Causal Effect of Exchange Rate Depreciation on Import Demand in Nigeria

Author's Detail:

Dr. Titus Chinweuba Eze, is a holder of Doctorate Degree in Economics with bias towards quantitative Economics. Currently he is a Senior Lecturer at the Department of Economics, Ebonyi state University, Abakaliki- Ebonyi State, Nigeria with the following contact Address: Cell Phone: + 234-

08035439312 and E-mail: ezetituschinweuba@yahoo.com

CO-Author's Detail:

Mr Michael Onyebuchi Eze, has a masters Degree in Economics and he is currently pursuing his Doctorate Degree Programme (Ph.D) in Mathematical Economics at Ebonyi State University, Abakaliki-Ebonyi State-Nigeria. Cell Phone: +234-07065433015

Abstract

The study examined the effect of exchange rate depreciation on import demand in Nigeria from 1981 to 2016. Toda-Yamamoto approach to Granger Causality test was employed in the analysis. Data obtained from the Central Bank of Nigeria (CBN) statistical bulletin on total imports (TIMP), exchange rate (EXCR), gross domestic product (GDP), consumer price index (CPI) and foreign direct investment (FDI) were analyzed in the study. The results showed that EXCR, GDP, and FDI have significant effects on TIMP in Nigeria while CPI has an insignificant effect on TIMP. These suggest that any economic policy that is able to increase the values of EXCR, GDP, and FDI by 1% will lead to a significant change in the import demand in Nigeria. Thus, the study recommends that government should as a matter of fact, intensify efforts in its pursuit of import substitution policies through inward-looking; and imbibe export promotion strategies via economic diversification with the view to promoting exports and reducing the level of imports. The exchange rate depreciation/devaluation policy is yet to bring about the desired reduction in the import demand in Nigeria. The depreciation, if well-utilized leads to increased exports and hence, improved economic growth and development of the nation.

Keywords: Consumer Price Index, Depreciation, Economic growth, Economic Development, Exchange Rate, Foreign Direct Investment, Import Substitution, Imports Demand, Toda-Yamamoto,

1.   **Introduction**

Exports and imports are the major issues in the international trade debate. Better information about foreign trade regime can simply be obtained if imports of countries are studied at some length. This is because; imports play a very critical role in countries' investment life as well as the industrial development and economic growth (Mohammad, 2007). Imports behaviour is very important not only to demonstrate the imports demand, which determines the level of foreign countries' dependence on the supply of input materials and finished goods that affects the balance of payments but also acts as a measure for comparing the purchasing power of exports with regards to terms of trade.

Many countries of the world including Nigeria engage in foreign trade with one another for the purpose of improving economic growth and standard of living of people in their countries. In Nigeria, agricultural export products include palm produce, rubber, cocoa, groundnut, cotton and solid minerals such as tin, gold and columbite, among others. Thus, the major foreign exchange earnings of Nigeria are derived from crude oil and liquefied natural gas. However, the imports of Nigeria consist of refined petroleum products, machinery, automobile and so on (Oloyede & Essi, 2017). According to the doctrine of comparative advantage, countries are enjoined to engage in international trade with those goods at which they have a comparative cost advantage over other countries and import those goods in which they have comparative cost disadvantage. The key determinants of import demand in Nigeria are the oil prices in the world market and the level of exchange rates. Depreciation in the exchange rate affects the domestic economy such as non-oil export sector and oil export sector at various degrees. Theoretically, exchange rate depreciation leads to an increase in the level of exports and decreases imports of a country while exchange rate appreciation improves import level and reduces exports of a nation.

Alemu and Jin-sang (2014) argued that exchange rate depreciation increases the country's competitiveness of export goods in the foreign markets while it makes the country's imports very expensive. Consequently, a higher price of imports brings about inflationary pressure, especially in the developing countries that depended so much on the imported energy resources, consumer goods and industrial raw materials for its growth and development. In this view, Nigeria depends heavily on the importation of refined petroleum products and liquefied natural gas, consumer goods and industrial raw materials; and today, most economies are relying on export promotion through various export promotion policies. Exchange rate policy plays a major role in the transmission mechanism of monetary policy. In developing countries, exchange rate depreciation is an adequate macroeconomic policy instrument that supports the export sector. In that, the authors argued that lower imports and higher exports increase the trade surplus of a country as well as improved aggregate demand (AD), which in turn leads to economic growth in the economy (Alemu & Jin-sang, 2014).

Ihuoma, Felix and Frances (2015) stated that the large foreign exchange revenues inflow, which accompanied the Nigerian oil boom in the 1970s, led government to neglect agricultural exports sector that was the major economic base of the country towards dependence on oil export sector, which now accounts largely on the foreign exchange earnings of the country. This development is no doubt brought about a decline in the output level of the agricultural performance and consequently, results in a decrease in both volume and value of traditional export products as well as led to a lack of economic diversification in the economy. Meanwhile, the broad-based macroeconomic aggregate growth of Nigeria had overtime been among the most volatile in the developing countries since the mid-1970s. For example, the nation's aggregate output growth rate was 3% between 1980 and 1985. By 1990 and 1995, the growth rates increased to 3.4% and further improved to 5.9% between 2000 and 2004. These output growth rates of the country therefore, reflected the pattern of trade that has deteriorated continuously in real terms during the period despite the economic reform and liberalization programmes undertaken by the successive governments in the country.

