Import Function for Nigeria from 1980 - 2014

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ABSTRACT

This research work aims at investigating import as a function of income in Nigerian economy between 1980 and 2014. The econometric techniques used for this thesis are Unit Root Tests, Johansen Cointegration, Vector Error Correction, and Granger Causality Methods. These techniques were consistent with seven of the previous studies in the literature review, and the other seven previous studies used other econometric techniques in their papers. Annual time series data was taken from the World Bank Database. The regression model was in logarithms transformation form purposely to linearize the model, to reduce the impact of outliers and thus to avoid spurious regression result.

The theoretical expectation is that there is a positive relationship between the IMPORTS and GNI, in Nigeria, that is, the higher is the GNI, the higher will be the consumption and thus the import. One Other variable was introduced to independent variable and the other variable is Real Exchange Rate (REXR). (IMPORTS), (GNI) and (REXR) have Unit Roots problem at level but were stationary at first difference statistics. Furthermore, in an investigation of cointegration, Trace and Max. Eigen Value Test indicates one cointegrating equations at 5% significance level. This thesis shows that there is a long-run relationship between the Imports and the Income in Nigeria between 1980 and 2014. The long-run shows positive relationship while the short-run shows no significant relationship.

Keywords: Stationary, Cointegration, VECM, Granger Causality, Import, Income

ÖZ

Bu araştırma, 1980 ile 2014 yılları arasında Nireya ekonomisine ait İthalat fonksiyonunu tahmin etmeye yönelik bir çalışmadır. Kullanılan ekonometrik teknikler Unit Root Test, Cointegration, Vector Error Correction and Granger Causality metotlarıdır. Bu yönüyle, bu çalışma önceki 7 çalışma ile benzerlik, ve diğer 7 çalışmayla da farklılık göstermektedir. Araştırma 35 yıllık Nijerya verilerini kullanmaktadır ve bu verilerin tümü Dünya Bankası veri tabanından elde edilmiştir. Verilerin tümü logaritmik veri olarak kullanılmıştır. Burdaki amaç, modeli linearize etmek, outlier etkisini azaltmak ve genel olarak yanıltıcı regresyon sonuçlarını önlemekti.

Teorik beklenti, İthalat ile Milli Gelir arasında positif bir ilişki olması yönündedir. Bir başka deyişle, gelir arttıkça tüketim artmakta ve buna bağlı olarak da ithalat artmaktadır. Regresyonda kullanılan bir diğer değişken ise Reel Döviz Kurudur. Her üç veri de de unit root problemi vardır ve sadece ilk farkları (fırst differenced data) stationary 'dir. Trace ve Max Eigen değerleri bir tane cointegrating denklem olduğunu göstermektedir. Yapılan regresyon gelir ile ithalat arasında uzun vadede positif bir ilişki olduğunu göstermektedir. Bu da teorik beklentimizle uyumludur.

Anahtar Kelimeler: Gelir, İthalat Fonksiyonu, Birim Kök Testi, Eş-bütünleşme, Vektor Hata Düzeltme Modeli.

DEDICATION

This thesis is dedicated to God Almighty who made all the provisions needed for the progress of this work. Also my lovely Daughters (Esther and Elsie), and my caring Husband Mr. Ebere I.N.G., may God continue to make your life meaningful.

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LIST OF ABBREVIATIONS

ADL	Autoregressive-Distribution Lag
AR	Auto Regressive
ARDL	Auto Regressive Distribution Lag
CLM	Classical Linear Model
ECT	Error Correction Term
e.g	Exempli Gratia (Latin Word)
ESAP	Economic Structural Adjustment Program
etc.	Et ‘ce tera (Latin Word)
GNI	Gross National Income
GDP	Gross Domestic Product
LN	Logarithms
Max	Maximum
Min	Minimum
MPI	Marginal Propensity to Import
NGN	Nigeria Naira
OLS	Ordinary Least Square Method
PDI	Personal Disposable Income
REXR	Real Exchange Rate
RESID	Residual Value
RGDP	Real Gross Domestic Product
RWR	Rolling Window Regression
UK	United Kingdom
USA	United State of America

VAR	Vector Auto Regression
VEC	Vector Error Correction
VECM	Vector Error Correction Model
ADF	Augmented Dickey-Fuller
KPSS	Kwiatkowski-Parron Schmidt-Shin
OLS	Ordinary Least Square Method
PP	Phillips Parron
SIC	Schwarz Information criteria

LIST OF SYMBOLS

No.	Number
Eqn.	Equation
$t\text{-}_{tab.}$	$t\text{-}_{tabulated}$
%	Percentage
β_0	Constant of the model
β_1	Coefficient or slope of GNI
β_2	Coefficient or slope of RXER
t	Time Period
X_t	It could be inflation, Unemployment, and Inflation
ΔX_t	Change in X_t or symbol of difference operator
U_t	Error Term
{ }	Error Bracket
( )	t-statistics Bracket
Z_1*	Error Reform Coefficient
$\amalg$	αB
α	Error Correction Coefficient
B	Cointegration Parameters
ε_t	Vector of Residuals/Residual Value and Σt implies Summation

B_i, α_i, M_i, and N_i The Short-Run Coefficient

Chapter 1

INTRODUCTION

1.1 Background of the Study

This research work is aimed to study Import as a function of Income in Nigeria between 1980 and 2014. Nowadays, no country is self-independent as to produce everything that they need. Therefore, every country has to purchase certain goods from other countries. Thus, a country should import goods and services that they cannot produce at a relatively low price.

The term “import” simply means goods and services brought in to a country from across national boarders or overseas. That is, the inward movement of goods and services from one country to another is referred to as import. Cole (2008) defines it as the action of buying of services and goods from one country to other countries.

World Bank states that Import of goods and services from the world at large, represent all market goods and services. Examples were given to include services oriented activities like travel, and transport. Other services may include governmental services, communication, finance, and construction services.

Import trade in Nigeria is categorized into visible trade and invisible trade. Nigeria visible trade comprises of goods that can be seen and touched such as tangible goods. These goods come from other countries and they include the following; plants and

machineries, electronics, automobiles etc. This appears in balance of trade whereas, Nigeria's invisible trade comprises of services rendered by other countries that cannot be seen and touched which include the following; tourism, banking, aviation etc.

Developing country like Nigeria, import secondary materials such as chemicals, food, manufactured goods machinery, equipment etc. purposely for economic development and growth of the nation and its importance is to help meet short falls in the domestic output.

Britain was Nigeria's leading trading partner during the colonial period but Nigeria diversified its trading partners after independence. Now, Nigeria is trading with about eighty countries in the world. Britain was Nigeria's primary trading partner in 1970's which was later replaced by United States although Britain still remains the leading vendor in Nigeria. More than 14 percent of its imports in the 1990's was done with Britain.

Nigeria's importation of goods is limited by import quotas and tariffs, and by this imposition of tariffs and quotas, (that is, Tax) on all imported goods. The tariff tax is part of source of income to the government. According to Tokunbo (2014), Nigeria income from importation of goods and services were measuring at 9.79 percent of the GDP in 2013 and this income was computed after the exclusion of compensation of employees which refers to as transfer payments and factor services.

Tokunbo (2014), states that Nigeria imported $53.3Billions which made Nigeria to be the 53rd largest importer in the world. During the last seven years, Nigeria's

imports of goods rose at a rate of 3.1percent, from $45.8Billions in 2008 to $53.3 in 2013. The big share of imported goods in Nigeria is refined petroleum that represent 17.9 percent of the total imports. This is followed by cars that accounted for 3.5percent of the total import.

National Bureau of Statistics (2014), states that the total of importation of goods and services in Nigeria in 1981 was about 158,248. Naira, and in May 1984, it accounted for 167,880 Naira. This rose to 1,554,732.90 Naira. In 2014 in march 2011. Importation of Capital goods accounted for 23% of total import, Food and Beverage is 17 percent, Fuel and Lubricants is 14percent, Transports is 27percent, Equipment's and plants is 12percent, and Consumer goods is 7percent of the total imports while, 16percent of import came from America, 43percent of imports came from Asia, 7percent of imports came from other Africa and 34percent of imports came from Europe.

According to the World Trade Organization in (2014) which demonstrated that import products are increasing the market choice. This is because, importation helps local market to improve variety of products offered and this can be achieved by providing consumers with different goods that may not be adequate locally, or goods that may boost the competition level of locally manufactured goods.

