

# An Analysis of the Effect of Naira Devaluation on Nigerian Balance Of Trade

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## Abstract

*This study investigates the effect of naira devaluation on Nigerian balance of trade using time series data from 1986 to 2021. The study examined the long run and short-run equilibrium relationship between devaluation and trade balance over the study period. The study used unrestricted Vector Auto Regression (VAR), Co-integration and Vector Error Correction Mechanism (VECM) technique in the analysis of data. The variables currency devaluation (CDV), Export rate (EXPT), Import rate (IMPT) and Trade balance are found to be I(1) variables, while Interest rate (INTR) is found to be I(0) variables. Based on the VAR Co-integration test result, it indicates long-run equilibrium relationship among the variables. The error correction term was correctly signed and statistically significant. The estimates from the VAR model showed both positive and negative shocks running from naira devaluation to trade balance, export rate, import rate and currency devaluation based on the past and current values. The study concluded that, naira devaluation have positive and significant impact on trade balance of Nigeria. The study recommended that, Government should improve this indigenous innovation to meet up with international standard as a means to reduce dependence on import and encourage production of competitive goods and services, as export becomes cheaper after devaluation, it is expected that Nigeria as a country will immensely improve on its exported goods and increase the output of exportable goods which will leads to favorable balance of trade among others.*

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## 1.1 Introduction

Generally, currency devaluation is a deliberate downward adjustment of the value of a currency relative to another currency or standard currency (usually dollar), it is one of the tool of monetary policy to stabilize the economy most especially the less developed ones operating fixed exchange rate or semi fixed exchange rate. Currency devaluation is habitually triggered when there is a deficit in trade balance and balance of payment (BOP/BOT) with the 2016-2017 naira devaluation in Nigeria associated to shocks springing out from the declining oil price and external economic and financial shocks Okaro, (2017): Nwagu, et al (2022).

Affirmed currency devaluation to be an endogenous factor affecting economic performance generally, where the required factors to aid achieve its positive benefits are not available. Devaluation as a deliberate reduction in the value of the currency in a particular nation in relation to other currencies of nations partaking international trade within the framework of the fixed exchange rate to boost growth Momodu and Akani (2016 ).

One reason a country may devalue its currency is to combat trade imbalances and it is decided by the government issuing the currency and is the result of governmental activities. Devaluation causes a country's exports to become less expensive making them more competitive on the global market. This in turns means that imports are more expensive, making domestic consumers less likely to purchase them. By making domestic currency relatively cheaper (i.e. devaluation), local production and exportation of commodities are encouraged. This helps to enhance the level of output growth of the economy (Yioyio, 2015).

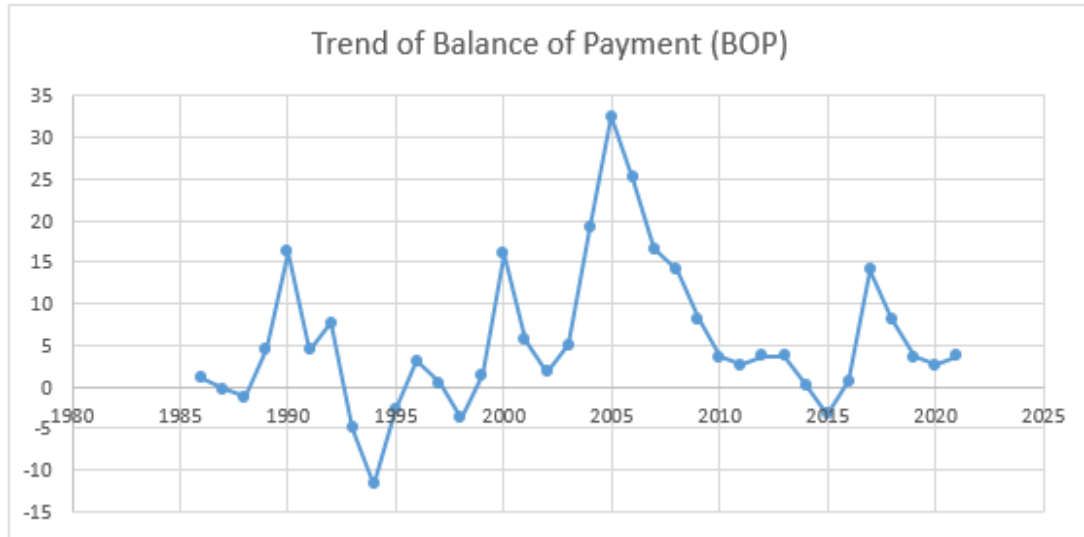
Every nation depends on international trade and payments, and the balance of payment reflects the performance of an economy in relation to the rest of the world. Devaluation has become inevitable in view of the recurring deficit in the balance of payments and as alternative policy option available to improve balance of trade Danmola et al (2013): Olakojo, et al (2021).