Similarly, Eze and Atuma (2017) postulated that the broad objective of exchange rate policy centered on the determination of the appropriate exchange rate necessary for a country's currency with the aims of achieving economic stability. This objective is achieved by employing various techniques and policy options, mainly to obtain efficiency in the foreign exchange market. Thus, exchange rate policies in Nigeria over time, have moved from fixed exchange regimes in the earlier 1970s to floating exchange regimes since the adoption of IMF-World Bank supported structural adjustment programme (SAP) in 1986. As a result, the Nigerian exchange rate has over the years depreciated against the US dollar and other major foreign currencies. For example, in 1981, the exchange rate of Nigeria was ? 0.61 per US dollar; and in 1991, the exchange rate depreciated to ? 9.9095 per US

dollar. By 2001, the rate of exchange stood at ? 111.9433 per US dollar and further depreciated to ? 153.8616 per US dollar in 2011. In 2015 and 2016, the exchange rates of Nigeria depreciated further to ? 197 and ? 305 per US dollar respectively.

However, the corresponding values of Nigeria's imports in 1981 stood at ? 12.8 billion and rose to ? 89.5 billion in 1991. By 2001, 2011, 2015 and 2016, the imports value of Nigeria in nominal term were ? 1,358.2 billion, ? 10,995.9 billion, ? 11,076.1 billion and ? 9,480.4 billion respectively while the corresponding exports of the country in nominal value was ? 11.0 billion in 1981 and rose to ? 121.5 billion in 1991. In 2001, 2011, 2015 and 2016, the exports values of Nigeria were ? 1,868.0 billion, ? 15,236.7, ? 8,845.2 billion and ? 8,835.6 billion respectively. From the trend analysis above, it can be observed that the naira exchange rate of Nigeria depreciated continuously overtime with imports of the country decreasing alongside the exchange rate depreciation. However, the exports of the country also decreased over time when compared to the values of the imports. For instance, when the imports of the country were ? 12.8 billion, the exports stood at ? 11.0 billion, and when the imports rose to ? 11,076.1 billion in 2015, the exports was? 8,845.2 billion. More so, when the imports of the country declined to ? 9,480.4 billion, the exports of the nation stood at ? 8,835.6 billion. Therefore, it against this notion, that this study investigates the effect of exchange rate depreciation on the import demands of Nigeria for the period 1981-2016.

1.   Review of Related Literature
2.1   Theoretical Review
An exchange rate can be described as the rate by which currencies are exchanged in the foreign exchange market by countries of the world. Exchange rate is also regarded as the value of a country's currency in terms of the currencies of other countries across the border (Khaled, 2016). If the exchange rate depreciated, this leads to changes in the relative prices of imports and exports in @ternational trade. The depreciation of the exchange rate will make exports relatively cheaper in other currencies, and imports will become more expensive. However, if the price of imported goods increases, this could be inflationary. Consequently, the effect of the inflationary pressure on aggregate demand will further compound the inflationary impact on the economy. This is because, the exports of the country will relatively be cheaper overseas, and thereby increasing the demand for domestic goods while the imports of the country will become expensive. Thus, the combination of the exports and imports will influence aggregate demand positively, since net exports form part of the aggregate demand function (AD   C+I+ +(-M).The degree at which the aggregate demand rises is determined by the price elasticity of export demand; certainly, the demand will experience growth. If the economy is close to its capacity, the growth in aggregate demand could also be inflationary (Khaled, 2016). Accordingly, If the national currency rate appreciated as a result of a depreciation in the foreign exchange rate, the domestic country will import more goods at cheap prices while if the national currency depreciated given an appreciation in the foreign exchange rate, the imports of the domestic country decreases due to the price increase in other countries goods (Kandil, Berument, & Dincer, 2007). Meanwhile, the national currency appreciates when there is a decline in the exchange rate, the exports of the domestic country will result in high foreign exchange for the country and vice versa. Increases or decreases in some country s currency brings about changes in the economic activities of countries at very much degree.

Eichengreeny (2007) stated that exchange rates of countries tend to depart from equilibrium level for two major reasons. The author identified the reasons for the departure to include the government interventions that are directly geared toward real exchange rate manipulation. In this case, governments embarked on manipulating policy instruments in order to influence the real value of the exchange rate by introducing capital controls or targeted foreign exchange markets intervention. Secondly, misalignments can be a result of the side effect of the policies of macroeconomics that are geared toward attaining some macroeconomic objectives, or as a result of international financial architecture distortions or imbalance in the domestic structural conditions. Economic theory postulated that the concept of long run is the period by which all prices are fully flexible. This implies that in the long run, prices will have time to adjust to any policy change. Staiger and Sykes (2010) argued that exchange rate misalignment such as currency devaluation does not have a long-run effect on trade inflow and outflow or on real economic activity because there will be change relative to prices when markets do not have distortions. In the short run however, changes in the nominal exchange rates influence relative prices and thereby affect both resource allocation between tradable and non-tradable sectors and the flows of international trade. The effect of exchange rate misalignments depends on the currency by which the domestic producers invoice their products. For example, if the price is set in the domestic currency by the producers, depreciation or devaluation decreases the price of domestic goods relative to foreign goods (Staiger & Sykes, 2010).