Importation has been of a great benefit to the Nigerian economy as it helps speed up industrialisation, meet consumer demand, improve standard of living, overcome famine and ensure national defence by importing defence equipment for its constables and armed forces to ensure its control and national integrity.

This study seeks to find out a relationship between import volume, Gross National income (GNI) and Real Exchange Rate (REXR), The study, furthermore, investigates also the direction of causality between these variables within the Nigerian Economy.

Munir Munir et al (2009) showed in their paper, that income plays a crucial role in determining imports and marginal propensity of import, and that the coefficient of income are positively related with import. In the case of India, Sanjay (2010), found out in his paper that imports were found to be very sensitive to PDI and that 29.55% of Indian PDI were spent on import during the post reforms period.

This study therefore will be attempting in determining the import function as a function of GNI for Nigeria and as such will be significant to Government of the country, consumers, students, and stack holders, producers, and importers of the country. As the import function will be a major guidance for so many economic agents in the economy. I was motivated to carry on this research on import function for Nigeria from 1980-2014.

In this research work, I made use of ‘’Import Figures” as the dependent variable and GNI and REXR Figures as independent variables

1.2 Scope of the Study

This research work examines import function for Nigeria from 1980 - 2014. Nigeria as a developing country deals more on importation of goods especially capital and consumption goods. As such, it is necessary to investigate its import functions. The variables used are Gross National Income (GNI), Real Exchange Rate (REXR).The Real Exchange Rate was used as exogenous variable so that import figures will not only be regressed on dependent variable. The cointegration trend assumption is

Linear Deterministic Trend in which the series are IMPORT and GNI and the exogenous series is REXR.

1.3 Limitation of the Study

The researcher faced some challenges during the course of the work, especially in the gathering of data for this research work. The most reflective constraints in this case is that there is a lack of proper record keeping by the Nigeria port authority. This manifested in the sense that financial records for a very few years were available. If appropriate data have been available, larger period could have been studied to give more accurate information and result on what the researcher work based.

1.4 Statement of Research Hypothesis

In this thesis work, we want to estimate import function in Nigeria where the import is a function of income for Nigeria.

1.5 Organizational Structure

This research work is structured into six chapters. Chapter one explains the introductory part of the study and it classifies the research work into the following segments; background of the study, scope of the study, limitation of the study, statement of research problem and hypothesis, organizational structure.

Chapter two deals with literature review of other previous work relating to the topic under review, while Chapter three covers empirical specifications and data with research methodology used in this context. It captures the following such as model specification, the theoretical expectation of the model, and descriptive statistics that describes the measure of central tendencies; mean, median, maximum, minimum and the measure of dispersion; standard deviation.

Chapter four deals with methodology or econometric methodology or estimation technique. The methodologies used are, estimation techniques in which Unit Root Test, Johansen Co-integration Method, Vector Error Correction technique, and Granger Causality test would be discussed. Chapter five demonstrated the econometric results known as estimation results of Unit Root, Co-integration, Vector Error Correction, and Granger Causality Results. The last chapter focuses on summary, conclusion and recommend

Chapter 2

LITERATURE REVIEW

The research work aims to investigate Import function for Nigeria between 1980 and 2014. Import is the transportation of goods from one country to another. It is also known as movement inward of goods and services from one country to another. There is a large previous work investigating on how foreign trade affects a nation's revenue but there is a slight work on empirical research work investigating import function for Nigerian economy**.** Some previous work in this chapter deals with import function in some countries and their empirical results are stated and grouped as follows:

Mohammed (2001) examined income functions in aggregate import demand as a function of income in Pakistan from 1960-1999 by using both equation approach and Ordinary Least Square Method. His empirical finding shows that import demand are positively related to the GDP of Pakistan country during the specified years.

Dutta and Ahmed (2006) looked into the behaviour of the comprehensive imports of India with the use of a time series data of 1971-1995. Dutta and Ahmed found that India's demand function for import volume is co-integrated with Real GDP and the Relative import price. Their econometric estimates states that India's demand for import is basically described by the general economic activity of the country, captured by Real GDP.

Demand function for India suggests that import demand is largely explained by Real GDP which relates to the general level of economic activity in the country. The amount of import is positively inclined by the real GDP changes than the relative import prices of import.

N'guessan and Yaoxing (2010) examined Cote d'ivoire's demand model for import , making use of series data starting from 1970 to 2007, they came out with the conclusion that a long-run co-integration relationship exist among consumption, relative prices, investment expenditure and import, it also show that import demand were inelastic for all component of spending and comparative prices, meaning that demand for import were not sensitive to price change. Also Chimobi and Ogbonna (2008) further explained that it is ineffective to use exchange rate policy in influencing import demand for Nigeria. Furthermore, Sa'ada and Hassan (2008) both identified the factors that determine import and they found that GDP and trade openness significantly determined import also that real exchange rate and foreign reserves were insignificant in determining import in Nigeria's Economy.

Chang (2005) re-studied the demand function for South Korea's aggregate import, his scope was specified from 1980-2009. His estimation method was robust, as he referred to it as the unrestricted error correction model .Chang (2005) result shows that cointegration exist among import volume, relative spending, and inflows (income) and that a long-run relationship exist among the demand for imports and its determinants in income and relative prices are all co-integrated and there is a long-run relationship between the demand for imports and its determinant in South Korea. Also, the projected long-run and short-run elasticity's of the demand for import with

respect to income and related prices.This simply means that a short and long-run positive relationship exist between relative prices and South Korea's import as well.

Mohammad (2012) investigated the determinants and econometric estimation of imports demand function. He made use of the following independent variables GDP, CPI and Exchange Rate (EX). And regressed them over 1997-2010 by using Multicollinearity, Auto-correlation, Durbin-Watson, Correlation and Heteroscedasticity. Mohammad (2012) result shows that one million dollars increase in GDP leads to increased demand for Palestine imports by 1.219 million dollars. This is to say that he found a positive relationship between t import demand and the GDP but no relationship exist amongst the demand for import and exchange rate in Palestine. This is caused by high dependent on trade with Israel which is represented by more than 59.9% in 2011 and the use of only one currency which made exchange rate not to affect the foreign trade in Palestine. Also, Douglason (2010) identified the factors responsible for import demand using error corrections mechanism, and he found out that import and income cointegrate also that import is determined by real income. His result points out that exchange rate policy and devaluation of local currency are ineffective in influencing import in Nigeria.

Munir, Naeem-Ur-Rehman, Yahya, Badshah, Tariq and Akhtar (2009) investigated the relationship between the remittances (GNP and REER) and imports in Pakistan for the period 1982-2007 by using simple Ordinary Least Square Method. Their estimated result signifies that, import in the economy is to a large extent determined by the role remittances play in the economy. Also, it shows that the marginal tendency to import and remittances coefficient are related positively with imports,

with the exception that real exchange rate were negatively related with imports as well.

Kira, Ranjini and Mark (2012) investigated the demand function for import with the U.S and U.K from 1996-2010 by using Co-integration analysis and Vector Error Correction Techniques to examine the Real Gross Domestic Product, Relative Price Imports, Real Foreign reserves and Exchange Rate. Their paper suggests that a unique cointegration relationship is found between imports and its independent variables (RGDP, RP, RFR, and RER) in both the U.S and U.K model. They also investigated the short and long run elasticity's in the two models and their result shows the followings such as, in Jamaica and U.S trade, they found also that in the short and long run, income has a low elasticity but that income is negative in the long run. Also, the long-run experiences more changes faster than in the short-run and this is much noted in Jamaica and U.S trade, U.K and Jamaica trade experience less elastic GDP in the short-run than in the long-run and, both imports and GDP are negative in the short-run. Finally, their papers also reveal that tight monetary policy has impacted significantly in Jamaica's import, only in the short-run as noted with the U.K especially, but not with the U.S.

Qazi and Mashood (2010) examined Bangladesh aggregate demand function for import by making use of Autoregressive distributed lag (ADRL) method for cointegration and Rolling Window regression method for the data of 1980-2008. Their estimated result shows the positive long-run import relationship with national income but signifies negative long-run relative price elasticity. The method above (Rolling Window Method) demonstrates a long-run elasticity of National Income variables varies between a positive range of 0.81 to 0.96.

