi or partly processed material that serves as input for other firms, completely processed material that cannot stand on its own as a final

 

good for some industries because it still serve as input for other firms (e.g. parts for vehicle assembly or computer manufacturing) and finally, materials in their crude state as already aforementioned. One thing stands very clear; in all production process, raw materials provide the most vital ingredients for all manufacturing business.

## 3. Theoretical Issues

The Ricardian and Heckscher-Ohlin trade theories provide a good benchmark on the reasons why countries could make gains from trade. The Ricardian or the comparative cost advantage theory enables us to understand that although two nations could produce two identical goods, however, exchange between the two nations becomes important when all the relevant cost of producing the two identical goods is put into consideration. Put simply, the idea is that if one of the countries can produce just one of the goods at a much reduced cost than the other, then it pays the country to continue to produce it while allowing the other country to produce the other goods which she can at a cheaper rate too (Todaro & Smith, 2011). Put in a more clear perspective, Krugman *et al.* (2012) argues that this should be driven by countries exporting goods in which their 'productivity is relatively high'. On the other hand, owing to differences on how nations are endowed with regard to factors of production, the Heckscher-Ohlin theory, lays emphasis on the extent in which those factors are employed in the manufacture of different goods. In this context, a country with abundant capital will be high in production of capital-intensive goods whereas a nation with abundant labour will be better in the production of labour intensive goods –both could benefit from specialisation and in exchange of goods as each nation imports only the goods where they have less intensity in production, thereby freeing up resources for production of goods where they have high intensity in production (Todaro & Smith, 2011).

Apart from the two well-known traditional trade theories explained above, other researchers have tried out theories/models that could shed light on peculiar reasons why international trade is advantageous to both countries and firms through monopolistic competition and imperfect competition (Dixit & Stiglitz, 1977; Levinsohn, 1993); or through economy of scale (Markusen & Melvin, 1981; Romer, 1987); or through new inputs/ intermediate inputs (Sanyal & Jones, 1982; Markusen, 1989; Feenstra *et al.* 1992; Romer, 1994). At this stage, it would be difficult not to deny that existence under autarky can never be a solution for any economy for the present. The problem always lies in identifying convincingly what is a high or low tariff and how to reach a consensus on what to adopt. Nevertheless, the welfare loss associated with imposition of tariff, when we consider that international trade could bring in new goods into an economy seems to be quite large (Romer, 1994). As Dornbusch (1992) observed, trade liberalisation creates opportunities to access cheap inputs from elsewhere. Since international trade affects the variety of goods available to consumers in terms of final goods, and producers in terms of choice of varied inputs (Sanyal & Jones, 1982), it implies that where restrictive trade is stringent, those choices will be lost and producers and consumers together with the whole economy might be worse off.

## 4. Empirical Literature

The relationship between trade liberalisation and imported inputs, especially raw materials has been studied from various angles. Topalova & Khandelwal (2011) explored the link between trade reforms and firm productivity in India from 1989 to 1996 using cross section of Indian firms. The study employed unbalanced panel, generalised method of moments (GMM) and other techniques to ascertain whether access to cheaper imported inputs influenced firms' productivity. Empirical results show that trade reform increased productivity in India because of increased access to foreign inputs. The study also noted that India's adoption of trade liberalisation opened firms to competition and more importantly, lessened the country's 'technological constraint on production'. Klenow & Rodriguez-Clare (1997) examined the variety gain from trade liberalisation using imports of Costa Rica from 115 countries from 1986 to 1992. The study also looked at the relevance of market size and the rate of tariffs to the variety of goods imported. After employing different estimation methods not limited to calibrated general equilibrium model (GEM), findings from the study indicate that a larger market and lower tariffs significantly increased the number of varieties imported. Further results show that welfare losses from protection are four times larger than the standard estimates with fixed variety; and changes in the variety of intermediate goods lead to substantial welfare effects. Goldberg *et al.* (2010) employed India firm level data from 1989 to 2003 to investigate the impact of trade liberalisation on domestic product variety. The study made use of ordinary least squares (OLS), GMM and instrumental variable (IV) to ascertain if declining costs and imported intermediate inputs helped improve product variety following trade liberalisation. Empirical estimates from the study indicate that access to new imported inputs caused by lower tariffs increased product range. Additional results show that lower input tariffs accounted for about 31% of new products which were non-existent before trade liberalisation. Amiti & Konings (2007) determined the impact of trade liberalisation on Indonesian manufacturing firms via importation of intermediate inputs and productivity for the period 1991 – 2001. The study employed amongst other techniques and methods, panel fixed effect and OLS. Empirical result shows that