Thus, several theories explain the influence of exchange rate depreciation or devaluation on countries' trade balance (exports and imports). These theories include the absorption approach, elasticity approach, and monetary approach. These theories are selected to enable the study to theoretically explain the nexus between exchange rate depreciation and import demand of Nigeria.

2.1   The elasticity approach
The elasticity approach was first propounded by Bickerdike (1920) and was popularized by   obinson (1947) and Metzler (1948). Thus, the approach is popularly known as Bickerdike- obinson-Metzler (B M) and Marshall-Lerner (ML) conditions. It vividly explains the nexus between the depreciation or devaluation of the exchange rate and the country's balance of trade. Elasticity approach postulated that exchange rates are the key function of the balance of trade of any country. The theory relates to the demand for foreign exchange to the demand for foreign goods. Accordingly, Adeyemi, Paul and Oluwatomsin (2013) postulated that any transaction taken during national currency depreciation or devaluation affects balance of trade negatively in the short run; and however, improves balance of trade in the long run, because imports and exports volumes will have time to

adjust leading imports and exports elasticities to rise as the quantities adjust. As a result, the price of exports in the currency devaluing nation will decline with the price of the import goods rising. This will therefore, lead the imports demand of the nation to reduce in the long run and hence, improved the balance of trade. The theory also expressed that the influence of exchange rate depreciation or devaluation largely depends on the imports and exports' elasticity of demand of a country. Meanwhile, the theory of elasticity approach centered on the substitution effects of both production and consumption caused by the relative changes in price that result from the depreciation or devaluation of the exchange rate (BigBen, 2011).

The approach otherwise known as the B M model is widely accepted in the economic literature to be the most sufficient condition necessary to improve balance of trade during the period of exchange rate depreciation or devaluation. The B M and ML conditions argued that devaluation or depreciation of the national currency rate leads to improvement in the balance of trade of a country (Marshall, 1923; Lerner, 1944). The conditions reiterated further that for a country to achieve a positive balance of trade as well as exchange market stabilization given its exchange rate devaluation or depreciation, the nominal values of the sum total of the demand elasticities for imports and exports should exceed unity. Therefore, the devaluation leads to an improvement in the payment balance of the country. Furthermore, the ML condition (Marshall, 1923 and Lerner, 1944)stated that the prices of imports of a country increase as the domestic currency is devalued or depreciated whereas the foreign prices of exports declines, which improves the balance of trade by raising the volume of exports with imports declining. However, the degree at which this is achieved success largely depends on the elasticities of price in the domestic imports' demand and foreign exports' demand. The Marshall-Lerner condition upholds that when the sum of price elasticities of demand for imports and exports in nominal value is greater than one, the balance of payments of a country improves given its exchange rate devaluation. Thus, the model for Marshall-Lerner (ML) condition is expressed as:

nx + nm >1   **(1)**

Where; nxis the demand elasticity for exports while nm   demand elasticity for imports. If the sum of price elasticities of demand for imports and exports is less than one; that is,

nx + bm< 1   **(2)**

It implies that exchange rate depreciation or devaluation affects payment balance negatively. Hence, if the sum of the price elasticities of imports and exports equates unity; that is,

nx + nm = 1   **(3)**

This means that depreciation devaluation has no effect on the payment balance position of the country concern; thus, it remains unchanged. It is very important here to distinguish between long-run and short-run elasticities as it leads to the consideration of the J-curve effect. In this sense, it was argued that a real depreciation or devaluation of the exchange rate in the long run improves trade balance and however, worsens trade balance in the short run as the Marshall-Lerner condition is satisfied.

2.2   Monetary approach

The monetary theory of exchange rate argued that money is a critical factor in any economy. It postulated that exchange rate is the function of the money supply. The theory expressed that fluctuations in the exchange rates are explained by the variations in the relative supplies of domestic currencies (Okwuchukwu, 2014). Hence, the theory suggested that the supply of money should be employed to forecast the changes in exchange rates as there is existence of a causal relationship between changes in the money supply and exchange rates. Accordingly, Levacic and ebmann (1982) while considering the monetarist model, stated that a rise or fall in economic factors influences the rate of exchange by affecting the demand for and supply of money balances.

The theory also argued that the demand and supply of money balance hold strong forces in the determination of a country's external trade position. Whereas an increase in the money demand of a country leads to a balance of payments surplus, an increase in money stock results in deficits in the balance of the payment of a country. However, the monetary approach focused on monetary account deficits, which comprises the items that influence the domestic monetary base. The approach emphatically laid more emphasis on the monetary aspects of payment balances by looking at the importance of financial assets above the role of merchandise trade. The monetary approach while considering the exchange rate stated that a nation's exchange rate dynamics are money phenomenon. Any observed disequilibrium payment balance can be eliminated through the manipulation of the monetary variables such as lack of sterilization by the monetary authorities, domestic credit, money demand stability function and under controlled exchange rate (Akpansung, 2013). Similarly, the theory treats money supply as an endogenous variable via the assumption of feedback from the payment balance by decrease or increase in international reserves to variations in the money and the central bank's monetary liabilities.