Bernard and Bayo (2008) investigated the determinant of import in Nigeria through the use of variables such as Real Gross Domestic Product, External Reserve, Real Exchange Rate and index of Openness from the period 1970-2008 by using Unit Root Test, Cointegration and Vector Error Correction Method. Their result shows that the Vector Error Correction Model (ECM (-1)) is significant, which simply means that a long-run relationship exist among the import quantity demanded and it determinants. In their study, a negative long-run relationship was found between imports and the Real GDP in Nigeria between 1970 and 2008. Also, in the short-run, the major determinant of import demand is Real GDP in Nigeria. Their lagged ECM(-1) shows, the aggregate import demand adjusted to correct a long-run disequilibrium between itself and its functions.

Uche, Anne, and Chekwube (2015) focused on income elasticity of import demand and price in Nigeria for the period of 1970-2013, they estimated the function by using Autoregressive Distribution Lag (ARDL) to test for a long-run relationship that exist among variables. Their result shows that there is a long-run negative relationship between import demand and the national income (NI) in Nigeria between 1970 and 2013.

Sanjay (2010) states that the behaviour of India collective imports during 1991- 92 and from 2007 to 2008 and His result based on the two important objectives that Marginal tendency to Import (MTI), that is to know the imports sensitivity for Personal Disposable Income (PDI) through the use of Ordinary Least Square Method. His findings indicate that India's import were found to be profound for PDI in India throughout the period of the post reform. whereas Marginal Propensity to Import (MPI) was noted to be -0.2955 meaning that during the period, Indians spent

29.55percent of the differences in their change of PDI on imports. Sanjay (2010) finds negative relationship between the MPI and PDI in India between the periods of 1991-92 to 2007-08.

Halil and Oguzhan (2014) examined the dynamic of import and National income functions in Turkey. They examined this, with the use of Unit Root Test, Co-integration Test and Multivariate Granger Causality Analysis between the period 1987 and 2011. Their empirical result shows that Turkey's Real GDP granger causes Foreign Direct Investment and the Real Exchange Rate, causing a link towards import in the long-run. Moreover, they indicates that Import Granger causes GDP in the long-run but they failed to identify whether there exist a positive or negative relationship amongst the imports and the GDP in Turkey between 1987 to 2011.

Hector and Ivor (2012) showed empirical, an investigation of small country's demand function for imports and they channel the variables by using annual time series data for Guyana over the years 1971-2010 through the single equation, Cointegration, and the Vector Auto Regression (VAR) frameworks. The channel variables are Foreign Exchange Reserves (FER), Official Foreign Aid (OFA), and Exchange Rate (XR) et-al. The coefficients show that a short and long-run relationship exists between import demand and Gross National Income. In their paper, they demonstrated that there is a positive long-run relationship between import demand and the National Income in Guyana for the period specified.

Abdul and Tayyaba (2010) examines the import demand function as GNI in Pakistan from 1960-2014 by using two different method of analysis namely, Autoregressive Distributed Lag (ARDL) and Dynamic Ordinary Least Square (DOLS). Abdul and

Tayyaba (2010) states that ARDL result shows a strong indication of the presence of a long-run unstable relationship among the variables included in the model for import demand but they also concluded finally that there exist a negative relationship amid the imports and the GNI in Pakistan between 1960 and 2014.

Abdusalam (2015) estimated the overall import function in the Libya economy by testing double log transformation method and using Johansen Multivariate Co-integration method for the period 1975-2014. His result shows that the behaviour of Libyan imports seems to be highly affected by the variation in its GDP and relative price. It establishes that skyrocketing in oil prices has completely upset the import-income relationship in Libya during the period of decline in oil revenue. The short-run elasticity of Libya imports with respect to its income is approximate -1.2 which shows a negative relationship between the imports and the income in Libya between 1975 and 2014.

Ichoku et al (2013) used OLS regression technique, co-integration and Error Correction Method (ECM) to investigate the causes of Nigeria's Non-oil demand for import, they resulted in a deviation of findings, imputing that real exchange rate, and real income were insignificant cause of relationship in the model, that is, real exchange rate and income were not significant in determining non-oil import demand.

The econometric modelling strategy is not consistent with all the previous studies in the literature reviewed but it is consistent with the other seven previous papers reviewed the other papers used other econometric techniques in their studies. The ten previous studies that is not consistent with econometric strategies are, such as Munir,

Munir, Naeem-Ur-Rehman, Yahya, Badshah, Tariq, and Akhtar in (2009) in Pakistan; Qazi and Mashood (2010) in Bangladesh; Sanjay in (2010) in India; Mohammed (2001) in Pakistan; Mohammad (2012) in Palestine; Uche, Anne, and Chekwube (2015) in Nigeria; and Abdul and Tayyaba (2010) in Pakistan. The non-consistent of the previous studies with this thesis used different econometric techniques and they have mixed empirical findings (that is results). In fact, Uche, Anne, and Chekwube (2015) in Nigeria used Autoregressive Distribution Lag (ARDL) to test for the price and income elasticity of import demand in Nigeria between 1970 and 2013. Uche, Anne, and Chekwube (2015) found that there exist a negative long-run relationship amongst import demand and the national income and there is also evidence of imperfect substitution between foreign trade goods and domestically produced goods. In Uche, Anne, and Chekwube (2015) implies that the use of currency devaluation as an import substitution tool is not validated by their results. Munir, Munir et al (2009) shows in his findings states that income plays a significant role in the determination of imports, and that Marginal Propensity of imports and coefficient of income are positively related with imports in Pakistan.

The technique used in this thesis was consistent with ten of the previous studies in the literature review as mentioned earlier. Those papers that shows consistency with this thesis are, namely, Bernard and Bayo (2008) in his research conducted in Nigeria; Halil and Oguzhan (2014), carried out his research in Turkey; Dutta and Ahmed (2006) in his research carried out in India; Hector and Ivor (2012) in whose research was conducted in Guyana; Chang (2005) in South Korea; Abdusalam (2015); Ranjini and Mark (2012) in Jamaica. Those papers that used the same econometric modelling strategies in their studies still have mixed or different empirical results. All these papers can be found in the literature review chapter of

this thesis. Therefore, I was motivated to investigate the import function for Nigeria from 1980-2014 due to the mixed empirical findings in the literatures read and the recent financial crises across the country.

Chapter 3

EMPIRICAL SPECIFICATION AND DATA

The researcher resorted by using Nigeria as a case study as a result of the recent financial crisis in the country and also due to the mixed results read in some of the papers read to find out the equilibrium relationship between import and income. More specifically, the researcher wants to estimate the import function for Nigeria between 1980 and 2014 where income is expected to have an equilibrium relationship on import.

The econometric techniques used for this thesis include ADF and PP Unit Root Tests, Johnsen Cointegration, Vector Error Correction, and Granger Causality Methods. Annual time series data was gotten from the World Bank Database was employed. The thesis uses Nigeria as a case study and the number of observation was 35 observations from 1980 to 2014.

The econometric techniques used for this thesis include ADF and PP Unit Root Tests, Johnsen Cointegration, Vector Error Correction, and Granger Causality

The multiple regression technique was in logarithms transformation form purposely to remove spurious regression and get good output. That is, this thesis used logarithms transformation form for the regression equation.

The primary and specific aim of this research work is to study import as a function of income in Nigeria between 1980 and 2014. The theoretical expectation is that GNI has a positive impact on Imports for Nigeria between 1980 and 2014. Another objective is to add other variable to the independent variable purposely to note the impact of other variable to the dependent variable and also to change the regression equation from simple regression to multiple regression so that GNI will not only be regressed on IMPORTS. The other variable introduced to independent variable is (REXR).

The methods and techniques used in getting the figures and facts in writing this thesis are described in the following sections.

3.1 The Model for the Study

The model for this thesis is indicated as multiple regression method to find out the import as a function of income in Nigeria.

Thus, the model specification is IMPORT = f(INCOME).

Where, import is a function of Gross National Income, and Real Exchange Rate. The other variable introduced is the Real Exchange Rate (REXR). The Other variable introduced was done in order that, it would not only be income that will serve as independent variable because there are other factors which affect import as it serves as a functions of income. The other variables added have been based on information derived from some studies in the literature review, such as Kira, Ranjini and Mark (2012) in Jamaica; Bernard and Bayo (2008) in Nigeria; Hector and Ivor (2012) in Guyana; Munir, Naeem-Ur-Rehman, Yahya, Badshah, Tariq and Akhtar (2009) in Pakistan; Mohammad (2012) in Palestine; and Halil and Oguzhan (2014) in Turkey.