 

productivity increased post liberalisation especially for firms that imported inputs for production owing to lower tariffs. Other findings reveal that higher productivity was achieved also through learning infused in foreign imported intermediate inputs. Fernandes (2007) examined changes in trade policies in Colombia and its impact on Colombian firms from 1977 to 1991. The study focused on whether Colombian trade liberalisation increased firms productivity amongst other things. The study employed OLS and GMM for estimation, and empirical estimates after controlling for heterogeneity of plant and firms suggest that productivity gains were achieved because of increased access to importation of intermediate inputs. Kasahara & Rodrigue (2008) explored the effect using imported inputs will have on plant productivity across firms in Chile from 1979 to 1996. The study made use of OLS and controlled for simultaneity and endogeneity using system (GMM). Empirical analysis from the study reveals that plant productivity increased due to use of imported intermediate goods by firms. Further results also indicate that there was positive dynamic effect when firms use foreign intermediate inputs. Similarly, Ge *et al*. (2011) find that trade liberalisation in China led to tariff reduction which ultimately encouraged importers to access foreign intermediate inputs. The study applied matched Chinese trade data from 2000 to 2006 for empirical analysis, and obtained result suggests that imports of intermediate inputs substantially improved firm performance. Edwards (2003) investigated the link between trade liberalisation, technological change and employment in South Africa involving some major firms spanning two periods: 1994 to 1998 and 1997 to 1998. The study used different estimation techniques including OLS, and obtained results show that imports of inputs like raw materials complemented skilled labour. Further revelation indicates that the enhancement in skilled labour and technological change were as a result of intensified use of foreign investment and computers amongst other findings. Frensch (2010) analysed the effect of trade liberalisation on a chosen set of imported inputs compared to volume per imported goods on a number of countries from 1992 to 2004. The study employed gravity model and made use of OLS and seemingly unrelated regression techniques. Findings revealed an extensive import margin effect on imported intermediate input compared to consumer goods. The study finalised that trade liberalisation aids emerging economies to engage in import led growth policies. Osigwe & Obi (2015) examined the impact of capacity utilisation rate on imports of raw materials in Nigeria using GMM for estimation. After controlling for endogeneity, findings show that one per cent increase in capacity utilisation rate increased imports of raw materials by 1.1% whereas depreciation of the real exchange rate led to a 0.12% decline in imports of raw materials. Other findings also show that when there is one per cent increase in inflation, imports of raw materials will decline by 0.72%. In another setting, Fan *et al.* (2013) examined how trade liberalisation affected the unit value of export prices through import decisions on quality of input and variety of imported inputs across some firms in China. Empirical evidence finds that lower tariffs lead firms to import more variety and higher quality of inputs. Further analysis reveals that firms who import varied high quality inputs have better export prices. The findings from the study support the significance of trade liberalisation in spurring firms to achieve good quality product through importation of different useful and standard foreign inputs.

Most studies on the impact of trade liberalisation on imported inputs have specifically looked at growth in aggregate import volume compared to export volume (Santos-Paulino, 2002; Awokuse, 2008; Ju *et al.* 2009; Hoque & Yusop, 2010), and in the studies that has to do with imported raw materials, none has taken into consideration to examine the growth of imported raw materials especially in the Nigerian context, to the best of our knowledge. Although we did not go into details in finding out how each of the different imported raw materials have grown pre and post liberalisation, we believe hopefully that it could be pursued in the future.