The Nigerian economy over the decade has been recognized to be a monocultural and oil-driven. With oil funding 95 percent of foreign earnings, 80 percent to GDP, an above 90 percent of total export valued at \$47.8 billion consequently placing Nigeria as the 49th largest exporter and import at \$39.5 billion placing Nigeria as the 53rd largest importer universally. Nigeria in the modern era is not immune from global economic and financial crisis. Nigeria, therefore, is currently trapped in the web of exchange rate volatility driving the adoption of devaluation as a feasible way out of the financial and economic quagmire Adekoya and Fagbohun (2016). Currency devaluation clinches to the fiscal policy which focal point on a calculated cutback in the value of the domestic currency to maximize gains in trade Aiya F (2014). Cooper, as cited in Momodu and Akani (2016) currency devaluation, is likewise reflected to be a shocking policy embraced by the government. Hence, most governments reject devaluation in line with their economic pattern. Devaluation occurs where there are trade and payment deficits, (Sibe, Nembo& Tafah, 2012): Olakojo, et al (2021).

### **Facts on Nigeria's balance of payment, Import and export**

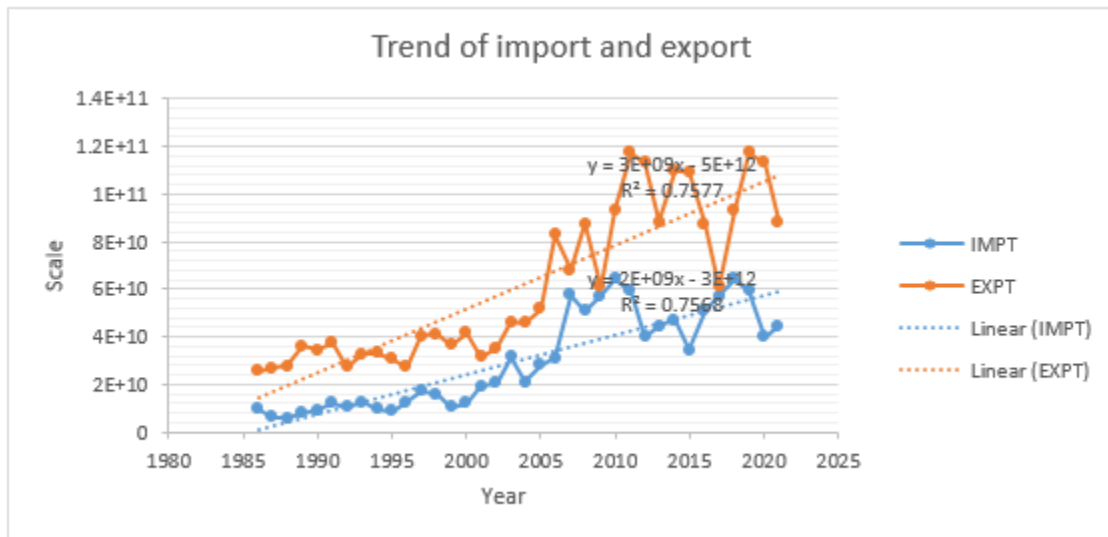
The Nigerian government is thus in dilemma of the effect of further devaluation of naira as the former CBN governor, Sanusi Lamido and some other renowned Nigerian economists are clamoring for it while others like Tella, Teriba and Utomi see this as no solution to the economic problem facing the country. Also in 2015, the Central Bank of Nigeria Governor, Godwin Emefelie announced the devaluation of the naira against the dollar with the aim of strengthening the currency (naira) in the course of the dwindling oil price (Osundiana & Osundiana, 2016): Okeke, et al (2020).

**Figure 1. Trend of Nigeria’s Balance of Payment**



**Figure 1** depicted the trend of Nigeria’s balance of payment from 1986 to 2021. From 1984 to 1985 Nigerian balance of payment is negative. This may be due to severe effect of unstable military government coupe from one another. However, Nigeria’s balance of payment attain its peak position of all time in 2005 where it started de-trending until 2015 up to the early stage of 2016 where it start trending upward. This may be as a result of post-election violence as well as the Boko haram insurgency particularly in the Northern Nigeria.

**Figure 2. Trend of Nigeria’s Import and Export**



From **figure 2** which depicted the linear trend of both Nigerian import and export. Nigeria recorded the lowest value of both import and export during 1999 to 2000. This may be as a result of transition from the military regime to the democratic regime. While they reached their peak point in 2010. In 2014 through 2015, Nigeria’s export and import faces challenges due to

political problems (Electoral violence) and insecurity. Finally, in the last phase of 2015 through 2016 both exhibit upward trend until the last phase of 2019 where it start declining. This may be as a result of covid-19 pandemic that generally affect global economy.

However, Devaluation is used to encourage exportation and discourage importation to correct unfavorable balance of trade by making home goods cheaper to foreign countries and foreign goods expensive in home country. Examining the economy of Estonia, Parts (2013) observed that external devaluation was not going to work for the economy rather, internal devaluation was adopts coupled with other fiscal policy measures and that is why she has quick recovery from the recent recession and its economy was in better shape than before the crisis. Estonia grew 22 per cent in 2010 and 25 percent in 2011. This is the result of rapid increase of high value-added exports by the manufacturing sector, which has also been the main job creator since the crisis. Indeed, export growth has been the main driver of Estonian economic recovery (parts, 2013, (Berry, 2012): Okeke, et al (2020).