The model specification after adding the other variable is stated as,

$IMPORT_t = \beta_0 + \beta_1 GNI_t + \beta_2 REXR_t + U_t$ ……..Equation (1)

The variables were transformed to natural log in order to linearize the model and to do away with spurious regression. The transformed model is written bellow as

$LN(IMPORT)_t == \beta_0 + \beta_1 LN(GNI)_t + \beta_2 LN(REXR)_t + U_t$ ……..Equation (2)

Where,

β_1 and β_2 are the elasticities of Gross national Income (GNI) and Real Exchange Rates (REXR) of the respective variable used.

$REXR_t$ = Real Exchange Rate (dollar to Naira)

GNI_t = Gross National Income (billion $)

U_t = Error Term or Disturbance term.

t = time period

Where; REXR stands for real effective exchange rate which is calculated as REXR = eP^f/P

In this formulation, e is the nominal exchange rate in direct quotation such that e is the home price of a foreign currency, that is, price in naira for each foreign currency.

P is the consumer price index in the home country (Nigeria) and P^f is the consumer price index (C.P.I) in the foreign country.

IMPORT is dependent variable while GNI, and REXR, are independent variables. The theoretical expectation for this thesis is $\beta_1 > 0$. Therefore, the theoretical anticipation for this study states that there is equilibrium relationship between the dependent variable (IMPORT) and the independent variables (GNI and REXR) in Nigeria. That is, import has positive function with income, and real exchange rate added to this work shows a negative relationship with import. That is, there is a negative relationship between imports and depreciation of the real exchange rate in Nigeria between the periods specified earlier.

This study uses a direct quotation where the nominal exchange (e) is defined as the home price for a foreign currency. Therefore the nominal exchange rate for naira versus US dollars would be written as e = 365naira per USD or e = 365 naira/dollar.in such a case, an increase in nominal exchange rate (such as e = 365naira/dollar) would imply a depreciation of the home currency, that is of naira.

Thus, nominal exchange rate (e) is the Nigeria currency (that is, naira) divided by US Dollar. That is, e is Naira per US Dollar. For example 365Naira = 1USD. Where, 365 naira is Nigeria currency official rate.

A increase in nominal exchange rate leads to an increase in dollar as against naira where, Naira (#) is Nigeria currency and $ is US Dollar.

Since REXR (increase) = $\underline{e\,P^f}$ where P^f is foreign price index

P^0

When REXR↑(increase), (Home currency depreciate) andthe import↓(decrease),vice versa.

In line with this, the real effective exchange rate would be defined as $REXR = \frac{e\,P^f}{P}$

Where e is the nominal exchange rate in direct quotation

P is the CPI in home country and

P^f is the CPI in foreign country

Therefore an increase in REXR would also imply a depreciation of home currency in the real sense which could have been either because of ;

1. Depreciation of home currency in nominal exchange rate or
2. An increase in foreign price level compared to home price levels

The foreign exchange market is where the buying and selling of different currencies take place. The price of one currency in terms of another is called the exchange rate. exchange rate affect the prices of imported goods, price of overall level consumers buying decisions and long term commitment of investors. A stronger Nigerian Naira indicates that Nigerians can buy foreign goods are cheaply however foreigners would find Nigerian goods costlier. Real exchange rate, according to Dani (2007) is the rate at which naira is exchanged for dollar and as real exchange rate decreases, import increases and discourages export. Alternatively, a weak Nigerian naira indicates that foreign goods for Nigerians would be more expensive and foreigners would find Nigerian goods cheap thereby it would discourage import. It is noted that if the demand for a currency is greater than its supply, its price will rise.

Import Theories

Imports are important to analyse aggregate expenditures, since imports are goods produced by foreign countries and are bought by the domestic economy and import, bought from foreign countries are influenced by the level of home countries income. As consumption in the household is influenced by income so also imports are influenced by income. When the household sectors income increases, it increases consumption expenditures, part of which are used to import goods and services therefore more income means more consumption and more imports.

Also investment expenditures are consists in imports by the business sectors, government purchases are also influenced by income. The multiplier process occurs because a change in income i.e when capital goods are purchased, it generates income which then induces consumption and the consumption in turn is an expenditure on production which generates more income. This happens on and on and income is generated even more.

The end result is that a change in production (income) causes a change in investment which in turn leads to a change in consumption and as consumption increases, it induces import. The change in income generated by a change in investment induces a change in both consumption and import.

3.2 Data

The data used are annual data from 1980 to 2014 and the variables are Import, Gross National Income, and Real Exchange Rate (REXR). The data are collected from World Bank website. All the variables are transformed into logarithm to bring into sight the effect in growth.

The Logarithm transformation form was used for both dependent and independent variables to remove spurious regression. More specifically we logged values to deal with non-linearity as well as the large numbers of import and GNI values which may dominate the regression results. Natural logarithm is known as logarithms transformation to base e. The model specification after logarithms (that is, logarithms transformation) is stated as,

$$LN(IMPORTS_t) = \beta_0 + \beta_1 LN(GNI_t) + \beta_2 LN(REXR_t) + U_t \text{.....Equation (3)}$$

Nigeria in this research work is used as a case study to investigate the import function for Nigeria between 1980 and 2014 and a sample size of 35 observations was used. This is because of insufficient data from the data agencies. The data extracted from data.worldbank.org were GNI, REXR, and IMPORT and the multiple techniques for regression analysis was used and the study employed three different analysis which helped in building up the analytical part of the work especially in the estimation. World Bank Database (www.data.wdi.org) for the Imports, GNI, and REXR data were collected.

The import volume numbers have been collected from World Bank database, the numbers are in million dollars.

IMPORTS represents Import of goods and services of all the goods and other market service from the rest of the world.; GNI represents Gross National Income, that is, the nominal annual percentage growth rate of GNI at market prices based on constant local currency.; REXR represents Exchange Rate index (2010 = 100) and it measures the value of a currency against a weighted average of several foreign currencies divided by a price deflator or index of costs.

Real Exchange Rate index (2010 = 100) is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs (World Bank Data Base) (www.data.wdi.org/indicators).

To make a better understanding of the numbers we are dealing, I would like to present the descriptive statistics of the data which is given in the table below. The descriptive statistics for import and the income of Nigeria is illustrated below such as,

Table 1: Descriptive Statistics Table

SERIES	**IMPORTS(billion$)**	**GNI(billion$)**
Mean	1.20	215.41
Median	1.21	100.81
Maximum	1.90	546.31
Minimum	5.74	49.73
Standard Deviation	4.32	172.44

The above is the descriptive statistics for import and income in Nigeria with sample period 1980-2014 in which the number of observation is 35 observations.

For the import in Nigeria: The mean is found to be 1.20 billion dollars, the median is $1.21billion, the maximum and minimum are $1.90billion and $5.74billion, the standard deviation is $4.32billion respectively. For the income in Nigeria: The average is 215.41billion dollars, the median, maximum, minimum and standard deviations are 100.81, 546.31, 49.73, and 172.44 respectively.

Chapter 4

ESTIMATION TECHNIQUES

The econometric modelling strategy is not consistent with all the previous studies in the literature but it is consistent with ten of the studies. To examine the regression equation we made use of the multiple regression equation as

$$\mathbf{LN(IMPORTS_t) = \beta_0 + \beta_1 LN(GNI_t) + \beta_2 LN(REXR_t) + U_t \ldots\ldots\ldots\ldots Equation\ (3)}$$

Before any time-series analysis is carried out on the above proposed model, we need to check for stationarity of the data, this is because an OLS on non- stationary data is likely to produce spurious regression result. Thus to test for any possible unit-root, that is non-stationarity of the data, we are going to test for stationarity by making use of, Phillips-Perron (PP), Augmented Dickey-Fuller (ADF) to test for Unit Root purposely to be sure that the variables satisfy the stationarity. Section 4.1 below looks into the unit root test in a more detailed form.

4.1 Unit Root Test and Stationarity

As mentioned above, to avoid spurious regression results, we test for stationarity of the data at levels, if they turn out to be stationary at the level data, we continue the OLS estimation of the proposed model in equation 3 with the level data.

If the data is not stationary at levels, then we must test for the stationarity of the first differenced data .In such a case the first differenced data quite often produce a stationary data so that the OLS estimation can be carried out by using first difference of the data.

KPSS tests are fundamentally different from the ADF and PP tests in the sense that ADF and PP test are carried out with a null hypothesis that there is a unit root, this means the data is not stationary while the KPSS test assumes a null-hypothesis that the data is stationary. Let us now brief the link between the unit root and stationarity in the paragraphs below.