2.3   Absorption approach

The proponents of the absorption approach to the balance of payments were Harberger (1950), Meade (1951) and Alexander (1952) as cited by Adeyemi, Paul and Oluwatomsin (2013). In the approach, Johnson (1967) and popularized by Miles (1979) postulated that the depreciation or devaluation of a national currency rate causes deterioration in the trade balance of a country. According to the approach, expenditure can be switched away from foreign goods to domestic produced goods, thereby leading to improved balance of trade of such nation; and this can be referred to as switching expenditure effect. In the same view, Hernan (1998) upheld that absorption approach shifted attention away from economic analysis to trade balance; hence, it tends to solve most of the economic aggregate problems in the economy. The author identified two major points of which one aspect is similar to the elasticity approach. In this case, the absorption approach reduced the current account to the balance of trade and referred to the countries as large countries. On the other hand, unlike the elasticity approach, the absorption approach introduced

money and income, though the former is discussed slightly. In the foregoing trade balance discussion, the absorption approach implicitly takes the Keynesian assumption of income-expenditure, which states that volumes of export are autonomous or independent of national income while imports depend positively and directly on national income (Adeyemi et al., 2013).

1.4   Empirical Review

Khaled (2016) examined the influence of the exchange rate on the country's import and export for the period 1982-1997 and und that exchange rate depreciation increases national currency value and decreases the foreign currency as well. Thus, if the domestic currency rate increases as a result of a decline in the foreign exchange rate, then the domestic country imports more goods at cheap prices. However, if the domestic country currency falls given a rise in the exchange rate, the imports of the home country will decrease as a result of the increase in the price of other countries. Similarly, if the national currency appreciated due to the exchange rate decline, the exports of the domestic country bring about high foreign exchange for the nation and vice versa. Alemu and Jin-sang (2014) investigated the impact of currency depreciation on the trade balance in selected Asian economies for the period 1990-2012 using the fixed-effect model (FEM) and the random effect model (EM). The variables employed in the investigation include trade balance, exchange rate, income per capita, lending interest rate, inflation rate, degree of openness, population size and physical infrastructure. The results showed that depreciation in the exchange rate improves the trade balance of about fourteen (14) Asian countries. The study noted that this was as a result of the fact that exports failed to respond as expected, which could have been as a result of a decrease in terms of trade for traditional commodities and manufactured products or as a result of over-dependence on imported goods that maybe expensive in the domestic currency.

Adeyemi, Paul, and Oluwatomsin (2013) studied the impact of currency devaluation on Nigeria's trade balance for the period 1970-2010 through the application of the Johansen cointegration test and variance decomposition analyses. The variables of the study include trade balance, domestic and foreign money supply, domestic and foreign interest rate, real domestic and foreign income and nominal exchange rate. The empirical results revealed that a long-run equilibrium relationship exists among the variables. The results also indicated that significant and inelastic relationship exists between trade balance and its determinants. Similarly, the study discovered that exchange rate has a positive and significant impact on the trade balance in the long run; however, short-run causality does not exist between exchange rate and trade balance and that volatility of money supply led to variance in trade balance than volatility in the exchange rate. Oloyede and Essi (2017) examined the influence of exchange rates on imports and exports in Nigeria for the period 1996   2015 through the applications of the Augmented Dickey-Fuller (ADF) unit root test and vector autoregression (A) analysis. The variables used in the analysis include exchange rates, exports and imports. The results showed that exchange rates have an insignificant and positive influence on imports while the exchange rate has a negative and insignificant influence on exports of Nigeria. The results also indicated that exports have a negative effect on exchange rates whereas imports have a positive influence on exchange rates in the economy.

Ihuoma, Felix and Frances (2015) investigated the effect of the exchange rate on the balance of trade of Nigeria from 1970 to 2012. Augmented Dickey-Fuller (ADF) stationarity test, Johansen cointegration and its associated error correction mechanism (ECM) were utilized in the analysis. The variables of the study include a balance of trade, world real industrial production index and real effective exchange rate, gross national product. The results of the cointegration test indicate evidence of a long run relationship among the variables. The result also revealed that the exchange rate has a negative and significant effect on the trade balance of Nigeria. Mohammad (2007) examined the response of the exchange rate on import demand in Pakistan using unit root test, ordinary least square (OLS) and cointegration test. The variables employed in the test involve real gross domestic product (DP), real exchange rate, effective exchange rate for imports, foreign exchange reserves, nominal exchange rate and consumer price index. The results demonstrated that a realistic exchange rate has a positive influence on import demand in Pakistan. The study also showed that domestic inflation, as well as an unrealistic exchange rate, discourages investment flows required for new incentives. More so, it was indicated in the study that a long-run equilibrium relationship exists among the variables.

Oyovwi (2012) examined the impact of exchange rate volatility on the imports of Nigeria using the Augmented Dickey-Fuller (ADF) unit root test, cointegration test and Parsimonious error correction model (ECM). The variables employed in the study include real gross domestic product, real import value, real terms of trade and volatility of real exchange rate. The study discovered that the volatility of the real exchange rate has an insignificant influence on the imports of Nigeria. The implication of this result as indicated by the researcher is that domestic consumption is channeled towards imported goods that in turn showed that the exports of Nigeria have very large import content. The study also discovered that exchange rate devaluation as policy instruments aimed at reducing the balance of trade imbalance still encourage massive importation, since the volatility of the exchange rate has an insignificant effect on imports of Nigeria. WenShwo, iHao and Stephen (2005) investigated the effect of exchange rate movements on exports in eight Asian countries in two ways including its variability and depreciation. Dynamic conditional correlation bi-variate A CH-M model, which estimates time-varying correlation and exchange rate risk was employed in the analysis. The study revealed that exchange rate depreciation has a positive and significant impact on exports for most countries while its contribution to export growth is insignificant. More so, the results indicated that the exchange rate has positive contributions to export growth in the Philippines and Malaysia. The results, however, indicate that exchange rate risk has a negative influence on six of the countries, which led to negative net effect in Japan, Indonesia, Taiwan, Singapore and it has zero net effect in Thailand and Korea.