## 5. Data and Methodology

This study will examine the association between trade liberalisation and growth of raw materials importation in Nigeria. The data which are secondary in nature were taken from the Central Bank of Nigeria (CBN) Statistical bulletins for 2011 and 2014, and the World Bank development indicators for 2016. The study period is from 1970 to 2014. Growth rate of raw materials (GRM) will be used as the dependent variable while exchange rate (EXR), import price index (MPI), inflation rate (INF) and trade openness (TOP) will serve as the independent variables. TOP will serve as a proxy for trade liberalisation, an indication of how open an economy is. Krueger (1998) noted that it is easier to show in the long run, why liberalising trade could bring about faster growth compared to why outward oriented economies are highly successful. Nations need raw materials they cannot source locally; hence, the significance of foreign raw materials cannot be discounted. The variables used in this study will be expressed in logarithm for easy interpretation (Wooldridge, 2013). Furthermore, to avoid a spurious regression result, since the time series are annual, they will be subjected to unit root test to ascertain their stationarity characteristics. To avoid falling into spurious result trap, the study will employ Augmented Dickey-Fuller (ADF) and Phillips-Perron tests credited to Phillips & Perron (1988) and Dickey & Fuller (1979) in their classic articles respectively. The ADF test follows the pattern in equation (*I*);

 

$$\Delta\Upsilon_t = b_1 + b_2 t + \theta\Upsilon_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta\Upsilon_{t-i} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (I)$$

where $\Delta$ is the difference operator, $\Upsilon_t$ is the variable of interest; $b_1$, $b_2$, $\theta$ and $\alpha_i$ are parameters to be estimated; $t$ is the time trend; $\varepsilon_t$ is an error term with pure white noise characteristics. The null hypothesis using ADF states that a series has unit root (i.e. H0: $\alpha = 1$) as against the alternative (H1: $\alpha < 1$). According to Gujarati & Porter (2009) inclusion of the lagged difference of the dependent variable in the ADF test, takes care of the effect of serial correlation occurring in the error term. The Phillips-Perron (PP) unit root test, however, employs the nonparametric technique to take care of the problem of serial correlation in the error term. This is different from ADF approach, where the lagged difference of the dependent variable was used. Following the examination of the variables for unit root using ADF and PP tests, if the variables are found to be stationary[1], this may suggest evidence of long run equilibrium among the variables concerned. To verify the suspicion, the study will apply the Engel & Granger (1987) and Johansen & Juselius (1990) method of cointegration. While the former could to an extent do the job, the latter will be used to strengthen it. An error correction model (ECM) will be applied if there is confirmation of long run equilibrium amongst the variables. To make sure the regression results are not spurious, different post diagnostic checks will be performed; they include serial correlation test, Jarque & Bera (1987) test for normality of the residuals, heteroscedasticity and CUSUM test. Besides, the study will use heteroscedasticity and autocorrelation-consistent standard errors (HAC). Gujarati & Porter (2009) recommended that HAC standard errors are robust in handling the problem of serial correlation and heteroscedasticity when they are present in regressions.

The theoretical underpinning for the study will follow the Keynesian aggregate demand theory for a small open economy. Also the Cobb-Douglas production function will be incorporated. The Keynesian theory brings in the national income and attempts to explain how economic growth could be maintained when there is disturbance in an economy. According to (Snowdon & Vane, 2005), in principle, the national income is determined by the spending pattern of different economic agents. These agents include households, government and businesses et cetera. We could assume that in a closed economy (where we have the identity, Y = C + I + G) only these three economic agents mentioned could apply. However, in a realistic world, nations do business with other nations, and this opens up possibility for beneficial incentives. In an open economy net exports arise from the difference between exports and imports of an economy with the rest of the world and represent the net expenditure from abroad on domestic goods and services which gives income to domestic producers (Mankiw, 2010). If the value of exports is higher than that of imports net exports will be said to be positive but if otherwise, it will be negative; that is if import value is greater than export value. Given net exports to be exports minus imports $(NX = X - M)$ the national income identity for a small open economy becomes:

$$Y = C + I + G = (X - M) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (II)$$

where $Y$ = output, $C$ = consumption, $I$ = investment, $G$ = government purchases, $X$ = exports and $M$ = imports. These are all output demand components.

Thirlwall (2000) stated that exports differ from other components of demand in three aspects; specifically, exports is the only demand component that emanated from outside the system, it is the only demand component that pays for import requirement for growth and lastly, it permits the importation of productive resources (raw materials) used for domestic production. On the other hand, the Cobb-Douglas production function explained the economy's production of goods and services, and the distribution of national income between capital and labour (Mankiw, 2010).