A data is said to have unit root and thus to be non-stationary if ρ in equation 4 is equal to 1. In such a case that $\rho = 1$, X_t makes a random walk, based on the error term ε_t and does not converge to a mean. On the other hand, when $\rho < 1$, X_t converges to a mean.

$X_t = \alpha + \rho X_{t-1} + \varepsilon_t$……....Equation (4)

Subtracting X_{t-1} from both the left and right hand sides of equation 4 we can get

$X_t - X_{t-1} = \alpha + (\rho X_{t-1} - X_{t-1}) + \varepsilon_t$ ……Equation (5)

which can be rewritten as

$\Delta X_t = \alpha + (\rho-1) X_{t-1} + \varepsilon_t$……Equation (6)

Where (ρ-1) can be substituted with ß so that we have ;

$\Delta X_t = \alpha + ß X_{t-1} + \varepsilon_t$ in such a framework, PP,and ADF tests, test for

H_0: ß = 0 or ρ = 1 It indicates that X_t is non-stationary.

H_1: $\rho \neq 1$. It indicates that X_t is stationary.

Where; X_t could be Import, GNI, and REXR

If P -values > α values, H_0 is not rejected. It indicates non-stationarity of the variables used.

but if P-values < α values, reject H_0. It indicates that the variables are free from non-stationarity. That is, the variables are stationary.

4.2 Cointegration Estimation Techniques

If the data is not stationary at levels but is stationary at first differenced, then, there is the need to check for a cointegrating relationship in the model variables. If the variables are cointegrated, the thesis will make use of cointegration process otherwise simple a simple OLS estimation will be carried on first difference data. If there is a cointegrating relationship amongst LN(IMPORTSt), LN(GNI), and LN(REXR), it indicates that there is an existence of a short and long-run relationship between these variables. This is captured by using the (VECM) model. The equation and test for cointegration in the above model are represented as follows;

$LN(IMPORTS_t) = \beta_0 + \beta_1 LN(GNI_t) + \beta_2 LN(REXR_t) + \varepsilon t$ ……Equation (7)

$\varepsilon_t = LN(IMPORTS_t) - \beta_0 - \beta_1 LN(GNI_t) - \beta_2 LN(REXR_t)$……..……..Equation (8)

The error term noted as ε_t is Non-Stationary.

$\varepsilon_t = a + b\varepsilon_{t-1} + U_t$

$\varepsilon_t - \varepsilon_{t-1} = a + b\varepsilon_{t-1} - \varepsilon_{t-1} + U_t$

$\Delta\varepsilon_t = a + (b-1)\,\varepsilon_{t-1} + U_t$

Where ;

$\beta = (b-1)$

$\Delta\varepsilon_t = a + \beta\varepsilon_{t-1} + U_t$ …….Equation (9)

A unit root test on the error term would indicate whether there is a cointegrating relationship between the variables or not.A rejection of the null hypothesis H_0: $\beta = 0$ indicates a rejection of unit root, which implies a rejection of unit root, which implies a stationarity of the error term. This in turn, implies a cointegrating relationship between the variables. Thus a fail to reject of

H_0: $\beta = 0$ indicates that no cointegration among the LN(Imports), LN(GNI), and LN(REXR).Therefore, provided that cointegrations among the variables exist, hence, (VECM) should be made known.

4.3 Vector Error Correction Method

Suppose there is the existence of Cointegration among the sequence, therefore, there is need for Vector Error Correction Method (VECM) specification to be established .A situation wherein LN(IMPORTSt) is the explained variable whereas LN(GNI) and LN(REXR) are the explanatory variables in focus.

$LN(IMPORTS_t) = \alpha_0 + \alpha_1 \Delta LN(GNIP_{t-1}) + \mathcal{E}_t$ …….....(10) equation for the Short-run.

Suppose (IMPORT), (GNI), and (REXR) are collocated, that means, there is the existence of stationarity at first difference. This indicates that there is a long-run value for equilibrium of (IMPORT) that can be known by the linear combination of (GNI), and (REXR).

i.e $LN(Imports) = \alpha + \beta_1 LN(GNI_t)^{Equilibrium}$ ……...…..…...…...Equation (11)

Some aspects of long-run relationship is stated below,

$LN(IMPORTS_t) = \alpha + \alpha_1 LN(GNIt) + \alpha_2 LN(GNI_{t-1}) + U_t\ LN(IMPORTS_{t-1}) + U_t$……...Equation (12)

The combination of VECM long-run and short-run equation is stated as follows:

$\Delta X_t = \sum_{i=1}^{m} \mathbb{\Gamma} i + \Delta X_{t-i} + \mathbb{\Pi} X_{t-1} + ECT_{t-1} + \mathcal{E}_t$…….……..……...Equation (13)

Where the following symbols represent;

Δ implies change in operator and X_t points to the 3 by 1 residuals of vectors (IMPORTS, GNI, and REXR).

ε_t indicates the 3 x 1 residuals of vectors of residuals and the Error Correction Term (ECT) is shown by ΠX_{t-1}.

Π can be characterized into separate matrices such as $\Pi = \alpha\beta$, where α implies the Coefficient of error correction also, β implies the factors of cointegration. The two are appraising the rapidity of the steady state in the long- run.

(VECM) shows the short and long-run speed of adjustment in the variable (X_t) with the help of the calculated parameters. If a long-run relationship exists between the series, there will be disequilibrium from the shock to the short run before the series get back to its original equilibrium in the long-run which is captured by the Error Correction Term.

4.4 Granger Causality

If there is a cointegrating relationship between these vriables,then ECM can be used to identify short and longrun relationship between them. If causality exist among the variables used, then Cointegration amongst variables must indicate that causality exists among the variables. But cointegration does not show relationship in causality, thus, the direction of causality is needed to be shown through the test of Granger causality.

Granger causality test is a hypothesised statistical test for controlling whether one time series is valuable in predicting another. That is, Granger causality test shows the path of the variables under consideration in the framework of the model. Granger causality Test shows that the existence of co-integration amid variables is observed. It therefore proves that there exist a Granger causality, and is represented as follows;

$LN(IMPORTS_t) = \sum_{i=1}^{m} \alpha_{1i} LN(GNI_{t-i}) + \sum_{i=1}^{m} \beta_{1i} LN(IMPORTS_{t-i}) + U_{1it}$……Equation (14)

$LN(GNI_t) = \sum_{i=1}^{m} \alpha_{2i} LN(GNI_{t-i}) + \sum_{i=1}^{m} \beta_{2i} LN(IMPORTS_{t-i}) + U_{2it}$……..…….…….....Equation (15)

H_0: The null hypothesis model states that there is a non- causality amid variables used.

event LN(IMPORTSt) happens before event LN(GNIt). Then, LN(IMPORTSt) is causing LN(GNIt) (meaning, variable LN(GNIt) event happened before variable LN(IMPORTSt) then, variations in LN(GNIt) should prime the variations in LN(IMPORTSt). This thesis deals with directional of causalities amongst the three variables used.

The idea behind Granger Causality Test states that the unidirectional sets of causality between LN(GNIt) and LN(IMPORTSt) coefficients are significant statistically and in both regressions, they both diverge from zero. (ECM) is necessary to exist with two or more variables that cointegrates, this is known as Granger Causality.

Furthermore, if LN(IMPORTSt), LN(GNIt) and LN(REXR) cointegrate, it is assumed that VECM will exist in equations (14), (15) respectively.

$\Delta LN(IMPORTS_t) = \sum_{i=1}^{m} \alpha i \Delta LN(GNIt)_{t-i} + \sum_{i=1}^{m} \beta i \Delta LN(IMPORTS_{t-i}) + Z_1 * ECT1_{t-1} + U_t$……...Equation (16)

$\Delta LN(GNI_t) = \Delta \sum_{i=1}^{m} N_i LN(GNI_{t-i}) + \sum_{i=1}^{m} M_i \Delta LN(IMPORTS_{t-i}) + Z_2 * ECT_{2t-1} + \varepsilon_t$……...….Equation (17)

The symbols, B_i, α_i, M_i and N_i shows the coefficients of the short-run.

The equation (16) and (17) points out the Error Correction Term ECT_1 and also in ECT_2 and the residual values are represented by Ut, also Ɛt.