Safet (2017) studied the effect of exchange rate depreciation on the trade balance of Albania for the period 1994-2015 using bounds testing cointegration technique, vector error correction model (ECM) and impulse response were utilized in the analysis. The variables used in the investigation include trade balance, real effective exchange rate depreciation and gross domestic product. The study revealed that a long run equilibrium relationship exists among the variables. The empirical results also showed that real effective exchange rate depreciation has a positive influence on the trade balance of Albania, both in the short run and in the long run, which showed that the J-curve effect is satisfied in the study. Komain (2013) investigated the impact of exchange rate uncertainty on the import demand of Thailand from July 1997 to December 2011 using A (1)- E A CH(1,1) process and bounds testing for cointegration. The variables of the study involve real aggregate imports, domestic real income and real effective exchange rate. The estimation results indicated evidence of long-run relationship among the variables. The results also showed that exchange rate uncertainty has a negative impact on the import demand of Thailand. It was also indicated that the presence of higher uncertainty in the real effective exchange rate in the short run does not encourage a large number of manufacturing firms to increase or decrease their imports of capital equipment and raw materials so as to hedge against real depreciation in the near future.

Nodir (2011) estimated the effect of volatility in the exchange rate on international trade in Uzbekistan for the period 1999-2009 through the application of the Johansen cointegration test. The variables used in the investigation include real exports, gross domestic product, real foreign income, real exchange rate, real imports, exchange rate volatility and real domestic income. The empirical results indicated that real exchange rate volatility has a significant effect on imports and exports in Uzbekistan. The results of the Johansen cointegration test showed evidence of long-run relationship among the variables. The results also indicated that real exchange rate volatility has a negative and significant influence on imports and exports in the economy in the long run.

2.5 Gap in Literature

Empirically, this study is an improvement on other research works carried out on the effect of exchange rate depreciation on the import demand of Nigeria and other related topics across countries of the world. The study reviewed various studies mainly to lay credence to this study. However, of all the scholarly works reviewed, this study is not aware of any other study carried out on the effect of exchange rate depreciation on the import demand of Nigeria and used Toda- amamoto approach to ranger causality which this study adopted in its analytical approach. More so, research on the related subject matter in Nigeria is very canty. For instance, of all the studies reviewed in the course of this study, only four (4) studies were observed to be done on the related subject matter in Nigeria. These studies include Adeyemi, Paul and Oluwatomsin (2013); Oloyede and Essi (2017); Ihuoma, Felix and Frances (2015) and Oyovwi (2012). Thus, it is against this established gap and the desire to contribute to knowledge in the literature that motivated this study.

3. Research Methods

In order to empirically investigate the effective exchange rate depreciation on the import demand of Nigeria for the period 1981 to 2016, unit root test through the application of the Augmented Dickey-Fuller (ADF) stationarity test and Toda- amamoto approach to ranger causality test were used in the analysis. The test of the unit root is undertaken to examine the order of integration among the series employed in the study. The Toda- amamoto approach to ranger causality is applied to examine the causality between the variables after obtaining mix order of integration at level, first difference and second difference. The variables utilized in the study include exchange rate (E C), total imports (TIMP), gross domestic product (DP), consumer price index (CPI) and foreign direct investment (FDI). Data for these variables were obtained from the statistical bulletin of the Central Bank of Nigeria (CBN) and the National Bureau of Statistics (NBS) of various publications from the period of 1981 to 2016.

3.1 Model Specification

The model used in this study is specified in functional form as:

TIMP f(E C , DP, CPI, FDI)   **4**

Where; TIMP   Total Imports; E C   Exchange ate; DP   ross Domestic Product; CPI   Consumer Price Index; and FDI   Foreign Direct Investment.

In linear function, the model is expressed as:

$$TIMP_t = \beta_0 + \beta_1 E C_t + \beta_2 DP_t + \beta_3 CPI_t + \beta_4 FDI_t + e_t \qquad \textbf{5}$$

Where; TIMP is the explained variable while E C , GDP, CPI, and FDI are the explanatory variables; β_0 is the constant term, $\beta$is are the parameters of the regression equations and e_t is the stochastic variable.

3.2 A Priori Expectation

Theoretically, it is expected that exchange rate, gross domestic product, and foreign direct investment will have a negative relationship with total imports while consumer price index is expected to have a positive relationship with the total imports of Nigeria.

3. Analysis and Result

This stage of the study illustrates the estimation results and consequently, discusses the results in accordance with the objectives of the study.

4.1 Stationarity Test

The stationarity test is conducted to examine the order of integration of the series used in the study by applying the Augmented Dickey-Fuller (ADF) unit root test. The results of the ADF unit root test are shown in Table 1 below.