Specifically, output further follows the aggregate Cobb-Douglas production function as

$$Y = A_t K^{\alpha} L^{1-\alpha} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (III)$$

where $\alpha$ and $1-\alpha$ are weights reflecting the share or contribution of capital and Labour. $A_t$ is technological progress (current available technology), $K$ is capital stock while $L$ is labour (Mankiw, 2010). An increase in equation *III* is expressed as:

$$\frac{\Delta Y}{Y} = \frac{\Delta A}{A} + \frac{\alpha \Delta K}{K} + \frac{(1-\alpha)\Delta L}{L} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (IV)$$

Equation *IV* is simply that the Cobb-Douglas production function in a form of relative changes shows that the growth of aggregate output (i.e. the left-hand side of the equation) is a function of the contribution of changes in total factor productivity (i.e. the first expression at the right-hand of the equation), changes in the weight

[1] Integrated of order one (i.e. I (I)) after first difference.

 

contribution of capital (i.e. the second expression at the right hand of the equation) and changes in the weighted contribution of labour (i.e. the last expression at the right hand of the equation). Technological advancement is certainly not possible under autarky (absence of trade). Thus, the openness of nations through trade liberalisation influences the growth of output, and the growth of capital stock results to investment spending. These can be expressed as:

$$\frac{\Delta Y}{Y} = f(TO, FDI, EXR) \quad \ldots\ldots(V)$$

The expression in equation *V* means that the growth of output is a function of trade openness and foreign direct investment and exchange rate. Output growth as shown in equation *V*, includes the various demand components in equation *II*. Following the conventional demand functional relationship,

$$RM = f(\mathrm{M}_p) \quad \ldots\ldots(VI)$$

Equation *VI* signifies that import of raw materials (RM) is also a function of import prices $(\mathrm{M}_p)$.

Thus equation *VI* can be written as;

$$\frac{\Delta RM}{RM} = f\left(\frac{\Delta M_p}{M_p}\right) \quad \ldots\ldots(VII)$$

Furthermore, equation *VII* can only be possible as a country trades with other countries. Considering the economy as a small open economy as earlier assumed, therefore:

$$\frac{\Delta RM}{RM} = f\left(\frac{\Delta M_p}{M_p}, TO^{\varphi}\right) \quad \ldots\ldots(VIII)$$

Let $\varphi$ be the marginal contribution of openness to trade which is greater than or equal to zero and less than or equal to one $(0 \leq \varphi \leq 1)$. Therefore, trade openness (TO) in equation *VIII* is expressed to increase the growth of raw materials. The test for unit root will be carried out on equation *IX* which is a modification of equation *VIII* above;

$$GRM_t = \alpha + \beta_1 TOP_t + \beta_2 \ln EXR_t + \beta_3 \ln MPI_{t-1} + \beta_4 \ln INF_{t-1} + \mu_t \quad \ldots\ldots(IX)$$

where ln is natural log; $\alpha$ represents the constant; $\beta_1$ to $\beta_4$ are parameters of interest that will be estimated; $_{t-1}$ is the previous value of the concerned variable; $\mu_t$ is an uncorrelated error term with zero mean and constant variance.

## 6. Empirical Results and Analysis

All the variables in equation *IX* were tested for unit root, first using ADF approach.

Table 1. Augmented Dickey-Fuller Unit Root Test

| ***Variables*** | ***ADF test statistic(at first difference)*** | ***Order of integration*** |
|---|---|---|
| GRM | -7.056066 (-2.931404)* | I(1) |
| TOP | -9.044772 (-1.948686)* | I(1) |
| EXR | -5.295681 (-2.931404)* | I(1) |
| MPI | -6.631512 (-1.948686)* | I(1) |
| INF | -6.832187 (-1.948686)* | I(I) |

Author's computation. Figures marked * show MacKinnon critical values for the rejection of the null hypothesis at 5% level of significance.

Table 1, shows that all the variables are integrated of order one (i.e. became stationary after first difference. To complement the ADF test, the Phillips-Perron unit root test is shown in Table 2 below.