The regression combination of LN(IMPORTt) and LN(GNI_t) in equation (16) are the left over lag worth of $ECT_{1(t-1)}$ and $ECT_{2(t-1)}$ represent also the left over lag worth from the blend of regression of LN(GNIt) on LN(IMPORTSt) as shown in equation 17LN(IMPORT), LN(GNI) and LN(REXR) have Unit Roots problem at level but they were stationary at first difference statistics. Trace and Max. Eigen Value Test indicates one cointegrating equations at 5% significance level. This thesis shows that there exist a short and long-run relationship amid Imports and Income in Nigeria between 1980 and 20.

Chapter 5

ESTIMATION RESULTS

In this chapter, the results of the multiple OLS estimations are presented, the chapter explains the multiple OLS regression equations which was stated in equation (2), and Also throws more light in chapter three which explains the Unit Root Test in equation (5), it also explained in equation (6) , the Cointegration test in equation (9) was also explained in the chapter, equation 13 explains VECM which explains the short and long-run relationship amid the variables used in the model, the test for Granger Causality was carried out also in this chapter to show the directional relationship of the variables, it was also shown in equation (16) and (17).

5.1 Result for Unit Root

The Unit Root Test result will be presented in this section, in the table (5.1) below. By introducing ADF, and PP unit root test, we test the level and first difference unit root statistics. The results for the test are reported for three cases; (i) without trend and drift, (ii) with trend and drift, (iii) the presence of trend and without a drift are reported. The null hypothesis state that there is the existence of unit root, while the alternative states otherwise.

Table 2: Unit Root Test Table for ADF and PP

LEVEL (STATISTICS)	LN(IMPORTt)	LAG	LN(GNIt)	LAG	LN(REXRt)	LAG

Tt(ADF)	-1.341	(0)	-1.902	(0)	-1.033	(0)
Tu(ADF)	-0.972	(1)	-1.741	(0)	-3.410***	(0)
T(ADF)	4.449*	(0)	-1.636	(0)	-0.094	(0)
Tt(PP)	-2.158**	(4)	-2.057	(1)	-1.033	(0)
Tu(PP)	-1.659	(0)	-1.741	(0)	-4.373*	(10)
T(PP)	4.449*	(0)	-0.614	(2)	-0.087	(3)
FIRST DIFFERENCE (STATISTICS)	LN(IMPORTS t)	LAG	LN(GNIt)	LAG	LN(REXRt)	LAG
Tt(ADF)	-2.257**	(1)	-4.326**	(0)	-5.046**	(0)
Tu(ADF)	-4.939**	(0)	-4.342**	(0)	-5.264**	(0)
T(ADF)	-0.857	(1)	-4.374**	(0)	-5.118**	(0)
Tt(PP)	-4.590**	(1)	4.235**	(4)	-5.024**	(6)
Tu(PP)	-6.135**	(4)	-4.170**	(6)	-5.285**	(9)
T(PP)	-2.176**	(2)	-4.295**	(4)	-5.104**	(6)

Tt implies a drift and trend; Tu represents a drift and without a trend; T indicates without a drift and trend. *, **, *** indicates H_0 is rejected at 1%, 5%, and 10% significance levels indicatively. The critical value is 2.260 at 5% significant level.

The Figures in the above bracket represents the lag lengths and it is rejected in ADF test to undo serial relationship in the value that is unexplained. Bartlett-Kernel formed the Newey-west bandwidth which makes use of the PP test. ADF and PP tests were introduced in order to be sure the variables are stationary, i.e there is no unit root at all the cases of the unit root test. I used E-VIEWS (6) to carry out the test on unit root stationarity of the variables in use.

The above result on the table (unit root table), shows that some of the imports figures are stationary at 5% and 10% significant level produced by ADF, PP, a while other Import figures are non-stationary at 5%, 10% and 1% significance level produced by ADF, PP. The test showed that LN(GNI) is stationary at 5% with the test carried on ADF, PP, also the test show that the variable, import is stationary at 5% level when tested with ADF, and PP. The test for stationarity was also carried out on real exchange rate, and the result shows that it is stationary and significant at 5% level when test with ADF, and PP, stationarity test. Thus, since there is unit root at level and , we have to take the first difference statistics of the data to ensure that our data is free from the unit root problem (that is, non- stationary). The result of stationarity is also reportedly at table (unit root) below. This test was conducted in three different cases. These test conducted in the three different stages as mentioned above all show that LN(IMPORTSt), LN(GNIt), and LN(REXRt) are all stationary at first difference statistics. The maximum lag length is ten this is done to obtain the stationarity. Schwarz-Info-Criteria (SIC) is used to know the optimum lag length.

Finally, since the LN(IMPORTt), LN(GNIt), and LN(REXRt) were stationary at first difference, it is necessary to run the Cointegration test of all the variable used.

5.2 The Cointegration Test Result

This section reports the cointegration test that are carried out and its result are presented in the (5.2.1) table and in the (5.2.2) table below. Table (5.2.1) represents trace cointegration rank test while maximum eigenvalue cointegration rank test would be presented in the table (5.2.2). The Johansen Juselius test through the determining trend test expectation (that is, no trend) and Variance of a critical value of 5% will help in carrying out the cointegration test.

Table 3: Trace test

hypothesized NO. of CE(s)	Eigen value	Trace for statistics	0.05 critical value	Probability Value
None*	0.893406	25.07812	15.49471	0.0013**
At most 1	0.040264	0.452072	3.841466	0.5014**

** implies rejection of the hypothesis at the 0.05 level.
*, **, *** signifies 1%, 5% and 10% significance levels.

H_0: no cointegration between the LN(IMPORTSt), LN(GNIt), and LN(REXRt).

T-statistics > critical value. H_0 is rejected.

The trace test noted that there exist one cointegrating equation(s) at level 0.05. The cointegration assumption is that there exist a linear deterministic trend among the series which are LN(IMPORTSt) and LN(GNIt). The exogenous series is LN(REXRt) and the lags interval (in first differences) is 2

** implies that the hypothesis is rejected at the 0.05 level.

Decision rule: Since t-statistics > critical value, H_0 is rejected at 5% significant level. Hence, there is one cointegrating factor between LN(IMPORTSt), LN(GNIt), and LN(REXRt) at 5% significant level through the use of trace cointegration rank test.

Table 4: Maximum Eigenvalue for Cointegration Rank Test.

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistics	0.05 Critical Value	Prob.**
None*	0.893406	24.62605	14.26460	0.0008

At Most 1	0.040264	0.452072	3.841466	0.5014

There exist at 0.05 level, one cointegrating equation and this is noted by carrying out the test on Unrestricted Cointegration Rank Test (test for Maximum Eigenvalue). * implies hypothesis rejection at 0.05 level

H_0: not one cointegration among LN(IMPORTSt), LN(GNIt), and LN(REXRt).

Eigenvalue > critical value. H_0 is rejected.

Decision rule: since Eigenvalue > critical value, H_0 signifies that at 5% level of significance, H_0 is rejected, hence, there exist one cointegration between LN(IMPORTSt), LN(GNIt), and LN(REXRt) at 5% significance. this is achieved by using of Max-eigenvalue rank cointegration test.

The variables LN(IMPORTSt), LN(GNIt), and LN(REXRt) are considered to be cointegrated by using Johansen-Juselius, and it means that they are going alongside with stochastic, and it expounded proportionately. Meaning, there is connection in the long-run.

The co-integration presented in table 3, and table 4 above, shows that the LN(IMPORTSt), LN(GNIt), and LN(REXRt) are cointegrated at 5% significant level. More so, since there is a cointegrated factor between the variables, the researcher seeks to know therefore, the long and short-run relationship amongst the variables in used. This is carried out by employing VECM to test the variables.

5.3 Vector Error Correction Model Results

In this section, this thesis will examines if there exist long or short-run or both relationships between the LN(IMPORTSt), LN(GNIt), and LN(REXRt).

The long and short-run test result will be shown in Table (5.3.1). The sign on coefficient of LN(IMPORTSt) is negative and it is statistically significant at 1%, 5%, and 10%.

From the cointegration results, we observed the long-run vectors in between import and the dependent variables. The other step shows the long-run estimation level coefficient of import model

Import = f(GNI REXR) and ECM which is used for the estimation of short term and error correction and its coefficient. The below table indicates that the results of the short term coefficient are not statistically significant. The ECT value in table 5.3.1 is 5.21516%, and it is statistically significant and negative. The value 5.21516 indicates that the values of import in the short run converge by 5.21516% speed of adjustment to its long run equilibrium level.

