DETERMINANTS OF NIGERIA'S NON-OIL IMPORT DEMAND

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Abstract
Primarily, the study assesses the determinants of non-oil import demand in Nigeria. This is aimed at measuring the relative strengths and nature of effects of the variables that determine Nigeria's non-oil import demand, and subsequently assessing the extent to which results are in conformity with those previously obtained on a wider aggregate of the Nigerian economy. An econometric method of analysis was employed. Results indicate deviations from the findings of earlier studies, as two key variables previously reported as significant (real exchange rate and real income) showed insignificant causational relationships in the model.

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1. Introduction

Nigeria, according to Okoh (2004), embraced globalization as one of the founding members of the world trade organization (WTO), the body that is currently charged with the responsibility to remove all barriers to trade between the nations of the world, so that the whole world becomes "one big" global market. This in Mackinnon's (1994) view underscores the importance of foreign trade in the development process, and has been of interest to development economists. These interests may have been necessitated by increasing disequilibrium in Balance of Payments (BOP), generated from such unification of markets, and how this is transmitted promptly and widely to the rest of the economy. Of the two forms of disequilibrium in trade, negative disequilibrium happens to be the more worrisome case, and is the common feature of most developing economies. This is as a result of their dependence on imported manufactures, as against their reliance on export of primary products. To manage this adverse situation, knowledge of variables to which imports respond in a given market economy provides valid information on how, and possibly the extent to which this form of disequilibrium in trade can be corrected in an economy. This in Egwaikhide's (1999) view may have prompted several authors to be preoccupied with the determinants of import in developing countries, with the result that a number of functional specifications have been explored.

As a developing economy, Nigeria has had her own share of high nominal value of aggregate import over the years. This has been the order since independence in 1960, and has been made worse by the oil boom of the 1970s that gave rise to an increase in average income, and subsequently increase in the demand for import. Evidence shows a concentration of these import volumes on the side of the non-oil sector, such that non-oil imports have over time been on a steady growth path. The nominal value of non-oil imports rose from an average of ₦36.55 billion, representing 96.8% of total import into Nigeria within the period 1970-1979, to ₦118.36 billion, representing 93.4% of total import in the period 1980-1989, ₦3.48 trillion in the period 1990-1999, representing 79.9% of total import and ₦19.33 trillion, representing 82.0% of total imports over the period 2000-2008/2. These represent an average growth rate of 22%.

This growth in the value of imports has in the literature been attributed to a number of factors which include expansion in crude oil exports that considerably raised foreign exchange earnings, the over-valuation of the naira during the period of controls, and liberal trade policies, born out of the desire to provide capital goods and raw materials for import substituting industries; both of which made access to imports easy. Again the expansion of domestic absorption which reveals supply inadequacies in the system, such that aggregate demand outweighs supply. To make up for the supply shortfalls and cut down on the surging inflationary consequences, Nigeria relied on imports, to the extent that imports as a component of total trade, particularly non-oil imports, have persistently been on a steady rise, resulting in deficits in Nigeria's overall trade Balance of Payments, (See Moro, 1995; Egwaikhide,1999; Oyinlola *et al.* 2010).

A critical examination of this, leaves no one in doubt that these deficits emanated from the non-oil sector. The sector has been growing in deficits since 1960, except in 1969 when it made a contribution of ₦2.4 million naira surplus to Nigeria's overall trade Balance of Payments. The rate of growth of these deficits on aggregate term in the sector has also produced a staggering figure. From the period 1970-1979 to 1980-1989, the growth rate was 69%, from 1980-1989 to 1990-1999, the growth rate stood at 97%, while the growth rate within the period 1990-1999 to 2000-2008 stood at 82%. This shows the extent of abuse of our oil surpluses in the overall trade balance.

The adoption and implementation of various import control measures during the era of controls by the authorities could not solve the problem, then Nigeria opted for exchange rate deregulation in 1986 as a way out of it. Import control measures during the period of controls include the import substitution strategy of industrialization, high tariff rates with outright ban on some categories of commodities, coupled with the use of administratively determined exchange rate. It is of note that the objective of import control has over the period been in conflict with the objective of maintaining a steady price level. Whenever this was the case, the government has opted for measures that will ensure steady price levels as against measures for the control of imports (Egwaikhide, 1999). The consequence of this is the fact that non-oil imports remained on a steady rise, with no solution yet in sight.

Interestingly, past studies like those by Ajayi (1975), Egwaikhide (1999), Aliyu (2001), and Aliyu (2007) revealed that some variables like real income, real exchange rate, foreign exchange are the main determinants of Nigeria's imports. None of these studies exclusively focused on the non-oil sector of the Nigerian economy. Therefore the view here is that these studies on the determinants of Nigeria's imports, the estimates of which were carried out on a wider aggregate, might have been plagued by the expected influence of the oil sector on the Nigerian economy. The outcome of these studies may not perfectly explain events in the non-oil sector, hence the need to carry out a similar study to explain events in the non-oil sector.

In light of this, the study seeks to assess the effects of the major components of Nigeria's non-oil import demand function, with a view to ascertaining the determinants of non-oil imports in Nigeria. To be able to accomplish this task, the study will address the following research questions: What are the determinants of Nigeria's non-oil import demand? What are the magnitudes of the elasticities of non-oil import demand function in Nigeria? In the attempt to provide answers to these questions, the broad objective of the study will be to investigate the determinants of Nigeria's non-oil import demand. Specifically the study seeks to ascertain the variables that determine Nigeria's non-oil import demand, and to estimate the size of elasticities of non-oil import demand function.