Table 1: ADF Unit Root Test between TIMP and its determinants

Trend and Intercept

Level			First Difference		Second Difference			
Variables	ADF Statistic	5% Critical Value	ADF Statistic	5% Critical Value	ADF Statistic	5% Critical Value	Order	Remarks
TIMP	-1.564270	-3.544284	-3.079033	-3.574244	-9.049554	-3.557759	1(2)	Stationary
E C	-0.736210	-3.544284	-2.564692	-3.548490	-6.513315	-3.552973	1(2)	Stationary
DP	-1.946364	-3.544284	-5.817334	-3.548490	-6.349653	-3.557759	1(1)	Stationary
CPI	-1.938128	-3.544284	-6.409927	-3.548490	-6.808315	-3.557759	1(1)	Stationary
FDI	-4.777562	-3.603202	-4.726104	-3.658446	-8.148310	-3.574244	1(0)	Stationary

Source: esearcher s compilation from E-view 9

The above table 1 represents the results of the ADF unit root test between total imports and its determinants in the Nigerian economy, which is conducted at level, first differencing and second differencing at 0.05 level of significance. The results revealed that all the variables including TIMP, E C , DP, and CPI except FDI were non-stationary at level at 5% (0.05) critical value. However, the results showed that while TIMP and E C were stationary at second differencing, DP and CPI were stationary at first differencing with only FDI being stationary at level at 5% (0.05). These claims are evident by the ADF tatistics and its critical values. Hence, since the order of integration is achieved among the variables though arbitrarily at level, first differencing and second differencing; it, therefore, implies that the variables possessed long-run properties, which also means that their mean, variance and covariance are constant over time. Since the variables indicated the same order of integration at second differencing, it implies that the series does not contain unit root at that level. Therefore, they can be used in the investigation as the results obtained from the estimation procedures will not produce spurious results.

4.2 Toda-Yamamoto Augmented Granger Causality (Modified Wald) Test

This estimation procedure is applied to test for causality between integrated variables based on asymptotic theory through the application of Toda- amamoto due to Toda and amamoto (1995). The model of Toda and amamoto emphasized that economic series could either be non-cointegrated or integrated of the different orders or both. In these situations, the conventional ECM cannot be applied for ranger causality tests. Thus, Toda and amamoto developed an alternative model, irrespective of whether the variables are I(0), I(1) or I(2), cointegrated or non-cointegrated of arbitrary order. The model is

popularly known as the Toda and amamoto augmented ranger causality. Toda- amamoto augmented ranger causality model is based on the equations below.

$$_t = \alpha + \sum_{i\ 1} \pi_i\ _{t-i} + \sum_{i\ 1} \pi_j\ _{t-j} + u_{yt} \qquad\qquad 7$$

$$_t = \alpha + \sum_{i\ 1}^{h+d} ?\ _i\ _{t-i} + \sum_{i\ 1}^{k+d} \delta_j\ _{t-j} + u_{xt} \qquad\qquad 8$$

Where; d maximal order of integration order of the variables in the system, h and k the optimal lag length of t and t, and are stochastic variables, which are assumed to be white noise with zero mean, constant variance and no autocorrelation. Meanwhile, all one requires to do is to determine the maximal order of integration d that we expect to occur in the model and construct a A in their levels with a total of (k + d) lags. In this study, the result of the lag length is shown below.

Table 2: Lag Length Criteria
Endogenous variables: TIMP E C   DP CPI FDI
Sample: 1981 2016
Included observations: 31

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1168.640	NA	5.27e+26	75.71872	75.95000	75.79411
1	-1038.782	209.4481	6.23e+23	68.95369	70.34142	69.40606
2	-998.2356	52.31828	2.62e+23	67.95068	70.49485	68.78002

    indicates lag order selected by the criterion
 L : sequential modified L   test statistic (each test at 5% level)
Source: esearcher s compilation from E-view 9

ble 2 above depicts the results of lag length criteria. The results showed a maximum lag length of 2 as; hence, it indicates lag order selected by the criterion for the study. This test is due to Dolado and Lutkepohl (1996) who advocated for the employment of a modified Wald test for restriction on the parameters of the   A   (k) with k being the lag length of the   A   system. In this approach, the correct order of the system (k) is augmented by the maximal order of integration (dmax), then the   A   (k + dmax) is estimated with the coefficients of the last lagged dmax vector being ignored. Toda and   amamoto (1995) confirm that Wald statistic converges in distribution to a chi-square random variable with degrees of freedom equal to the number of the excluded lagged variables regardless of whether the process is stationary, possibly around a linear trend or whether it is cointegrated. In this study,   A   is used to capture the values of the excluded lagged variables since the time series are integrated of order one and order two, that is, 1(0), I(1) and I(2). Having obtained the maximal lag length, the study proceeds to test for Toda- amamoto augmented   ranger causality approach.

Table 3: Toda-Yamamoto Approach to Granger Causality (Modified Wald) Test
 A   ranger Causality Block Exogeneity Wald Tests

Dependent variable: TIMP			
Excluded	Chi-sq	df	Prob.
E C	7.106072	2	0.0286
DP	12.49356	2	0.0019
CPI	2.687433	2	0.2609
FDI	26.55754	2	0.0000
All	42.70392	8	0.0000

Dependent variable: EXCR			
Excluded	Chi-sq	df	Prob.
TIMP	2.021099	2	0.3640
DP	1.550819	2	0.4605
CPI	2.895747	2	0.2351
FDI	0.991242	2	0.6092
All	16.89810	8	0.0312