Table 5: Estimation of Vector Error Correction

Cointegrating equation:	**Cointegrating Eq. (1)**	
LNIMPORTSt (-1)	1.000000	
LNGNIt(-1)	0.243861	
	[0.02920]	
	(8.35120)	
C	-26.74307	
Error correction	**D(LNIMPORTSt)**	**D(LNGNIt)**
Cointegrating Equation (1)	-0.521516	-0.673480
	[0.15437]	[1.02474]
	(-3.37844)	(-0.65722)
D(LNIMPORTSt)(-1))	0.356145	-2.114328
	[0.31144]	[2.06744]
	(1.14355)	(-1.02268)
D(LNIMPORTSt(-2))	0.448413	-4.418129

	[0.33274]	[2.20886]
	(1.34763)	(-2.00019)
D(LNGNIt(-1))	0.092104	-0.406225
	[0.06387]	[0.42397]
	(1.44213)	(-0.95814)
D(LNGNIt(-2))	-0.030948	0.193721
	[0.05666]	[0.37611]
	(-0.54622)	(0.51506)
C	-1.930593	-8.572342
	[2.07217]	[13.7558]
	(-0.93168)	(-0.62318)
LNREXRt	0.086163	0.396194
	[0.08953]	[0.59436]
	(0.96235)	(0.66659)

Standard Errors in [ ] and t-statistics in ( ).

The above result indicates that VECM (ECM(-1) is statistically significant and it means that there is a short and long-run relationships between variables. That is, the regressors and import cointegrates and has a relationship in the short and and long-run. But REXRt does not indicate any kind of relationship since it was not statistically significant in both the long and short-run. Besides, the number of observations after adjustment was 32. A 1% rise in the LNGNIt(-1) will make LNIMPORTSt increase by 0.243% in the long-run. Also, a 1% rise in LNGNIt would make a decrease in LNIMPORTSt by 0.0309% in the short-run. Furthermore, 1% rise in D(LNIMPORTSt(-2) would lead to a reduction in the GNIt by 44percent which is not significant. Other short-run like D(LNGNIt(-2)), D(LNGNIt(-2), and LNREXRt are statistically insignificant at any significance level. Therefore, they do not have any kind of short-run relationship. Hence, the speed of adjustment is 52% and it contributes much to GNI in the long-run because if there exist a short and long-run relationship between the sequence, there would be shocks resulting to

disequilibrium in the short-run before a return of the series to its long-run equilibrium which is captured by (ECT).

5.4 Test Results for Granger Causality

Granger causality test is applied under the VECM after the cointegation test and after which the ECM analysis are carried out. The model's null hypothesis indicates that there exist a non-causality amids variables used. The rejection of the null hypothesis signifies that the independent variable event occurs before the dependent variable event.

In this section, the direction of the causality among the variables used are investigated in this section and it is carried out by use of Granger pair test with 35 as the number of observations and the sample scope is 1980-2014. The direction of causality depends on the number of lagged values in the equation, and the results of the causality between the variables are presented in the table (5.4) using different numbers of lags.

Table 6: Test indicating Granger causality

DIRECTION of Causality	LAG NO	F-Statistic	Decision
LNGNIt→LNIMPORTSt	2	1.45377	Do not Reject
LNIMPORTSt→LNGNIt	2	1.97189	Do not Reject
LNREXRt→LNIMPORTSt	2	0.19052	Do not Reject
LNIMPORTSt→LNREXRt	2	0.18850	Do not Reject
LNREXRt→LNGNIt	2	0.55859	Do not Reject
LNGNIt→LNREXRt	2	4.09549*	**Reject**
LNGNIt→LNIMPORTSt	3	0.80532	Do not Reject
LNIMPORTSt→LNGNIt	3	1.26524	Do not Reject
LNREXRt→LNIMPORTSt	3	7.17845*	**Reject**
LNIMPORTSt→LNREXRt	3	0.20278	Do not Reject

LNREXRt→LNGNIt	3	2.72642**	**Reject**
LNGNIt→LNREXRt	3	2.09446*****	**Reject**
LNGNIt→LNIMPORTSt	4	36.4515*	**Reject**
LNIMPORTSt→LNGNIt	4	7.59017****	**Reject**
LNREXRt→LNIMPORTSt	4	1681.96*	**Reject**
LNIMPORTSt→LNREXRt	4	0.22789	Do not Reject
LNREXRt→LNGNIt	4	2.84142*	**Reject**
LNGNIt→LNREXRt	4	2.41938***	**Reject**

→ implies the route of causality from LNGNIt to LNIMPORTSt, LNIMPORTSt to LNGNIt, LNREXRt to LNIMPORTSt, LNIMPORTSt to LNREXRt, LNREXRt to LNGNIt, LNGNIt to LNIMPORTSt, LNIMPORTSt to LNGNIt, LNREXRt to LNIMPORTSt, LNREXRt to LNGNIt, and LNGNIt to LNREXRt while, *, **, ***, **** and ***** indicates significant at 5%, 7%, 9%, 12% and 13%.

H_0: Signifies that variables have non-causality relationship between them. If we reject the null hypothesis, it signifies that the independent variables event occurs before the dependent variable event.

If F-statistic > t-tab, reject H_0. Since F-statistic > t-tab, H_0 should be rejected. Thus, the variable under study Granger causes the other variable.

We detect the optimal lag length in this thesis at two, three, and four in order to show the route of the causality. According to Pantula theory which implies that to get the route of two or more variables the lag length must be increased and the maximum lag length must not more than ten by making use of previous values of other time series. This is done purposely to measuring the ability of future values time series in order to be able to focast. At two, three, and four lags, there is bi-lateral causality since we

have more than two variables. The $F\text{-}_{statistics}$ at 5% level is significant since there are more than two variables with two to four lags therefore, there exist a bi-lateral causality among variables. LNGNIt to LNREXRt, LNREXRt to GNIt, LNIMPORTSt to LNGNIt, and LNGNIt to LNREXRt that were significant at 13%, 7%, 12%, and 9% significance level. Therefore, the direction of causality is from LNGNI to LNIMPORTSt, LNREXRt to LNGNIt, LNREXR to LNIMPORTSt, LNREXR to LNIMPORTSt, and LNGNI to LNREXRt in Nigeria with 5% significant level.

The Granger causality result indicates that LNGNI granger causes LNIMPORTSt at lag(4), LNREXRt granger causes LNGNIt at lag(4), LNREXR granger causes LNIMPORTSt at lag(4), LNREXR causes LNIMPORTSt at lag(3), and LNGNI graanger causes LNREXRt at lag(2) in Nigeria with 5% significant level.

Also, LNGNIt granger causes LNREXRt at lag(4) with 9% significant level, LNIMPORTSt granger causes LNGNI at lag(4) with 12% significant level, LNREXRt granger causes LNGNIt at 7% level of significant at lag(3), and LNGNIt granger causes LNREXRt at lag(3) with 13% significant level. The 7%, 9%, 12%, and 13% significant level is far above our theoretical expectation of the level of significance. Our prior expectation is 5% significant level.

Chapter 6

SUMMARY, CONCLUSION AND RECOMMENDATION

6.1 Summary

This thesis investigates import as a function of income between 1980 and 2014 by using Nigeria as a case study with sample size of 35 observations, this sample size is chosen because of insufficient data from the data agencies. The method of data collection is purely based on secondary data which was used to arrive at the facts and figures in writing this thesis. The study also employs the annual time series data which was taking from the World Bank Database, and the model for this thesis is specified as multiple regression shown in equation (2). In this research work, the regression model was transformed to the logarithms transformation form purposely to control spurious regression and get better output. Error term (U_t) was included because, we always leave out some random variables outside which influences IMPORTt and which cannot be modelled.

The econometric modelling strategy is not consistent with all the previous studies in the literature but it consistent with seven of the studies in the literature review such as Bernard and Bayo (2008) in Nigeria; Halil and Oguzhan (2014) in Turkey; Dutta and Ahmed (2006) in India; Hector and Ivor (2012) in Guyana; Chang (2005) in South Korea; Abdusalam (2015) in Libya; and Kira, Ranjini and Mark (2012) in Jamaica. The remaining papers that does not show any constituency are, Munir, Munir, Naeem-Ur-Rehman, Yahya, Badshah, Tariq, and Akhtar in (2009) in Pakistan; Qazi and Mashood (2010) in Bangladesh; Sanjay in (2010) in India;

Mohammed (2001) in Pakistan; Mohammad (2012) in Palestine; Uche, Anne, and Chekwube (2015) in Nigeria; and Abdul and Tayyaba (2010) in Pakistan.

All the papers found different empirical findings in which the papers and their results can be found in the literature review of this research work.