1.1 Scope and Policy Relevance

The study will exclusively focus on the non-oil sector of the Nigerian economy. Annual data spanning the period 1970 to 2010 will be employed. The choice of range of period is informed by availability of data. Findings from the study will enable us assess the extent to which estimates are in conformity with those previously obtained by earlier studies. It is expected to provide empirically predictive estimates of non-oil import demand, necessary for the provision of valid and reliable information on how best to regulate the volume of Nigeria's non-oil import demand, in the midst of growing income, and by extension provide policy option(s) for the regulation of Nigeria's Balance of Payments position.

2. Trade Policies and Import In Nigeria: An Overview

Iyoha (1986) reports that in Nigeria, the major instruments of trade and commercial policy are tariffs, quota, and export and import prohibitions, exchange rate determination, import, debt management as well as cartel arrangements. Exchange rate determination is often adopted as an important instrument of trade and commercial policy. This is because foreign exchange plays a major role in all international economic transactions, being the means of offsetting payments.

2.1 SAP and Trade Performance

According to Gbosi (2003), Nigeria's foreign trade policies prior to the adoption of SAP in 1986 were aimed at striking a balance between promoting domestic production, controlling the effects of domestic shortage of certain essential commodities and generating revenue for government expenditures. It specifically consisted of quantitative import controls administered through a comprehensive import licensing system, and selectively high tariffs frequently imposed on the basis of the perceived needs of the country. Quotas were also used to quantitatively restrict imports, while high duties were placed on agricultural commodities and luxuries (50 – 100 percent, and 150 – 200 percent respectively), while capital and raw material goods attracted low duties (5 – 10 percent and 15 – 20 percent respectively). In addition to direct trade control, Gbosi (2003) opines, the exchange rate was administratively determined. This was to ensure cheap inputs especially of raw materials for local manufacturing import-substituting industries. As a result, the naira was generally over-valued by as much as 30 – 45 percent in real terms between 1978 and 1983.

   The Structural Adjustment Programme (SAP) was adopted in July, 1986 against the background of the crash in the international oil market, and the resultant deteriorating economic conditions in the economy. One of the policy instruments of SAP is Trade Liberalization. By this, one means the gradual removal of restrictions on trade. It was designed to achieve fiscal balance and balance of payments viability by altering and

restructuring the production and consumption patterns of the economy, eliminating price distortions, reducing the heavy dependence on crude oil exports and consumer goods imports, enhancing the non-oil exports base and achieving sustainable growth among other objectives. The main strategies of the programme were the deregulation of external trade and payments arrangements, the adoption of a market-determined exchange rate for the naira, substantial reduction in complex price and administrative controls, and more reliance on market forces as a major determinant of economic activities.

The objective of finding a realistic exchange rate which could match the demand for foreign exchange with supply, under SAP would have the effect of making imports more expensive, and exports cheaper, and by so doing curtailing the volume of imports. This process of deregulation coupled with an appreciable degree of openness during the SAP era made the economy vulnerable to international trade shocks and widening of the size of disequilibrium in Balance of Payments (BOP). Eqwaikhide (1999) shows that between 1953 and 1989 imports as a proportion of GDP did not fall below 10% except for 1974 and 1986. Furthermore there is evidence of increasing deficits in the Balance of Payments (BOP) ever since SAP was introduced (See Aliyu, 2007).

2.2 Trends of Variables and Non-oil Import Responses

From the foregoing analysis, two distinct periods are rightly observed in Nigeria's external trade, within the period under study: the period of control (embodying direct trade controls and use of administratively determined exchange rates) and the period of liberalization of trade. As a matter of necessity, this section takes analysis of behaviours of variables in the model over the period, and how non-oil imports are affected.

An examination of the individual trends of variables in the model indicates that: from 1970 to 1982 GDP for instance increased significantly. Beyond this period, it recorded infinitesimal increment above the successive period's level. In response to this behaviour, non-oil imports increased at a relatively low rate up to 1982, decreased till 1986 and began to increase again - this time at a higher rate. In another instance, trade policies in place prior to the liberalization of trade in 1986 brought about slight changes in the level of real exchange rate (mainly in the upward direction), and non-oil imports responded by the controlled increases observed within same period. After 1986, the real exchange rate became relatively stable over time, but non-oil imports increased significantly. From an examination of Nigeria's level of foreign reserve, one can rightly observe that there has been continuous increases in the behaviour of the variable (level of foreign reserve) over the entire period under study. Non-oil imports in response, have continuously tracked these observed increases over the period. An analysis of the effect of the openness of the economy indicates that increases in the degree of openness gave rise to increases in the level of non-oil imports; between the years 1970 to 1986, the various import control measures adopted during the period of

control were able to curtail increases in the level of non-oil imports to an appreciable level. On the other hand, the liberalization of trade in 1986 resulted in an unprecedented rise in the level of non-oil imports. As for the foreign exchange component of the model (level of import capacity), there is really no definite pattern in the trend of Nigeria's level of import capacity over the period, therefore one cannot quickly attribute changes in the level of non-oil imports to changes in the level of import capacity.