Table 2. Phillips-Perron Unit Root Test

| ***Variables*** | ***PP test statistic (at first difference)*** | ***Order of integration*** |
|---|---|---|
| GRM | -7.038540 (-2.931404)* | I(1) |
| TOP | -8.996223 (-1.948686)* | I(1) |
| EXR | -5.299213 (-2.931404)* | I(1) |
| MPI | -6.630720 (-1.948686)* | I(1) |
| INF | -12.66514 (-1.948686)* | I(1) |

Author's computation. Figures marked * show MacKinnon critical values for the rejection of the null hypothesis at 5% level of significance

Table 2 confirms the ADF test that all the variables are integrated of order one (I (1)); thus the order of integration implies that there may be a long run relationship between the cointegrating variables. First, the Engel & Granger cointegration test was carried out on equation *IX* and the results shown in Table 3.

 

Table 3. Cointegration Test on the Residual of Equation *IX*

| | |
|---|---|
| Augmented Dickey-Fuller Test Statistic | -3.420117 (-2.619851)*** (-1.948686)** (-1.612036)* |
| Phillips_Perron Test Statistic | -3.391698 (-2.619851)*** (-1.948686)** (-1.612036)* |

Author's computation. (a). Figures marked ***, **,* are the 1%, 5% & 10% critical values in that order.(b). Figures not in parenthesis are the test statistic of the unit root method applied

The results in Table 3 show that at level, the residual of equation *IX* is stationary. To make the result robust, the Johansen cointegration test was also performed.

Table 4. Johansen Cointegration: Trace Test

| **Hypothesized No. of CE(s)** | **Eigenvalue** | **Trace Statistic** | **0.05 Critical Value** | **Prob.**** |
|---|---|---|---|---|
| None* | 0.572293 | 85.34667 | 69.81889 | 0.0018 |
| At most 1* | 0.448440 | 48.82604 | 47.85613 | 0.0404 |
| At most 2 | 0.274180 | 23.24081 | 29.79707 | 0.2344 |
| At most 3 | 0.169091 | 9.461328 | 15.49471 | 0.3244 |
| At most 4 | 0.034197 | 1.496216 | 3.841466 | 0.2213 |

Author's computation. (a). Single asterisk (*) denote rejection of the null hypothesis at 0.05 level. (b).Double asterisks (**) show Mackinnon-Haug-Michelis (1999) p-values. (c). Trace test shows at least 2 cointegrating equations at 0.05 level.

Table 5. Johansen Cointegration: Maximum Eigenvalue Test

| **Hypothesized No. of CE(s)** | **Eigenvalue** | **Max-Eigen Statistic** | **0.05 Critical Value** | **Prob.**** |
|---|---|---|---|---|
| None* | 0.572293 | 36.52062 | 33.87687 | 0.0236 |
| At most 1 | 0.448440 | 25.58524 | 27.58434 | 0.0882 |
| At most 2 | 0.274180 | 13.77948 | 21.13162 | 0.3834 |
| At most 3 | 0.169091 | 7.965112 | 14.26460 | 0.3823 |
| At most 4 | 0.034197 | 1.496216 | 3.841466 | 0.2213 |

Author's computation. (a). Single asterisk (*) denote rejection of the null hypothesis at 0.05 level. (b).Double asterisks (**) show Mackinnon-Haug-Michelis (1999) p-values. (c). Max-eigenvalue test shows at least 1 cointegrating equation at 0.05 level.

In Table 4 and Table 5, the Johansen cointegration test verifies the Engel & Granger test that there is a long run association between the variables in equation *IX*. The trace and maximum Eigenvalue tests show that there is at least one cointegrating and two cointegrating equation(s) respectively. Sequel to this confirmation, the result of the long run estimates is shown in Table 6.

Table 6. Results of the Long Run Estimates of Equation *IX*

| **Variable** | **Coefficient** | **HAC std. error** | **t-Statistic** | **P-value** |
|---|---|---|---|---|
| Constant | 2.004557 | 1.087922 | 1.842556 | 0.0730 |
| TOP | 0.022383 | 0.010528 | 2.126130 | 0.0399** |
| LOGEXR | -0.253655 | 0.118099 | -2.147817 | 0.0383** |
| LOGMPI(-1) | -0.775175 | 0.135599 | -5.716669 | 0.0000** |
| INF(-1) | -0.017060 | 0.006448 | -2.645768 | 0.0117** |
| R2 | 0.972505 | | F-statistic | 344.8608 |
| Durbin-Watson statistic | 1.201826 | | Prob(F-statistic) | 0.000000 |

Author's computation. A double asterisks (**) denotes statistical significance at 5% level of significance.