Source: esearcher s compilation from E-view 9

The results in table 3 illustrate the estimation of the Toda- amamoto approach to   ranger Causality (Modified Wald) test. Based on the Toda- amamoto approach to   ranger Causality, the results indicated that E C ,   DP, and FDI have significant effects on imports demand (TIMP) of Nigeria while CPI has an insignificant effect on TIMP. This was made evident by the Chi-sq values and the p-values of the respective variables. From the results, the Chi-sq values and the p-values of the variables such as E C ,   DP, CPI and FDI are 7.106072 (0.0286), 12.49356 (0.0019), 2.687433 (0.2609) and 26.55754 (0.0000) respectively with the values in the bracket being the p-values. Similarly, the results also indicated that the joint influence of the explanatory variables (i.e. E C ,   DP, CPI, and FDI) on the dependent variables (i.e. TIMP) is statistically significant. The evidence of this claim is indicated by the Chi-sq and p-value of 42.70392 (0.0000) with the value in bracket being the p-value of the corresponding variables. More so, the results of the Toda- amamoto approach to   ranger causality indicated that the variables such as TIMP,   DP, CPI and FDI do not have a significant effect on E C   in the economy. This is evident by the Chi-sq value and p-value of the variables under consideration. From the results, the Chi-sq and p-values of the variables including TIMP,   DP, CPI and FDI are 2.021099 (0.3640), 1.550819 (0.4605), 2.895747 (0.2351) and 0.991242 (0.6092) with the values in the bracket being the p-values corresponding to the variables. However, the results indicated a significant joint influence of the

independent variables on the dependent variable with the Chi-sq and p-value of 16.89810 (0.0312) with the value in the bracket being the p-value.

These results conformed to the discoveries of Alemu and Jin-sang (2014), Adeyemi, Paul and Oluwatomsin (2013), and Mohammad (2007) who took investigation on the influence of exchange rate depreciation and other related topics on imports demand across the country and found a significant relationship between the two variables. However, the results negate the findings of Oloyede and Essi (2017), Ihuoma, Felix and Frances (2015), Oyovwi (2012), Komain (2013) and Nodir (2011) that conducted similar research and found the insignificant effect of exchange rate depreciation on imports demand in the countries concern. The exchange rate depreciation increases alongside the increase in imports demand of Nigeria because the economy has overtime, depended heavily on imports of goods and services, and hence, it lacks enough goods to engage in foreign trade in rder to benefit from large exchange rate depreciation. Thus, the result violates the theories of elasticity approach and absorption approach in Nigeria.

A serial correlation test was also conducted using A esidual Serial Correlation LM tests and the results indicate an LM-Stat value of 31.12360 while the p-value is 0.1850. Since the p-value of 0.1850 is greater than 5% critical value, the study rejects the hypothesis of there is serial correlation and concludes that serial correlation is not found in the model. More so, the normality test among the variables was also conducted via the application of A residual normality tests using the Jarque-Bera technique. The results indicate the Jarque-Bera value of 3.599815 and a p-value of 0.1653, which is greater than the chosen 5% critical value. Hence, the study concludes that the model is well specified in the study.

4.4   Policy Implications of the Results
The study examined the effect of exchange rate depreciation on import demand of Nigeria for the period 1981-2016 using the Toda- amamoto approach to ranger Causality (modified Wald) test. The estimation results showed evidence of unidirectional causality running from E C , DP, and FDI to TIMP while causality does not run between CPI and TIMP. Hence, it is estimated on the average that any economic policy that raised E C , DP and FDI by 1% will significantly affect the level of import demand of Nigeria. These imply that E C , DP and FDI lead to import demand in the economy and not the other way round.

3.   Conclusion and Recommendations
The study investigated the effect of exchange rate depreciation on the import demand of Nigeria from 1981 to 2016. The Toda- amamoto approach to ranger Causality (modified Wald) test was utilized in the analysis. Data obtained from the Central Bank of Nigeria (CBN) statistical bulletin on total imports (TIMP), exchange rate (E C), gross domestic product (DP), consumer price index (CPI) and foreign direct investment (FDI) were employed in the investigation. The stationarity test was conducted via the application of the Augmented Dickey-Fuller (ADF) unit root test. The results revealed that all the variables including TIMP, E C , DP, and CPI except FDI were non-stationary at level. However, the results showed that while DP and CPI were stationary at first differencing, TIMP and E C were stationary at second differencing with only FDI being stationary at level at 5% level of significance. The results of the Toda- amamoto approach to ranger Causality indicated that E C , DP, and FDI have significant effects on import demand (TIMP) of Nigeria while CPI has an insignificant effect on TIMP. Similarly, the results indicated that the joint influence of the explanatory variables (i.e. E C , DP, CPI, and FDI) on he dependent variable (i.e. TIMP) is statistically significant. However, the results also revealed that the variables such as TIMP, DP, CPI and FDI do not have a significant effect on E C in the economy in reversed form.

Thus, the study recommends that government should as a matter of facts, intensify efforts in its imports substitution policies through inward-looking; and imbibe exports promotion strategies via economic diversification in a view to promote exports level and reduce the level of imports dependency in the economy as exchange rate depreciation devaluation policy of the country have not helped to bring about the desired reduction in the imports demand dependency of Nigeria. It is in this way that exchange rate preciation will bring about increased exports which is a positive factor in the economic growth and development of the nation.