In summary, one can rightly observe that while Nigeria's level of foreign reserve and degree of openness of the economy relatively have strong positive effects on the level of non-oil imports, the real exchange rate has weak effects; which is positive at the period of control, but relatively negative under trade liberalization. The effect of real GDP and level of import capacity cannot be ascertained from the trend analysis. However, it is observed that non-oil imports generally performed more poorly during the period of control, as a result of various import control measures that were in place then, than during the period of liberalization of trade. (see Figure I)

3. Literature Review

3.1 Theoretical Literature

Several theories exist in the literature that offer explanations on import demand function. The argument put forward by each of these theories/models is useful, coherent and at the same time convincing, yet they are not far from each other. A strand of these (The Production Theory) argues that the demand for imports can be derived from production theory and there is no need to model final demand, given the nature of international trade where traded goods are either used in other production processes or go through a number of domestic channels before reaching the consumer. Another (The International Finance Theory and Policy) maintains that imported goods are not a part of domestic Gross National Product (GNP). It assumes that consumption, investment, government and export demand are included in demand for imported goods. A third strand (The Stock Adjustment Import-Exchange Model) assumes that the basic objective is to minimize the cost of discrepancies between actual and desired levels of both imports and international reserves, which is expressed in a quadratic form. In another line of argument, another school of thought (The Centre-Periphery Model) examines international trade as a whole, in an attempt at explaining the widening international differences in the level of development between the developed and developing countries. It concludes that through the means of labour migration, capital movements and trade, international inequalities are perpetuated in exactly the same way as regional inequalities within the nations. The last although not the least school of thought reviewed, (The Simple Import Demand Model) advocates the inclusion of the foreign exchange component in the import demand function, on the ground that most less developed countries (LDCs) suffer from foreign exchange scarcity, such that it is necessary to include it in the import demand function as a determinant of their ability to import goods and services.

   Among these theories, the simple import demand model best suits analysis of non-oil imports in Nigeria, it being a developing economy. The production theory and international finance theory are not of interest, because their assumptions are more suitable for industrialized economies. That of Hemphill (1974), (The stock adjustment import-exchange model) as adopted by Egwaikhide (1999) is also not of interest because it incorporates the phenomenon of import substitution; a development strategy that relies heavily on imported inputs for production. Nigeria had abandoned this development policy in the 60s. Again, the Prebisch model is more or less an analytical framework explaining the nature and pattern of trade between the developed and developing economies

3.2 Empirical Evidence

The need to ascertain the extent to which theoretical underpinnings are in consonance with empirical findings leads us into an excursion into the views and findings of other scholars in the area of the study. The models that are of importance and will be instrumental guides in charting the course of the study's investigation are those of Olayide (1968), Learner and Stern (1970), Khan (1974), Ajayi (1975), Warner and Kreinin (1983), Thursby and Thursby (1984), Ozo-Eson (1984), Bahmani-Oskooee (1986), Olopoenia (1991) Kotan and Saygili (1999), Egwaikhide (1999), Aliyu (2001), Aliyu (2007) and Omejimite and Akpokodje (2010).
   The pioneering efforts of Olayide (1968) to model the determinants of aggregate imports in Nigeria focused on only some selected commodities of Nigeria's imports in the period 1948-1964. Evidence from multiple regression models indicate that terms of trade, real income (measured by GDP) and the index of trade restrictions had fairly good parameter estimates. Unfortunately given that the study focused exclusively on some selected commodities, it is expected that the economic factors facing demand for these commodities might well not be the same as those of commodities outside the list. Therefore, results obtained may not be valid for those not included in the study. Secondly, the fact that the study measured real income in terms of absolute value of GDP, limits the validity of the result obtained. Learner and Stern (1970), used the basic imports demand model that relates imports to income and relative prices; a model that has been criticized by several authors. For instance, Burgess (1974) argued that although the traditional imports demand model is able to provide measures of income and price elasticities, it assumes that total imports consist of final commodities that are not separable from those other goods that serve as inputs to the consuming sectors. Even the appropriate measure of both the dependent variables are not provided by theory. Thus it is not surprising according to Egwaikhide (1999) that various authors have used different price indexes and functional forms in the aggregate imports demand model. Khan (1974), in his import demand model for individual countries using annual data, investigated the period 1951-1969. Employing the popular OLS technique for

his analysis, with the variables specified in logarithmic terms, he found that relative prices play an important role in the determination of imports for developing countries. Warner and Kreinin (1983), have also employed a similar model to that of Khan (1974), but their approach differs from that of Khan (1974) in two respects; first there are two distinct investigation periods, (the period of fixed and flexible exchange rates regimes), to analyse the behaviour of the variables in the two periods. Secondly, Warner and Kreinin estimated the import demand function employing the OLS technique as Khan did, but they also repeated the estimation after excluding petroleum products to remove their influence on the results. The results of the investigation reveal that the introduction of floating exchange rates appeared to have affected the volume of imports in several countries, but the direction of change varied between them. Some other studies carried out in the context of developing economies and Nigeria in particular, studies like: Ajayi, (1975), Ozo-Eson, (1984), Bahmani-Oskooee, (1986), Olopoenia, (1991), Kotan and Saygili, (1999), Egwaikhide, (1999), Aliyu, (2001), Aliyu (2007), apart from relative prices, further reported significant impact of some other variables such as real exchange rate, money supply, foreign reserve, real income, foreign exchange, real expenditure as factors that determine the level of imports in Nigeria. These studies are, however, limited by the fact that many of them (see for instance Olopenia, 1991; Egwaikhide, 1999; Aliyu, 2007) considered the demand for imports within a larger model. Estimates obtained from the models employed in these studies cannot perfectly explain events in the non-oil sector. Furthermore, Olopoenia specifically related imports function-ally to real expenditure and real exchange rate - a formulation based on the monetary approach to the Balance of Payments. In it, the choice of the variables were largely dictated by the objectives of the macro-econometric model developed, which may not be same as some other models.