The coefficient of trade openness (TOP) a measure of trade liberalisation has a positive sign in the long run and is statistically significant at 5% level as shown in Table 6. The implication of this result is that TOP has significant impact on the growth of raw materials in Nigeria. Ceteris paribus, a percentage increase in TOP will on average, increase the growth of raw materials by about 2.24% per annum. As observed by Dornbusch (1992) that having access to a greater variety of foreign inputs at a reduced price enhances production than having fewer which could happen in a restricted regime. When we look at the coefficient of exchange rate (LOGEXR), it reinforces, the dilemma faced by Nigeria, all along and for the present. It shows that all things being equal, a percentage increase in exchange rate will on average, decrease the growth of raw materials by about 25.4% annually. The effect is statistically significant at 5% level and goes to show that the exchange rate phenomenon has been a menace the country's economic managers find very difficult to handle effectively. The coefficient of import price index (LOGMPI(-1)), a measure of how much the country pays for goods from the rest of the world shows that a percentage increase in a lag of the variable, holding every other variable constant will on average, lead to a decline in the growth of raw materials by about 77.5% yearly. According to Table 6, the effect is statistically significant, using the 5% benchmark. On the other hand, the coefficient of a lag of inflation (INF(-1)) also shows that when all the variables are equated to zero, a percentage increase in a lag of inflation will lead to a

 

decrease in the growth of raw materials by about 1.7% on average on a yearly basis.

Table 7. Results of the Short Run Error Correction Model of Equation *IX*

| Variable | Coefficient | HAC std. error | t-Statistic | P-value |
|---|---|---|---|---|
| Constant | 0.141274 | 0.045658 | 3.094181 | 0.0037 |
| D(TOP) | 0.012831 | 0.003860 | 3.323678 | 0.0020** |
| D(LOGEXR) | -0.370179 | 0.166719 | -2.220374 | 0.0326** |
| D(LOGMPI(-1)) | 0.316805 | 0.199950 | 1.584417 | 0.1216 |
| D(INF(-1)) | 0.002486 | 0.002106 | 1.180521 | 0.2453 |
| ECMx(-1) | -0.220034 | 0.078042 | -2.819421 | 0.0077** |
| R2 | 0.318725 | | F-statistic | 3.461980 |
| Durbin-Watson statistic | 1.963855 | | Prob(F-statistic) | 0.011492 |

Author's computation. A double asterisks (**) denotes statistical significance at 5% level of significance

The error correction model result is displayed in Table 7 above. In the short run result, TOP, which stands as a measure of trade liberalisation and exchange rate are statistically significant just like in the long run. However, import price index and inflation were statistically insignificant in the short run. The main variable of interest, the error correction term, (ECMx (-1)) which shows the speed of adjustment towards long run equilibrium is statistically significant at 5 % level and follows a priori expectation since it has a negative sign. This suggests the presence of a long run association amongst the variable in the model. This study shows that about 22% of any short run disequilibrium between the growth of raw materials and its independent variables comprising trade openness used as a proxy for trade liberalisation, inflation lagged one period, import price index lagged one period and exchange rate is corrected in the long run annually.

Table 8. Results of the Diagnostic Test

| Test | Estimated statistic | p-value |
|---|---|---|
| Breusch-Godfrey Serial Correlation LM Test | (F-stat) 0.116140 | 0.8907 |
| Breusch-Pagan-Godfrey Heteroscedasticity Test | (F-stat) 0.499266 | 0.7747 |
| Ramsey RESET Test | (F-stat) 0.173913 | 0.6791 |
| Normality Test | (JB-stat) 0.233142 | 0.8899 |

The display in Table 8 shows that the model is valid. The null hypothesis of no serial correlation, no heteroscedasticity and no misspecification was not rejected at 5 per cent level. In addition, the result also indicates that the null hypothesis that the residuals are normally distributed was not rejected. The stability test conducted using the CUSUM test shows that the model is also stable (see Appendix).