The theoretical expectation for this thesis is $\beta_1 > 0$ which simply means that there is a positive relationship between Imports and the GNI in Nigeria for the period 1980-2014. Other variable were introduced as exogenous variable by the researcher. the variable added is (REXRt). The added variable was based on some studies in the literature review, examples are Kira, Ranjini and Mark (2012) in Jamaica; Bernard and Bayo (2008) in Nigeria; Hector and Ivor (2012) in Guyana; Munir, Naeem-Ur-Rehman, Yahya, Badshah, Tariq and Akhtar (2009) in Pakistan; Mohammad (2012) in Palestine; and Halil and Oguzhan (2014) in Turkey.

The research work carried out the tests for Unit Root, Stationarity, Cointegration, VECM, and Granger Causality tests. There is a Unit Roots problem at level but they were stationary at first difference statistics.. There is one cointegrating factor which prompted the researcher to test for the VECM. VECM shows a short-run and a long-run relationship between the series. Also, Granger causality test was employed to know the direction of causality between the series. Granger Causality Test shows the following route between the series such as, LNGNI to LNIMPORTSt at lag(4), LNREXRt to LNGNIt at lag(4), LNREXR to LNIMPORTSt at lag(4), LNREXR to LNIMPORTSt at lag(3), and LNGNI to LNREXRt at lag(2) in Nigeria with 5% significance level.

Energy Import prohibition has caused Nigeria to lose 800Million Naira yearly to Motor Vehicle (Tokunbo 2014). The major import prohibition in Nigeria are: Live and Dead Birds including Frozen Poultry, Pork or Beef, Birds Egg; Refined Vegetable Oils and Fats excluding Lensed Oil, Castor Oil, Olive Oil and Crude Vegetable; Cane or Beet Sugar and Chemically Pure Sucrose; Cocoa Butter, Powder and Cake; Spaghetti/Noodles; Fruit Juice in retail Packs; Water including Mineral Waters and Aerated Water that containing added Sugar or Sweetening matter or Flavored, Ice Snow but excluding or Health Drinks such as Power Horse, Red Ginseng etc.; Bagged Of cements etc. and it is noted that an increase in import reduces the local currency value and when Naira depreciates, foreign goods becomes expensive in naira prices and the home country import less of the goods and services.

6.2 Conclusion

We have investigated import as a function of income in Nigeria between 1980 and 2014. The research was conducted using Unit Root test, Stationarity test, Cointegration test, VECM, and Granger Causality tests and we find out the following results:

It is noted that a positive long-run relationship exist amid Import and income in Nigeria for the period 1980 to 2014, the result also shows a short-run negative relationship between the periods studied. The long-run relationship shows that for a 1% increase in the LNGNIt(-1) would increase LNIMPORTSt by 0.243%. In the short-run, a 1% increase in the LNGNIt would decrease LNIMPORTSt by 0.0309% in the short-run. Furthermore, the short-run also shows that a 1% increase in D(LNIMPORTSt(-2)) would reduce the GNIt by 44percent. Short-run variables like D(LNGNIt(-1)), D(LNGNIt(-2)), and LNREXRt are statistically insignificant at any

significance level. Therefore, they do not have any kind of short-run relationship more so, there exists a long-run equilibrium convergence since some of the short-run values are significant statistically. Hence, -0.521516 indicates the speed of adjustment to the long-run equilibrium with the short-run values. -0.521516 signifies that the short run values of import converge to the longrun equilibrium by 0.5215516% speed of adjustment yearly GNI and REXR contributions. This will affect LNGNIt in the long-run in that if there exist a short-run and long-run relationship between the series, shocks in the series would result in disequilibrium in the short-run before its adjustment to the equilibrium in the long-run.

The Granger causality result implies that LNGNI granger causes LNIMPORTSt, LNREXRt granger causes LNGNIt, LNREXR granger causes LNIMPORTSt, LNREXR causes LNIMPORTSt, and LNGNI granger causes LNREXRt in Nigeria with 5% significance level. Thus, LNGNIt granger causes LNREXRt with 9% significant level, LNIMPORTSt granger causes LNGNI with 12% significant level, LNREXRt granger causes LNGNIt at 7% level of significance, and LNGNIt granger causes LNREXRt with 13% significant level. The 7%, 9%, 12%, and 13% significance level is far above our prior expectation of 5% significance level.

The economic implication is that, if people in Nigeria spend more money on importation of goods and services, Nigeria GNI will increase as a result of increase in importation also, an increase in GNI leads to an increase in importation and this would necessitate the carrying out of a set of macro- economic policies and policies relating to sectors that would affect real income and as such, expanding income and depreciation in real exchange rate will increase the flow of imported goods into the country.

From the research carried out, it is noted that countries that are dependent on import have a higher marginal propensity to import and Nigeria has been noted to be one of them and it is being noted that Nigeria has a positive marginal propensity to consume and thus marginal propensity to import and this has been noted to be, because the higher potion of goods consumed are mostly imported goods and services.

As a greater amount of imported are mostly consumed in Nigeria, also means that as income increases, countries that consume more imported goods have a significant impact on global trade.

When family's disposable income increases, the demand for imported goods also increases especially if the goods are luxury goods and are imported as such. The increase is noted to be more than proportional compared to the noted increase in income.

The income of the country increases when the elasticity of the country's income equal the elasticity of import. Nigerians spend more money on imported goods and service, thereby increasing the GNI of the country. , devaluation of currency allows for the high cost of importation of goods and services as in the case of Nigeria today. That is, when a country's currency is devalued, her citizens spend more in the purchase of goods and services from outside their country.

6.3 Recommendation

The limitation faced in this research work is as a result of in sufficient information from the World Bank Database. İt is more reliable to re-visit a similar or related topic in this research area when more time series data is available. The future research would put more additional valuables to import as a function of income in Nigeria and additional variables to include in future research are real exchange rate.

The policy implication to maintain an efficient exchange rate require a coincise effort to achieve and maintain an efficient monetary and fiscal policies.

The share of import of goods should be of the share of aid in the total capital formation to be of a part of development assistance to impact positively for growth and development.

Nigeria government may implement fiscal discipline whenever the country is experiencing drastical reduction in importation of goods and services in the country. This is to say that there is need to strike balance in order to attain breakeven in times of economic development and judiciously rectifying internal and external imbalances.

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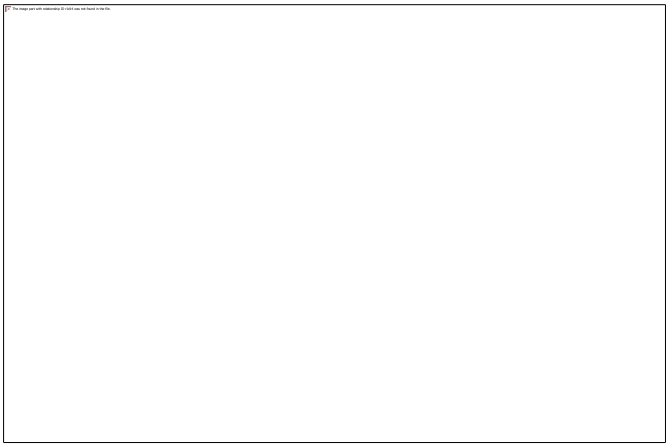
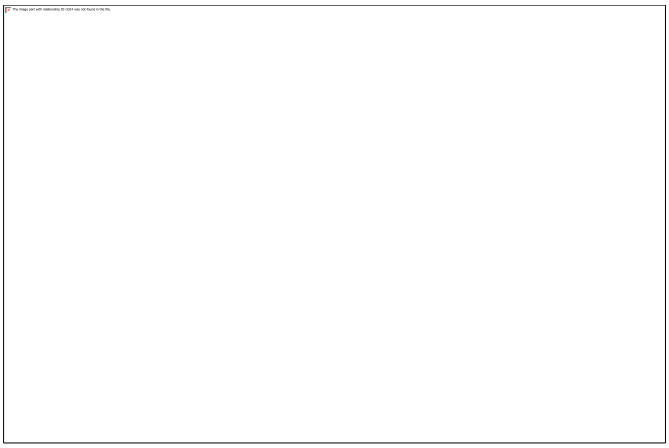
APPENDIX



Nigeria Loses N800million Yearly to Vehicle Import Restriction

November 13, 2014.



Isuzu Motors Partners Kewalram Chanrai Group To Set Up Truck Assembly Plant In Nigeria. November 11, 2014.