Given developments in econometric modeling and the fact that there is no universally accepted model of imports demand that can fit all or capture the dynamics in different countries, the models have undergone a number of refinements in recent times. According to Aliyu (2007), Learner and Stern (1970) note that there are no well-defined criteria for choosing a particular functional relationship/specification. Rather it is the researcher who decides what functional form to use (influenced by the theoretical position chosen), provided the choice is not harmful to the results obtained. Concerned about the issues arising from the various functional imports demand models, Thursby and Thursby (1984) - cited in Egwaihide (1999) - examined the appropriate-ness of alternative specifications, using five countries (Canada, Germany, Japan, United Kingdom and the United States) as case studies. They explored nine different models of aggregate imports demand from which 324 alternative specifications were derived. Furthermore, Aliyu (2007) stated that the general conclusion from this detailed research is that there is no single functional form that is universally appropriate across countries over times. The paper argued that Thursby and Thursby (1984) further discovered

that logarithmic functional form is more appropriate, which supports earlier findings by Khan and Ross (1977). Omojimite and Akpokodje (2010) found that exchange rate reforms in Nigeria accounted for a marginal improvement in the country's trade balance. As against the view that exchange rate reforms discourage the importation of consumer goods, their findings show that during the reforms, the importation of raw materials and capital goods did exceed the pre-reform era.

Among the Nigerian studies, all but Egwaikhide (1999) and Aliyu (2001) carried out aggregated estimations of Nigeria's aggregate import demand function. These in each case culminated into a cointegration and error correction mechanism, suggesting a cointegrating relationship between imports and their determinants. The outcome of this shows that certain variables such as, real income, real exchange rates among other factors determine Nigeria's level of import demand. This study intends to investigate further the extent to which these findings are in conformity with events in the non-oil sector. This will provide a measure of confidence to solving the trade deficits problem of the sector.

4. Methodology

4.1 Theoretical Framework

The useful theoretical framework for the analysis of non-oil import demand function is the simple import demand model (Khan, 1974). This import demand model as developed by Khan, has also been employed in some other studies like Nurusimhan and Pritchett (1993) and Thirlwall (1999). It was modified and used by Yekini (1999), Aliyu (2001), Okoh (2002) and Aliyu (2007). It involves the use of cointegration and possible error correction modeling, using Ordinary Least Squares (OLS) regression technique, predicated on the simple linear relationship between import as dependent variable and its theoretical determinants as explanatory variables.

4.2 Analytical Framework

Several models were employed by different authors in the line of study. However, the model that is more appropriate for what the study intends to do in this investigation and upon which analysis herein will be based is the model adopted by Aliyu (2007). The paper employed the simple import demand model as developed by Khan (1974). This culminated in a cointegration and error correction modeling, using the Ordinary Least Squares regression (OLS) estimation technique, which was predicated on the simple linear relationship between exports-imports as dependent variables and exchange rate, income, imports capacity, level of foreign reserves, degree of openness and SAP policy etc as independent variables; and found, among others, that exchange rate significantly affects imports more than exports (i.e oil and non-oil). Index of openness in the imports model stimulates more imports while other factors not included in the model but

captured by the error correction mechanism in imports model exert negative influence on imports on the long run.

The development in the literature (in the area of econometric modeling in particular) gives us the flexibility of choosing our own functional specification, as Learner and Stern (1970) noted that there are no well defined criterion for choosing a particular functional relationship/specification. Rather it is the researcher who decides what functional form to use (influenced by the theoretical position chosen), provided the choice is not harmful to the results obtained. Thursby and Thursby (1984), as cited in Aliyu (2007), further discover that logarithmic functional form is more appropriate. Reasons for the appropriateness of logarithmic functional form are for the purpose of linearizing the model, so that it can be estimable using OLS regression technique. Secondly, given that the coefficients to be estimated are elasticities, logarithmic functional form enables one to measure the percentage change in the dependent variable, for a given percentage change in the independent variables.

4.2.1 Model Specification

Following Aliyu (2007), the model will specify a linear relationship between non-oil imports (NOM) as dependent variable, and Real Income (RGDP), Real Exchange-Rate (REXG), Level of Foreign Reserve (FRV), Index of Openness (IOP), Import Capacity (IMC) and a dummy variable (for SAP policy period, (DSAP)).

The functional non-oil import demand can be specified as;
NOM = f(RGDP, REXG, FRV, IOP, IMC, DSAP)   (1)

Where: NOM = Non-Oil Import, RGDP = Real Gross Domestic Product, REXG = Real Exchange Rate, FRV = Level of Foreign Reserve, IOP = Index of Openness, IMC = Level of Import Capacity, DSAP = Dummy Variable for SAP Policy Period and f = functional symbol.