## 7. Conclusion

Trade liberalisation has benefits, but it equally has disadvantages. The demerits emanate from the uneven way countries in the developed world treat the less developed economies with regards to trade agreements and deals (Stiglitz, 2006). Despite how an economy might structure their trade policy, the important thing, is that autarchy has never been an option and would never be in time to come. That could be a given for the moment. What is worrying though, is the fact that, on the whole, the developing countries have failed to do the needful in setting their local environments in a manner that could allow for absorption of trade liberalisation. The sole objective of this study is to explore the link between trade liberalisation and the growth of raw materials in Nigeria. To accomplish the task, annual time series data was employed for the empirical analysis after checking to ensure the data has no unit root problem. The data were taken from the World Bank and the Central Bank of Nigeria, and extends from 1970 to 2014. The empirical findings from the study shows that trade liberalisation (trade openness was used as a proxy) has significant impact on the growth of raw materials in Nigeria within the period under review, both in the long run and in the short run. This result, somehow goes against the current trend in Nigeria because the absence of imported raw materials together with other factors led to closure of many industries in the country ('Interest rate regime worth giving a look' 2017). The inaccessibility of imported inputs, especially the ones without local replacement or substitute, could undermine an economy –when firms cannot access their basic raw materials, a lot of things happen. Operations would be scaled down or completely shut down and the aftermath of the exercise will lead to people losing their jobs and so will national income fall. This could have geometrical effect when it happens across various industries at the same time. To forestall the recurring problem of the difficulty in accessing/ importing essential raw materials into the country, the managers of the economy should take a holistic approach to the way industries using imported inputs are treated. Imported inputs in this context, means the raw materials that could only be imported because they are unavailable domestically. Import waivers should be given to firms whose businesses are critical to the economic progress of the country. Secondly, the government is advised to remove all the bottlenecks that impede these industries from importation of invaluable raw materials. When this is done with sincerity, productivity gains could be enhanced. Finally, this study did not examine by how much raw materials import has grown pre and post liberalisation. Also we did not

 

look at how different categories of raw materials import have grown. We leave that for future discussion.

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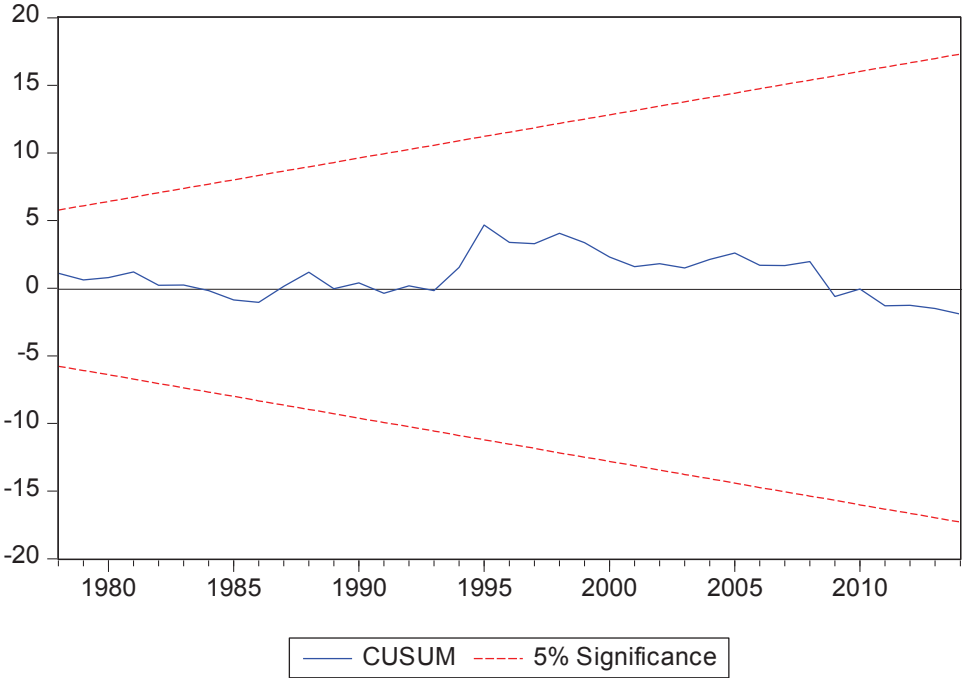
**Appendix**

**CUSUM STABILITY TEST**




**RESIDUAL TEST FOR NORMALITY**