References
Adeyemi, A. O., Paul, O., & Oluwatomsin, M. O. (2013). Estimating the long run effects of exchange rate devaluation on the trade balance of Nigeria. *European Scientific Journal*, 9(25), 233-249.

Alemu, A. M., & Jin-sang, L. (2014). Examining the effects of currency depreciation on trade balance in selected Asian economies. *International Journal of Global Business,* 7 (1), 59-76.

Alexander, S.S. (1952). The effect of a devaluation on a trade balance. *I.M.F. Staff Papers*, 2(2), 263-278.

Akpansung, A. O. (2013). A review of empirical literature on balance of payment as a monetary phenomenon. *Journal of Emerging Trends in Economics and Management Sciences,* 4(2), 124-132.

BigBen, C. O. (2011). The impact of exchange rate variations on trade balance: Evidence from Nigeria. *JORIND*. 9(2), 393-403.

Bickerdike, C. F. (1920). The instability of foreign exchange. *The economics Journal*.

Dolado, J. J. & Lutkepohl, H. (1996). Making Wald tests work for cointegrated   A   Systems. *Econometric Review,* 15, 369-386.

Eichengreen, B. (2007). The real exchange rate and economic growth, commission on growth and development. *Working Paper 4*, World Bank.

Eze, O. M. & Atuma, E. (2017). An Empirical analysis of the impact of exchange rate devaluation on trade balance of Nigeria: ector error correction model approach. *Asian Journal of Economics, Business and Accounting,* 3(3), 1-15.

Hall, P., & Henry, M. (1989).Using cointegration analysis in econometric modeling. London: Practice Hall, Harvester Wheat Sheaf. Independence of   egression   esiduals. *Economics Letters,* vol.6, pp. 255-259.

Harris,   ., &   . Sollis, (2003). *Applied time series modeling and forecasting*. West Sussex: Wiley.

Ihuoma, C. E., Felix, A. E., & Frances, N. O. (2015). Exchange rate behaviour and trade balances in Nigeria: An empirical investigation. *International Journal of Humanities and Social Science*, 5(8), 71-78.

Johnson, H.   . (1967). *Towards a general theory of the balance of payments*. In International trade and Economic   rowth: Studies in pure Theory. Cambridge, Mass: Harvard University Press.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inferences on cointegration: with application to demand for money. *Oxford Bulletin of Economics and Statistic,* 52, 169-210.

Khaled, A. (2016). How Exchange   ate Influence a Country's Import and Export. *International Journal of Scientific & Engineering Research*, 7(5), 131- 139.

Kandil, M., Berument, H., & Dincer, N. N. (2007). The effects of exchange rate fluctuations on economic activity in Turkey. *Journal of Asian Economics*, 466 489.

Komain, J. (2013). Exchange rate uncertainty and import demand of Thailand. *Asian Economic and Financial Review*, 3(10), 1269-1280.

Levacic,   . &   ebmann, A. (1982).*Macroeconomics.* London, Macmillian Publishers Ltd, 89-100.

Lerner, A. P. (1944).*Economics of control: Principles of welfare economics*. The Macmillian Company. N.   .

Marshall, A. (1923). *Money, credit and commerce*. London, Macmillan.

Metzler, L. (1948).*The theory of international trade*. In Howard, S.E. (1984), ed., 1, a Survey of Contemporary Economics. Philadelphia: Blakiston.

Miles, M.A. (1979). The effects of devaluation of the trade balance and the balance of payments: some newresults*. Journal of Political Economy*, 87, 600-620.

Mohammad, A. (2007). Exchange rate response of import demand in Pakistan.*Sarhad Journal of Agriculture*, 23(4), 1182-1186.

Nodir, B. (2011). The exchange rate volatility and the trade balance: Case of Uzbekistan. *Journal of Applied Economics and Business Research JAEBR*, 1(3), 149- 161.

Oloyede, O., & Essi, D. I. (2017). The effect of exchange rate on imports and exports in Nigeria*. IIARD International Journal of Economics and Business Management,* 3(2), 66-77.

Okwuchukwu, O. (2014). Exchange rate and balance of payment: An autoregressive distributed lag (A   DL) econometric investigation on Nigeria. *IOSR Journal of Economics and Finance*, 4(6), 21-30.

Oyovwi, O. D. (2012). Exchange rate volatility and imports in Nigeria. *Academic Journal of Interdisciplinary Studies,* 1(2), 103-114.

Pesaran, M. H., &   . Shin (1999). An autoregressive distributed lag modeling approach to cointegration analysis. Chapter 11 in S. Strom (ed.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*. Cambridge University Press, Cambridge, (Discussion Paper version).

obinson, J. (1947). *The foreign exchanges. In essays in the theory of employment*. Oxford: Blackwell.

odrik, D. (2008). *The real exchange rate and economic growth: Brookings papers on economic Activity.* Fall 2008, ed. D. W.

Elmendorf, N. . Mankiw, and L. H. Summers, 365 412, Brookings Institution.

Safet, K. (2017). The effect of depreciation of the exchange rate on the trade balance of Albania. *Review of Economic Perspectives – NárodohospodářskýObzor*, 17(2), 141 158.

Staiger, . W. &Alan, O. S. (2010). Currency manipulation and world trade. *World Trade Review,* 9(4), 583 627.

Toda, H. . & amamoto, T. (1995). Statistical inference in vector autoregressions with possibly integrated processes. *Journal of Econometrics* 66, 225-250.