When estimating parameters are introduced and a random term "U" to take care of variables not included in the model but affect non-oil imports, equation (1) transforms to:

$$NOM = \beta_0 + \beta_1 RGDP + \beta_2 REXG + \beta_3 FRV + \beta_4 IOP + \beta_5 IMC + \beta_6 DSAP + U \qquad (2)$$

The dynamic model of equation (2) after expressing the same in log-linear form as supported by Thursby and Thursby (1984) is specified as;

$$|_n NOM_t = \beta_0 + \beta_1|_n RGDP_t + \beta_2|_n REXG_t + \beta_3|_n FRV_t + \beta_4|_n IOP_t + \beta_5|_n IMC_t + \beta_6|_n DSAP_t + U_t \qquad (3)$$

β_1, β_2, β_3, β_4, β_5, and β_6, are the elasticities of Real Income, Real Exchange Rate, Foreign Reserve, Index of Openness, Import Capacity, dummy variables-for SAP policy period. The a priori expectation is that β_1, β_3, β_4, $\beta_5 > 0$. While β_2 is expected to be less than zero. The dummy variables for SAP is intended to capture the period before and after the introduction of the Structural Adjustment Programme in Nigeria. It will be assigned binary 0, and 1; 1, for post SAP and 0, for pre SAP eras. Its coefficient is expected to assume a value greater or less than zero.

4.2.2 Cointegration and Error Correction Model

Cointegration becomes an overriding requirement for any economic model using non-stationary time series data. If the variables do not cointegrate, then we have the problem of spurious regression and econometric work becomes almost meaningless. On the other hand, if the stochastic trends do cancel, then we have cointegration which will then necessitate an error correction model (ECM). The ECM has the advantage of including both long-run and short-run information of the model.

In the event of a long run relationship among the variables, equation (3) transforms into an error correction model specified as:

$$\Delta|_n N0M_t = \beta_0 + \beta_1 \Delta|_n RGDP_t + \beta_2 \Delta|_n REXG_t + \beta_3 \Delta|_n FRV_t + \beta_4\Delta|_n IOP_t$$
$$+ \beta_5\Delta|_n IMC_t + \beta_6\Delta DSAP_t + \lambda ECM_{t-1} + V_t \qquad (4)$$

Where:

$ECM = (\Delta|_n N\text{-}0M_t - \beta_0 - \beta_1\Delta|_n RGDP_t - \beta_2\Delta|_n REXG_t - \beta_3\Delta|_n FRV_t - \beta_4\Delta|_n IOP_t - \beta_5\Delta|_n IMC_t - \beta_6\Delta DSAP_t)_{t-1}$

λ = Adjustment parameter which shows the extent to which the disequilibrium in the dependent variable ($\Delta|nN0M_t$) is being corrected each period.

Δ = first deference operator

$V_t = \Delta U_t = (U_t - U_{t-1})$

Either equation (3) (if there is no long run relationship among the variables) or (4) (in the event of a long run relationship among the variables) shall be estimated.

Thus, our first objective shall be captured by the respective test of significance on each explanatory variable. By evaluating the signs and magnitude of the elasticities, the second objective will be captured.

4.3 Estimation Procedures

The Ordinary Least Square (OLS) will be employed in estimation of the model, being the best linear, unbiased estimator. This is after making sure that the variables in their behaviours conform to the assumptions of the classical regression model. Effort will

be made to ensure that the model adheres to the principles of parsimony using AIC (Akaike Information Criterion) and SBC (Swartz Bayersian Criterion). A unit root test will be conducted using Augmented-Dickey-Fuller (ADF) and/or Phillips Perron (PP) to examine the time series properties of the model. The level or order of integration of the residual error term of a set of non stationary time series aggregate should be zero (that is, $U_t \sim I(0)$) in order to qualify as an error correction model. Furthermore, a stability test will be conducted to test for the stability of the model across samples within the period using recursive residual and cusum tests.

4.4 Data Sources and Transformation Processes

Annual data had been widely used in previous studies. So far, the study has no justifiable reason to deviate from this existing practice; economic variables respond to policy changes after a lag of time, hence the use of annual data will be employed here. However, some data for the variables of interest will need transformation. Explained below are sources of these data and mechanisms for the expected transformations on some of them:

1. NOM (Non-Oil Import), RGDP (Real Gross Domestic Product), REXG (Real Exchange Rate), FRV (Level of Foreign Reserve): Annual data on each of these variables are published by CBN in the statistical bulletin.

2. IOP (Index of Openness): This is said to be synonymous with the idea of neutrality in the trade policy. This is measured as a ratio of the sum of non-oil export and import to RGDP. Thus (NOX + NOM)/RGDP. Where NOX = Non-Oil Export, NOM = Non-Oil Import, RGDP = Real Gross Domestic Product.

3. IMC (Import Capacity): This is the foreign exchange component of the model to be employed, which represents the capacity the economy has to import. It is measured as the ratio of annual average reserve to annual import.

$$\text{Thus, IMC} = \frac{\text{Annual Reserve Average}}{\text{Annual Non - Oil Import}}$$

Given that a part of RGDP is included in the norminator (annual reserve average); some degree of multicollinearity is expected. The study however chose to accommodate this rather than drop the variable (IMC); dropping it will lead to misspecification of the model.

4. REXG (Real Exchange Rate): Processed data on this will be sourced from the African Institute for Applied Economics (AIAE) Enugu.

E-VIEW Econometrics software shall be used to estimate the model and evaluation of the results; Ms-Excel 2003 will be used for data entry.