In the early 1980's, the growth rate reduced, but from 1986, as a result of the structural adjustment program (SAP) and economic reforms, there was an improvement because the GDP increase at the rate of 4 percent. In 2013 to 2015 the GDP averaged 1.32 percent (Osundiana & Osundiana, 2016), (Rawlins & Praveen 1993).

Economic theory posits that devaluation will likely improve a nation's trade balance; however, there are different schools of thought with divergent explanations of how devaluation improves trade balance (Rawlins & Praveen 1993). Developing countries often face a major decision in reducing large trade deficits and in order to achieve this, they are faced with challenging policy decision of whether to devalue exchange rate or embark on internal/external debt financing. Empirical literature on developing and transition economies have established that currency devaluation will lead to improvement in trade balance in the long-run (Agbola 2004, Rawlins & Praveen, 2000; Musila and Newark, 2003; Okeke, et al (2020), Bahmani-Oskoee & Ratha, 2004).

The balance of trade problem has reached an unviable proportion and has become a binding constraint in the realization of the government objectives. It have been determine by a relatively poor non-oil performance, high import bill, stagnated agriculture, high taste for foreign goods and service continuous fall in the country's foreign exchange, inflationary pressure, inefficient manufacturing sector and mishandling of the oil boom.

The disequilibrium in the country's balance of trade have generated questions concerning the causes, its impact on social progress and what policies to adopt to achieve favorable balance of trade position. Therefore, the aim of this study is to examine and identify the determinants of disequilibrium in the balance of trade and the manner in which these determinants relates and process of correcting it; to examine the policies initiated by the federal Government of Nigeria aimed at correcting the balance of trade disequilibrium.

This study will be presented in five sections, the first section is the introduction, Facts on Nigeria's balance of payment, Import and export followed by the second section which discusses the literature being reviewed as well as theoretical framework. Section three discusses the methodology used in the study. Section four present the empirical result as well as their interpretations and discussion of major findings. Section five summarizes and conclude the study with necessary recommendation.

## **2.1 Literature Review and theoretical framework**

### **2.1.1 Conceptual Clarification**

Farhi, Gopinath and Itsokhoki (2012) define fiscal devaluations asset of tax policies that, together with adjustment in money supply, will result in the same real economic allocation (consumption, output and labour supply) as would be achieved by a nominal exchange rate devaluation. Argentina's has been devalued by 20% with the belief of the new developmentalist in export led economic growth with a greater role for the state than the neoliberal views on the basis of a devalued currency, lower wages and a relatively stable macro economy. They advocate for sound fiscal policy and recommend that government should operate surplus in order to curb inflation that may result from it, they believe that, bringing down the country's real exchange rate was inevitable and necessary to promote greater competitiveness and growth (Vernengo, 2014).

Whereas, the alternative views, based on the old structuralist school which emphasize structural constraint on economic growth and development, most especially developing country's need for income and wealth redistribution to promote domestic and the need overcome their subordinate position in the world economy to them, devaluation was inevitable and is not particularly good. First, it will be inflationary, since it will lead to higher price of imported goods, which include intermediate and capital goods needed for production, and might need to demand for higher nominal wage, once workers purchasing power fall. They said, devaluation might be contractionary, causing output to fall since lower real wage will lead to a contraction of demand, further, devaluation tend to favour exports, and benefit the agribusiness sector, by redistributing income towards groups with lower propensity to spend, so also contributing to the contraction of demand. In short, structuralist argue that the devaluation will worsen inflation, in this sense; devaluation will not solve any of the pressing problems. Currency devaluation does not create wealth but it distributes wealth across the boundaries of nation, state or currency zone regions (Ould May, 2003). International devaluation was used to combat financial crisis in Estonia because external devaluation was not an option to the economy and it help to solve unemployment problem and European debt crisis (Part, 2013)

The trade balance of a country is defined as the difference between the monetary value of its exports and imports over a certain period of time. A trade balance can be positive or negative. A trade balance can be positive (trade surplus) if the monetary value of a country's export is greater than its imports and negative (trade deficit) if the monetary value of its imports greater than its exports. Moreover, balance of payment is defined as a systematic record of economic and financial transactions of a country for a given period of time, say one year, between resident of an economy and non-resident of the world. These transactions involve the provision and receipt of real resources- goods, service and income- and change in claims on and liability to the rest of the world. Specifically, the balance of payments records the transaction in goods, services and income change in ownership and other changes in the economy's holding of monetary gold, Special Drawing Rights (SDRs) and claim on and liabilities to the rest of the world. It also records unrequited or unilateral transfers- the provision or receipt of an economic value without the acceptance or relinquishing of something of equal value Okeke, et al (2020).

However, Exchange rate can be described as the price of the domestic currency in terms of other currencies. There are two basic types of exchange regimes: floating exchange and fixed exchange rate. Floating regime is one where currencies are allowed to move freely up and down according to change in demand and supply. Thus, floating exchange rates changes freely and are determined by trading in the forex market. This is in contrast to a "fixed exchange rate" regime.

In the other hand, fixed exchange rate, sometimes called a pegged exchange rate, is a type of exchange rate regime where a currency's value is against either the value of another single currency, or to a basket of other currencies, or to another measure of value, such as gold. Fixed exchange rate is usually used to stabilize the value of a currency by directly fixing its value in a predetermined ratio to a different, more stable or more internationally prevalent currency (currencies). In doing so, the exchange rate between the currency and its peg does not change based on market conditions. This makes trade and investments between the two currency areas easier and more predictable, and is especially useful for small economies in which external trade forms a large part of their GDP.

In a fixed exchange-rate system, a country's central bank typically uses an open market mechanism and is committed at all times to buy and/or sell its currency at a fixed price in order to maintain its pegged ratio and, hence, the stable value of its currency in relation to the reference to which it is pegged. The central bank provides the assets and/or the foreign currency or currencies which are needed in order to finance any payments imbalances.

### **2.1.2 Effect of Devaluation on Nigerian Balance of Trade**

The effect of devaluation on the nation's economy as reported by Sahil (2015), Imimole & Enoma (2011), Ike (1984), Ozumba (1978) has been summarized into positive and negatives. The positive effect are;

- It makes home goods cheaper to foreign countries and foreign goods expensive in the home country. In this way deficit in the balance of payment is corrected; it brings equilibrium in the external and internal value of the currency. So the various imbalances in the economy are removed; it brings about increase in foreign aid since the international lending agency like the IMF, IBRD insists upon it, especially in the developing countries like India, Pakistan, and Nigeria. Foreign investors also feels pleasure to make the investment in those countries where the currency is devalued; it removes the uncertainty in the business circle there by increasing the rate of investment; and it encourages the inflow of remittances as nationals who are working abroad would prefer to send capital home, because they will get more value in terms of foreign currency while the negative effect are
- It is a temporary curve for the unfavorable balance of payment. Its effect are for the short period
- It create a problem for the consumer because a costly import leads inflation in the country
- It create the foreign debt burden in terms of the home currency. This is a big loss for a developing country like India, Pakistan, and Nigeria. Foreign debt becomes more difficult to service, and they reduce peoples' confidence in their currency; and it brings about competition in devaluation. If one country devalues other countries also follow this policy then the policy will become useless; it causes deterioration in terms of trade.

The upshot of these various consideration is that devaluation in developing countries is likely to be deflationary in the first instance, and thus may "make room" for any improvement in the balance on goods and services, without active reinforcement from monetary and fiscal policy (Cabellero & Krishnamurthy, 2000).

### 2.1.3 Empirical Literature

Adekoya and Fagbohun (2016) examined the impact of currency devaluation on manufacturing output growth in Nigeria between 1980 and 2014, employing Augmented Dickey-Fuller for stationarity test, Engel-Granger co-integration for long-run relationship, ordinary least square for long-run estimate and Granger causality test for causal relationships. The result revealed that all the variables are stationary at I (1) with a long-run relationship. It further showed that all the variables except import exert positive effect on manufacturing output growth.

Momodu and Akani (2016) investigated the impact of currency devaluation on economic growth of Nigeria. The Johansen Co-integration method was used for this analysis because the study involves the use of multivariate estimations. The result from the multivariate co-integration test shows that there is at least one co-integrating vector in the relationship between economic growth and the independent variables. This implies that a long run relationship exists among these variables. The autoregressive distributed lags (ARDL) approach is used for the ECM. The error correction mechanism result indicates that short term changes in economic growth may actually be sufficiently explained by currency devaluation and other factors selected in the model. They accepted the hypothesis of a significant short term relationship between economic growth and currency devaluation. The study shows that in the short run currency devaluation leads to increase in output and improves the balance of payments but in the long run the monetary consequence of the devaluation ensures that the increase in output and improvement in the balance of payment is neutralized by the rise in prices.

Nigeria's economic performance fluctuated over the study period, 1986 to 2021 for economic and political reasons. The trade deficit problem (without oil) that the Nigeria's economy face is the characteristic feature of Nigeria's balance of payment situation. One of the major works on the effect of devaluation on trade balances of a country was the work of Reinhart (1994); Okeke, et al (2020).. He examine the role of relative price in affecting trade. He came up with the following findings. The analysis suggests that in accordance with standard microeconomics theory, income and relative prices are both necessary and sufficient to pin down steady state trade flows. Relative price is found to be significant determinant of the demand for export and import. Even though relative price has a predictable and systematic impact on trade, price elasticity tend to be low and in most cases, will be below unity. Zaiden (1999) gave a suggestion that this type of result suggest that large relative price swings are required to have an appreciable impact on trade patterns. Industrial country income elasticities are above their developing country. This means that in a scenario of balanced growth, the developing country trade balance should improve.