5. Empirical Analysis of Results

This section presents the results of various tests that were conducted, and the analysis that follows from the results of the stationarity tests on the various macro data for the study. The ADF test outcome which was substantiated by the Phillips-Perron test outcome, establishes stationarity in all the series (some at level form, and others after first differencing). A confirmatory test for the suspected absence of a long run relationship between the dependent variable and the regressors was conducted on the residual term as presented in table (II). This yielded residuals that are non-stationary at level form. The implication of this finding is the absence of a long run relationship between the dependent variable and the independent variables, and the fact that analysis herein can and will be based on model (3).

Table (III) presents the results of the regression model as specified in equation (3). The results show that only three out of the six coefficients are statistically significant at 5% as well as 10% levels of significance. Four of these variables have the theoretically expected signs, while the other two (exchange rate and import capacity) have not. The coefficient of multiple determination (i.e. adjusted R^2) of 0.97 indicates a very strong explanatory power of the model, i.e. changes in the dependent variable (non-oil import demand) can actually be accounted for by the independent variables. The result of the F-statistic shows that independent variables are non-zero at 95% level of confidence. This leads to the rejection of the null hypothesis that the coefficients have zero value. There is some degree of positive autocorrelation in the model as judged by the D. Watson statistics. This is however not unconnected with the quality of data used.

The result of the white hetroscedasticity test as presented in table (IV) failed to reject the hypothesis of no hetroscedasticity in the data. The conclusion drawn from this is that the homoscedasticity assumption of CNLRM has not been violated; so the variances are constant over time. From the correlation matrix the pair-wise correlation between IOP and FRV variables is high, suggesting that there may likely be collinearity between the variables. However, the study chose not to drop any of these variables from the model to alleviate the problem, because that may lead to specification bias, which has its own consequences. The remedy here may be worse than the disease itself. A collinearity problem, even when severe, is essentially a data deficiency problem and we have no choice over the data in use herein being secondary data. As a result the best option to get around this, which is really not a problem, according to Blanchard (1967), is not to resort to creative techniques, but instead "do nothing". Hence, a collinearity problem, even when severe, is essentially a sample phenomenon which violates no regression assumption. It is not a serious problem when it comes to prediction (see Gujarati and Sangeetha, 2007). The Jaique-Bera (JB) test of normality rejects the hypothesis that the residuals are normally distributed. From the results, JB statistics = 18.65199, and the P value of obtaining such a high value is 0.000089 (see

figure (II)). This is not unconnected with the sample size for the study (the JB test of normality is an asymptotic test). It is however not specified in the literature what constitutes a large sample for this test (see also Gujarati and Sangeetha, 2007).

5.1 Stability Tests

Employing the recursive residual test to examine the stability of the model across samples within the period under review. The results show that the recursive residual of 1992 and 1995 although within the ±2 s.e band, moved towards the lower band. Generally however, the model yields a stable result. The cumulative sum of residual (CUSUM) test yields a better result, as there is no apparent case of the statistics tending toward the critical lines of 5% level of significance.

The result of the CUSUM of squares test statistics shows that the residual plot went beyond the critical lines between 1997 to 2002, but remained within the band in other periods. The conclusion drawn from these tests of stability indicates that the model is stable within the study period, therefore estimates from it can be reliably used to analyse and predict the non-oil import demand in Nigeria. (see figures II, IV and V).

5.2 Discussion of Results

From the study, it was discovered that a unit change in the level of foreign reserve is expected to induce changes in non-oil imports by 99 percent, in the same direction, which is not surprising given the strong positive link among revenue from oil, the level of foreign reserve and imports generally in Nigeria.

Another finding from the result is the fact that non-oil imports decrease by 99 percent, for every percentage increase in the level of import capacity–which is somehow ambiguous. The result outcome is however not unconnected with the inseparability of some of the data that were used. In the study we have no choice but to make use of the data in the form that they were made available. Originally, a major objective in the study was to net-out the influence of oil receipts. This study could not completely achieve this, given that the annual reserve average, which is a component of level of import capacity, has oil receipts as a dominating unspecified component-hence the ambiguous result obtained. This ambiguity will always have itself corrected whenever the study is undertaken on a wider aggregate (i.e. oil and non-oil trade), as has been observed in some of the previous studies (see Egwaikhide, 1999; Aliyu, 2007 etc.).

Furthermore, the findings revealed a relatively negligible effect of openness of the Nigerian economy, on non-oil imports; non-oil imports increase by 4 percent for every percent increase in the degree of openness and vice-versa. The implication of this outcome is the fact that, though non-oil imports are affected by openness of the economy, however, openness should not be a major concern when it comes to regulating the level of non-oil imports in Nigeria. A critical examination of this particular result leads one into admitting again the influence of oil receipts as a result of the inseparability of the variable (RGDP), used in the computation of IOP into oil and non-oil real GDP.

A summary of these outcomes is the fact that Nigeria's non-oil imports are not stimulated by changes in real income, real exchange rate and SAP policy, but rather stimulated by changes in the level of foreign reserve, degree of openness and level of import capacity.

6. Conclusions and Recommendations

6.1 Conclusions

The paper undertook a detailed review of theoretical and empirical literature, which led the authors to agree with Aliyu (2007) that there is no consensus on the specific factors affecting import demand models generally, as most applications of these models to different countries adopted a similar approach, which is Ordinary Least Squares (OLS) in either static or dynamic form. This paper further discovered that most Nigerian studies employed the (OLS) in dynamic form, suggesting the existence of a long run relationship among the variables in Nigerian data. However, it is of note that these studies included oil imports in their models.