However, according to Zaiden, this type of result does not hold for Africa, most likely because of the high primary commodity content of Africa export. The Jordanian economy was also investigated by Al-abdelrazag (1997) he investigated the impact of dinar devaluation on the trade balance for the period of (1969 to 1994). Al-abderazaq follow the elasticity approach to the balance of payment. His findings shows that devaluation did not improve the trade balance, simply because, the sum of demand elaticities for import and export is less than one.

Navaretti et al. (1997) also investigated the Cameroonian economy and they showed that the devaluation has major consequences; in particular for firm already involve in trade, firms increase their exports, while non-exporting firms were reluctant to incur the substantial cost

needed to enter the international market. Cost, according to them increase especially for importing firms. Akinlo (1996) investigated the effect of depreciation of the Nigerian economy between (1986-1991). When pointed out that when the massive depreciation of the naira during the adjustment is taken into consideration, the actual profit for all categories of industries fell precipitately. When compared with 1985 adjusted values, all categories of industries showed a significant increase. He conclude that negative relationship existed between the profit level of the manufacturing industries generally and the movement in the exchange rate. The higher the rate of exchange rate depreciation, the lower the rate of profit, and vice versa. He went further to tell us that the result tend to demonstrate that exchange rate constituted the major component of the manufacturing industries production process in particular and the economy at large in general.

Adeniyi et al (2011) attempted to query the existence or otherwise of J-Curve in four West African Monetary Zone (WAMZ) countries: namely The Gambia, Ghana, Nigeria and Sierra Leone. They used data from first quarter in 1980 of fourth quarter of 2007 and a bounds testing approach, with an autoregressive distributed lag (ARDL) methodology to co-integration in capturing the impact of devaluation on trade balance, domestic income and effective exchange rate in all countries. More importantly, the result seen to support the J-Curve hypothesis only in the case of Nigeria no exhibition of J-Curve pattern for Sierra Leone. Real devaluation policy with its attendant differential impact across countries implies that such policies should engender incentives that are compatible with the growth and development objectives of member states. Amojimiti and Akpokodje (2010) empirically compared the effect of exchange rate volatility on export of a panel of seven Communaute Financiere Africane (CFA) countries with that of nine non-CFA counterpart during the period 1986-2006. The GARCH model was utilized in generating exchange rate volatility series for this period. This series were then incorporated into an export equation and estimated using technique such as OLS, fixed effect, first difference GMM and the systems GMM equation. The system GMM technique, as shown in the result perform better than other estimation technique. It was found that exchange rate volatility negatively impact on the exports of both panels of countries with a larger effect on the panel of the non-CFA than on the CFA countries. They concluded on the need to take appropriate monetary and fiscal policy actions to stem the rising exchange rate volatility.

In Nigeria, a study carried out by Ojo (1978) on the effect of exchange rate on the country's trade balance suggested that exchange rate changes do not play any significant role in the explanation of Nigerian import-export balance. Rano-Aliyu (2010) quantitatively assessed the impact of exchange rate volatility on non-oil export flows in Nigeria, employing fundamental analysis where the flow of non-oil export from the Nigerian economy is assumed to be predicated on fundamental variable: the naira exchange rate volatility, the US dollar volatility, Nigeria's Terms of Trade (TOT) and index of openness (OPN). The co-Integration result revealed that non-oil exports and the fundamental variable had a stable long-run equilibrium relationship. With the use of quarterly data for a twenty-year period, it was shown from the vector co-integration estimates that the naira exchange rate volatility decreased non-oil sector by 3.65%, while the same estimate for the US dollar volatility increased export of non-oil in Nigeria by 5.2% in the year 2003.

Onafowora and Owoye (2008) examined the impact of exchange rate volatility on Nigeria's export to it most trading-partner-the United State using quarterly data from January 1980 to April 2001. They employed the co-integration and vector error correction (VECM)



framework. Empirical analysis point to the presence of a unique co-integrating vector in the long-run linking real export, real foreign income, relative export price and real exchange rate volatility. Also, increased volatility of the real exchange rate raised uncertainty about profit to be made which exert significant negative effect on export both in short and long-run. Their result show the improvement in the term of trade (represented by decline in the real exchange rate) and real foreign income exert positive effects on export activity. Most importantly, they found that the trade liberalization and economic reform policies implementation in the post-1986 structural adjustment period contributed to Nigeria's export performance. Overall, the findings suggest that Nigeria's exporting activities can be further boosted by policies aimed at achieving and maintaining a stable competitive real exchange rate.

Omojomite and Akpokodje (2010) investigated the effect of exchange rate reforms on Nigeria's trade performance during the period 1986- 2007. The study was carried out given the exchange rate reform (combined with trade policy reforms) under Nigeria's economic reforms programme which was anticipated to diversify the export base of the economy from oil to non-oil exports through competitiveness in the relative price of non-oil exports in addition to reducing imports, especially of consumer goods. It find a small positive effect of exchange rate reforms on non-oil exports when the value of the country's currency is reduced via depreciation. However, the structure of import which is pro-consumer goods remain unchanged even after the adoption of exchange rate reforms. Contrary to expectation, exchange rate reforms were found to stimulate imports rather than constrain it, even though in an insignificant manner.

Oyinlola et al (2010) examined the long-run impact of exchange rate and price changes on trade flow in Nigeria using exports and imports functions. The bounds testing (Auto regressive distributive lag model) approach to co-integration was applied on a quarterly data from 1980Q1 to 2007Q4. The result indicate that in the short run , Nigeria's trade flows are majority influenced by relative prices, domestic and foreign income, nominal effective exchange rate and the stock of external reserves,. It was also revealed from the result that in the long-run, devaluation is more effective than relative price in altering imports demand at both baseline and augmented models. In exports demand however, the reverse is the case.

Shehu & Youtang (2012) examined the causal relationship between exchange rate volatility (ERV), trade flows and economic growth of Nigeria which is consider as small open economy. The empirical study is based on time series data over the period of 1970-2009 applying time series econometrics methodology. The result indicate significant effects of ERV on trade flows in Nigeria. Their research finding supports preference for a flexible exchange rate regime over the fixed regime as it facilitates more trade flows to Nigeria. They recommended effective diversification of the Nigerian economy by encouraging more manufacturing firms' production output sufficient enough to meet the demand of both domestic and regional markets of West African followed by full implementation of floating exchange rate system.

While some studies have shown that currency devaluation will lead to improvement in the trade balance in the long-run (Gupta-Kapoor and Ramakrishnan, 1999), other studies have shown that exchange rate devaluation has had unfavorable impact on trade balance (Bahmani-Oskooee & Alse, 1994). Even when there is an observed favorable trade flow, the pattern that the trade balance follows in the short-run after devaluation is incoherent in some cases (Bahmani-Oskooee et al, 2001). This study is therefore intended to fill in the gap to the increasing debate on the subject of exchange rate and reforms, devaluation or deregulation on non-oil exports,

external sector performance or imports and exports separately. The distinguishing mark of this study therefore is the extension of time series data in determining the long-run relationship between exchange rate behavior and trade balances.

Though currency devaluation is one of the endogenous factors that do affect the economic performance of a Nation. Aigbnkhan (1991) observed that the macroeconomic performance in Nigeria started on a good note in the 1970s as the period coincided with end of civil war which necessitated the need for massive reconstruction activities. During this period, the total GDP grew at an average rate of 6.2%. The average figure hid the trend in the sectoral performance as the total GDP grew at the rate of 21.4% between 1970 and 1971. The growth in the total GDP during this period was mainly driven by petroleum as growth in this sector was 32.4% on the average with manufacturing sector growing at an average rate of 4.8% and agricultural sector actually declining at the rate of 2% on the average. The period also witnessed an upsurge in the demand for goods and services due to the reconstruction exercise and the increased salary and wages granted on the basis of the Adebbo commission's recommendation (The Adebbo commission recommend increase in salaries and wages was paid in December 1971) according to Ozumba (1978) this led to serious shortage of goods and services and upward movement in prices with the inflation rate rising to 14.9% on the average during this time.

Bahmani- Oskooee (1985) investigated the J-curve phenomenon for Greece, India, Korea and Thailand and found evidence in favor of the J-curve effect for all the countries export for Thailand. In particular, it took two quarters, four quarters and three for the trade balance of Greece, India and Korea deteriorate after devaluation. For Thailand, the trade balance at the onset improves for five quarters subsequent to a devaluation policy and thereafter deteriorated. Aiya (2014) assessed people's perception on the impact of devaluation of Nigerian currency on the performance of poverty alleviation programmes in Edo state Nigeria, using primary data and chi square statistical analysis, he found that currency devaluation limits the performance of poverty alleviation programmes in Edo state. He recommends that there should be proper funding of Poverty Alleviation Programmes because the devaluation of currency as often recommend by the Bretton Wood institution such as IMF and the World Bank has resulted in hyper inflationary trend in the economy. Devaluation is expansionary in terms of GDP since export increase more than the import according to Mundell-Fleming model but based on the result of Saibene et.al, (2012), they concludes that devaluation is contractionary for the countries with a large amount of debt dominated in a foreign currency whereas, amount of debt denominated in their own currency all things being al. they also assert that after sharp currency devaluation, the debt burden increases in real terms, leading to the following chain of events: firms' profit decrease, bank lending is constrained, and thus the amount of investment is sharply reduced, reducing also next period output. Because the question of determining optimal policy is very important for many economies in the world.

Farhi et al., (2012) considered the cases of producer and local currency price setting with some price stickiness, as the real effects of nominal devaluations depend on whether prices are set in the producer's currency or in local currency. Their model features two countries, home and foreign, the foreign with a passive policy of a fixed money supply. The home country can alter its money supply and also potentially use six different fiscal instruments to achieve the policy goal that mimics a nominal devaluation but maintains a fixed nominal exchange rate: import and export tariffs, a value- added tax (with border adjustment), a payroll tax paid by producers, and

consumption and income taxes paid by consumers. The authors consider various degrees of capital account openness: balanced trade (financial autarky), complete risk-sharing with Arrow-Debreu securities (securities that are paid in only one time period), and an arbitrary net foreign asset position. They found out that the two fiscal devaluation policies that mimic nominal exchange rate devaluations are: (1) a uniform increase in import tariffs and export subsidies and (2) a uniform increase in value-added taxes and a reduction in payroll taxes.