The results of the stationarity test using the Augmented Dickey Fuller and Phillips-Perron test show that all the series are either stationary at level form or first difference. The result of the cointegration test substantiated this suspected absence of a long run relationship between the dependent and independent variables. Given this results outcome, the paper hence adopted OLS estimation technique in static form in analysis herein.

From the empirical estimation of the static model it was established that while the coefficients of the level of foreign reserve, import capacity - which is the foreign exchange component of the model - and degree of openness are statistically significant, those of real income, real exchange rate and SAP policy were statistically not significant. The economic implication of this is the fact that Nigeria's level of foreign reserves, import capacity and degree of openness are very vital for regulating the level of non-oil imports in Nigeria. Hence import restrictions, reduction in the level of foreign reserves, as well as increases in the level of import capacity are required to reduce the level of non-oil imports in Nigeria. The reverse of these measures will achieve the opposite result.

Specifically:

- There is a positive theoretical link between revenue from oil, level of foreign reserve and non-oil import demand in Nigeria.
- While the level of foreign reserve and degree of openness positively stimulates non-oil import, the level of import capacity negatively affects it.
- Real income and real exchange rate do not have a significant impact on non-oil import demand in Nigeria. This failed to support findings from previous Nigerian studies like those by Ajayi (1975), Egwaikhide (1999), Aliyu (2001) and Aliyu (2007). This revelation is however surprising given the role of both variables in international trade. This finding supports the expected effect of psychological factors (consumption habits) in particular, on the level of non-oil imports in Nigeria.

6.2 Recommendations

Based on the findings above, this paper make the following recommendations as ways of fostering a favourable foreign trade, and enhancement of Balance of Payments (BOP) equilibrium in Nigeria.

• Rather than channel Nigeria's oil revenue to importation of consumables, most of which can be produced domestically, effort should be geared towards efficient and judicious utilization of these oil receipts in the provision and maintenance of the nation's infrastructures, and creating the required enabling environment for an efficient private sector driven economy.

• Given that the degree of openness stimulates non-oil imports, and the fact that Nigeria's non-oil export sector is yet to develop as to be able to generate enough export receipts to balance her import bills, there is need to apply caution in the drive to join the league of globalized economies. Since openness is inevitable in today's global system, sequencing of phases of liberalization as an instrument of openness is highly desirable.

• Policy and programmes with the ability and capacity to redirect the attitude of Nigerians towards products made in Nigeria should be adopted and tenaciously implemented. This should be complemented with expenditure switching measures as ways of stimulating consumption of home made products; Aliyu (2007) establishes the fulfillment of the Marshall-Lerner condition in Nigeria.

• Import restriction policies should be adopted: This is necessary on one hand, given that imports performed poorly during the period of control, compared with the liberalization period. Secondly, given the high percentage of the nation's reserve that goes into non-oil import expenditures, restrictions in the mode of high import duties on some categories of light manufactures is necessary to reduce the already high expenditures on non-oil imports, and depress the already stimulated taste of Nigerians for foreign light manufactures that can be produced domestically. Again this will give protection to domestic firms, who will be expected to produce to meet domestic demand given improvements in the level of infrastructural development.

Table I. Augmented Dickey-Fuller and Phillip-Perron Stationarity Tests

Variables	Slope	t-stat.	Critical value	DW	Slope	t-stat	Critical value	DW
LnNOM	-0.63	5.25	-1.95	1.89	0.15	8.25	-1.95	2.37
LnRGDP	0.01	3.03	-1.95	2.00	0.06	4.16	-1.95	1.98
LnREXG**	0.23	-5.76	-1.95	2.05	-0.94	-5.76	-1.95	1.98
LnFRV**	0.01	-2.88	-1.95	1.80	-.0.50	-3.35	-1.95	1.80
LnIOP	-0.5	3.39	-1.95	1.96	0.07	3.40	-1.95	2.67
LnIMC**	0.29	-5.79	-1.95	2.07	-1.07	-6.74	-1.95	2.03
DSAP**	0.00	-4.18	-1.95	2.00	-1.00	-6.08	-1.95	2.00

Source: Authors computation from data from regression result and test of stationarity,
*Note: ** Indicates variables that are stationary after first differencing.*

Table II. Results of cointegration

Equations	Coefficient	t-statistic	Critical value
Equation 4.8	-0.37	-2.13	-2.94

Source: Authors computation from cointegration test result.