Siddig (2012) examined exchange rate devaluation in Sudan using computable general equilibrium. The paper reports the impact of devaluation on several economic indicators considering domestic commodity markets, the factors market and institutions. Responses of specific economic variables such as prices, household demand, welfare, and the balance of payment are used to describe the resulting equilibriums of the economy as a result of devaluations in the three scenarios. The results reveal that devaluation of the Sudanese pound will considerably increase most domestic commodity prices. This is desirable for producers who target the world market because their returns in the local devalued currency will tend to be higher. Accordingly, export oriented sectors, which have a larger share of exports in their total output, show the greatest increases in output and exports compared to other sectors. He concludes that, devaluation of Sudan's currency would increase domestic prices of tradable goods and encourage producers to export. However, domestic consumers are negatively affected because the increase in prices is unaccompanied by similar increases in household income. This could also lead domestic production to deteriorate at a certain point in time since the cost of intermediate inputs will also increase especially imported intermediate inputs. Therefore, devaluation would encourage producers of some sectors to increase output and exports, while it would hinder consumers to enjoy the previously cheaper imported and domestic commodities since domestic prices increase.

Newton (2013) while reviewing sterling devaluation between 1968 and 1970 explained the travails of the British labour government and that it took a year to convince people on the need for devaluation which paid off at last. Ould-Mey (2003) examined currency devaluation and resource transfer from southern (ex-colonized) to the Northern (ex-colonizer) countries and found that the resource transfer from the south to the North was contributed to by currency devaluation by devaluation of the export from the South and over valuation of modern exports. In a study conducted by Soukiazis, Cerqueira, & Antunes, (2013) on the effect of external and internal imbalances as well as role of relative prices on growth rate in Portugal found that currency devaluation is a stimulus to growth which is increasing the country's competitiveness in the foreign market.

Shin, & Greenwood-Nimmo, (2014). This paper develops a cointegration nonlinear autoregressive distributed lag (NARDL) model in which short- and long-run nonlinearities are introduced via positive and negative partial sum decompositions of the explanatory variables. We demonstrate that the model is estimable by OLS and that reliable long-run inference can be achieved by bounds-testing regardless of the integration orders of the variables. Furthermore, we derive asymmetric dynamic multipliers that graphically depict the traverse between the short-and long-run. The salient features of the model are illustrated using the example of the nonlinear unemployment-output relationship in the US, Canada and Japan.

## 2.2 Theoretical Framework

For the purpose of this study, the elasticity approach will be adopted (The reason being that the focus of the study Marshall-Lerner stabilization condition is based on elasticity approach). The elasticity approach focuses on the impact of relative price on the trade balances as pointed out by Husted and Michael (1995). The aim of devaluing a country's currency is to bridge the gap between the value of exports and that of imports. Devaluation will lead to a reduction in the net excess demand for foreign currency. Devaluation will reduce the foreign prices of the devaluing country's exports and increase the foreign demand for domestic products. The immediate effect of devaluation is to raise the price of imported goods, which will through one way or the other reduce the demand for imports. Elasticity approach to devaluation stipulates that the effect of devaluation on the trade deficit depends on the demand elasticity of imports and the supply elasticity of foreign goods. Changes in domestic proceeds from exports depend on the elasticities of foreign demand for export, from the country and on the elasticities of the domestic supply of exports.

However, any change in the foreign exchange rate will cause a change in the domestic proceeds of imported foreign goods. The relative price effect of the Nigerian naira devaluation is supposed to increase world demand for domestic goods and decrease domestic demand for imported goods. This works out perfectly if a country is a major producer of international goods that can compete effectively in the international market. In this case, demand will be shifted towards the country. But if it is a country that the bulk of the export is oil that is quoted in US\$ or if the goods are agricultural goods that are somehow price inelastic, change in the demand for a country that falls into this type of category might be very insignificant. Nigeria is one of the countries that falls into this type of category.

The Marshall – Lerner condition provides the analytical ground for the elasticity approach. This was proposed by Stern (1980). The Marshall – Lerner condition rests on several restrictive assumptions:

- Partial equilibrium provides the theoretical base, that is, it considers the effect of exchange rate variations on import and exports.
- It assumes that the price elasticity of supply at home and abroad both equal infinity
- It ignores the monetary effects of exchange rate variations.
- The Marshall – Lerner condition assumes an initial balance of trade. Some writers including Murray do not agree with some of the assumptions of Marshall – Lerner especially the first two assumptions as stated previously.

They believe that the elasticity of supply is expected to be less than infinity and this will dampen the effect of devaluation. This condition is stated as:

$$ex (nx - 1) + M nm (cm + 1) \Delta B = X \quad ex + nx \quad nm + cm$$

Where  $\Delta B$  = change in the trade balance;  $X$  = value of exports;  $M$  = value of imports;  $ex$  = home export supply elasticity;  $cm$  = foreign import supply elasticity;  $nx$  = elasticity of foreign demand for exports. And  $nm$  = elasticity of domestic demand for imports.