The Regression Model
Table III. Regression results of non-oil import demand

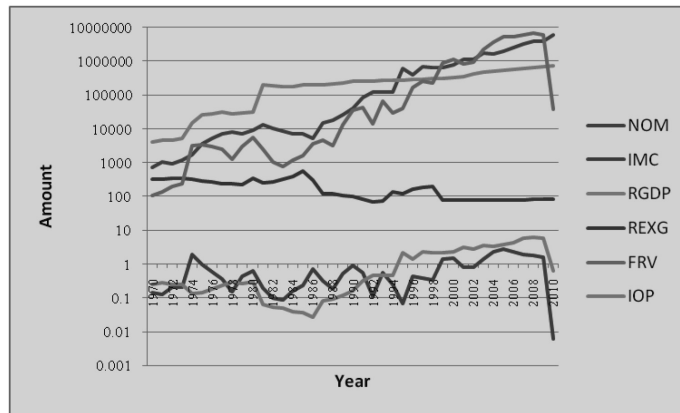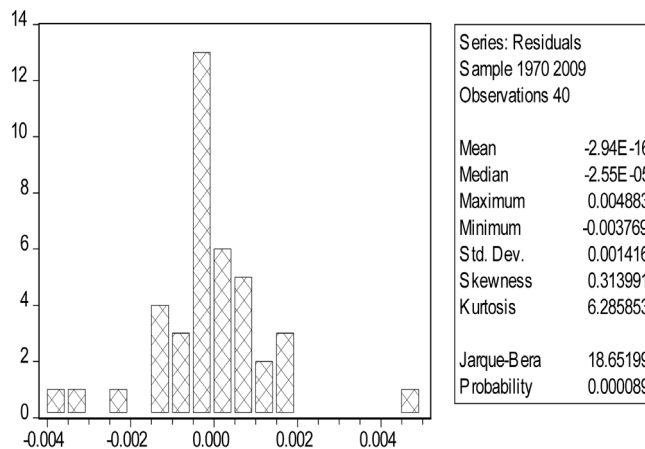| Dependent variable	Independent variables/Constant	Coefficient	t-values	Other statistics
LnNOM	C	-0.004	-0.559	R^2 0.98
	LnRGDP	0.009	1.754	Adj R^2 0.97
	LnREXG	9.410	0.109	F-stat 20533383
	LnFRV	0.991*	205.721	D.W 2.469
	LnIOP	0.039*	7.965	
	LnIMC	-0.991*	-206.988	
	DSAP	-0.001	-0.395	

Source: Authors computation from regression results
Note: * indicates significance at 5% level

Other second order tests
Table IV. White hetroscedasticity Test

No of observation	$R^2_{auxiliary}$	df	$n.R^2_{auxiliary}$	$X^2_{0.05}(k)$
40	0.638270	28	17.87156	41.3372

Source: Authors computation from test statistics and chi-table analysis.

Figure I. Trends of variables and Non-oil Import Responces

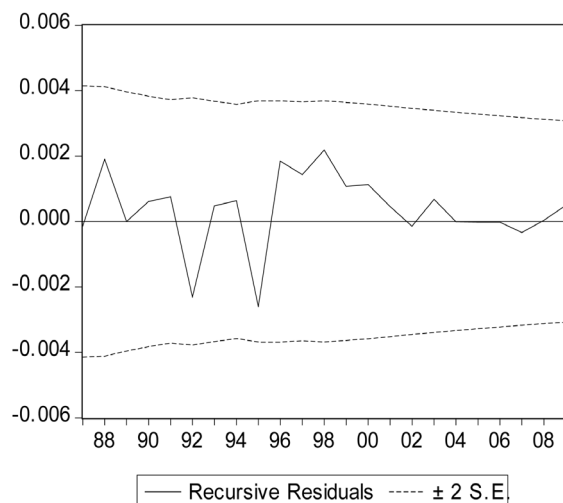| Series: Residuals |
|---|
| Sample 1970 2009 |
| Observations 40 |

Mean	-2.94E-16
Median	-2.55E-05
Maximum	0.004883
Minimum	-0.003769
Std. Dev.	0.001416
Skewness	0.313991
Kurtosis	6.285853
Jarque-Bera	18.65199
Probability	0.000089

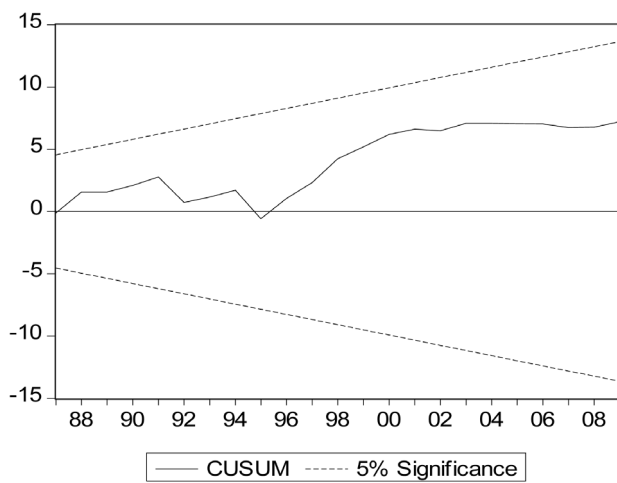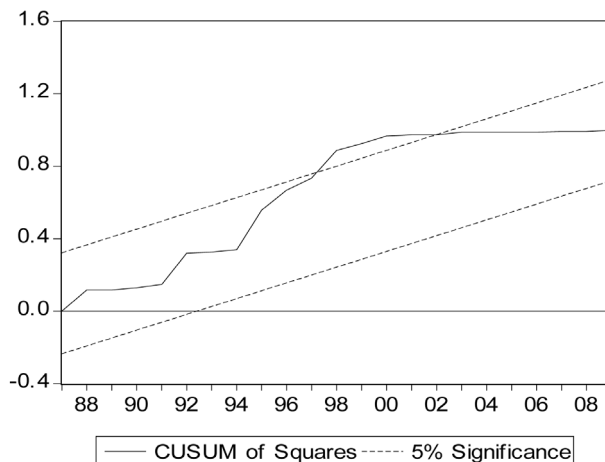**Figure II**

Figure III

Figure IV

Figure V

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