When  $ex = cm = \infty$  and  $x/m = 1$ ,

The Marshal Lerner Condition is reduced to  $nx + nm > 1$ .

Several economic theories posit that devaluation will most likely improve a nation's trade balance. However, there are different school of thought with divergent explanations of how devaluation improves or dampens a country's economic fortune.

Developing countries often face major decision in reducing large trade deficits and in order to achieve this, they are face with challenging policy decision of whether to devalue exchange rate or embark on internal/external debt financing. There are arguments whether a long-run relation exists between the trade balance and nominal effective exchange rate in Nigeria.

This study adopts an eclectic approach to the study of factors that affect trade balances and attempts to draw relevant from the conventional theories, such as those mentioned above. It then adopt these elements to deal with particular parameters within the economic system. An eclectic approach is imperative since no one theory is adequate to explain changes in trade balance in any given economy. More so, most developing countries such as Nigeria are characterized by structurally unique features that are often not addressed in any one of the conventional theories explain above.

### 3.0 Methodology

The effect of naira devaluation on Nigerian Balance of trade is analyzed in this research from the period of 1986 to 2021 using time series data. The theoretical model presents significant Effects of devaluation on Nigerian balance of trade.

#### 3.1 Sources of data

The effect of naira devaluation on Nigerian Balance of trade will be analyzed in this research from the period of 1986–2021 using time series data. The data will be obtain from Statistical Bulletins and Annual Report, Annual Abstracts of Statistics (various issues) published by National Bureau of Statistics (NBS), World Bank, World Development Indicator and Index Mundi.

#### 3.2 Method of data analysis

The study will employ the vector auto-regression (VAR) frame work which is made up of five variables; Trade Balance (TBC), Currency Devaluation (CDV), Interest Rate (INR), Import (IMP), Export (EXP).

##### 3.2.1 Model Specification

$$TBC = f(CDV, INR, IMP, EXP) \dots \dots \dots 3.1$$

Where:

TBC	=	Trade Balance
CDV	=	Currency Devaluation
INR	=	Interest Rate
IMP	=	Import
EXP	=	Export

The Unrestricted VAR model is adopted for this particular work because it has a forecasting power relative to large structural models. Again, one of the common virtues of VAR

is that it obviates a decision as to what contemporaneous variables are exogenous, all variables are endogenous, according to Ang and Mckibbin (2007), once distinguish between the short run dynamics and long – run causality. Also the VAR frame work all the variables as potentially endogenous as explained by Sims (1980).

This study seeks to examine the Effects of devaluation on Nigerian Balance of trade for a period of 1986 – 2021. The basic aim of our empirical estimation is to; first examine the long – run relationship among the CDV, INR, IMP, EXP and the level of TBC, Second, to evaluate the dynamics and causal relationship among these five variables use impulse response function and variance decomposition to examine how each variable response to shock by the other variables in the VAR framework. And to achieve this, a log form of VAR models with OLS regression will be adopted for this work.

#### **VAR Model:**

The VAR Model of order P can be expressed as follows:

REMIT determinants and remittance effect VAR model is specified as:

$$Y_t = m + A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + e_t \dots \dots \dots 3.2$$

Equation (3.2) specifies VAR (p) process, where  $Y_t$  is a 5 x 1 vector of variables and  $A_i$  ( $i= 1, 2, \dots, p$ ) are 5 x 5 matrices of coefficients,  $m$  is a 5x1 vector of constants and  $e_t$  is a vector of white noise error term.

#### **3.2.2 Description of Variables**

Nigeria being a developing economy, the variables that are important in terms of devaluation which will likely influence the nation’s growth including variables of economic growth subject to availability of data will be discuss below:-

**TBC:** The excess of visible exports over imports, Central Bank Statistical Bulletin (2010), (2015)

**INR:** The cost of credit which has to be paid for a 1-period loan, as a percentage of principal amount. Interest rate obtained from World Bank

**CDV:** decreasing the value of the country’s currency in terms of other currencies proxy by exchange rate depreciation (Exchange Rate obtain from National Bureau of Statistic)

**EXP:** Goods and services produced in a country and sold to non-residents. Export obtain from World Development Indicators

**IMP:** Goods and services brought by residents of a country but provided by non-residents. Import obtain from Index Mundi

#### **3.2.3 Estimation techniques**

For each model (specified above), the study will use the time series data. Such data will be subjected to different test. Empirical work based on time series data assumes that the underlying time series is stationary. Therefore, tests for stationarity, cointegration, granger causality test, model specification tests will be conducted.

#### **3.2.4 Unit root test**

The first step involves testing the order of integration of the individual series under this consideration. Researchers will develop several procedures for the test of order of integration. The most popular ones are Augmented Dickey-Fuller (ADF) test due to Dickey and Fuller

(1979, 1981), and the Phillip - Perron (PP) due to Phillips (1987) and Phillips and Perron (1988). Augmented Dickey-Fuller test relies on rejecting a null hypothesis of unit root (the series are non-stationary) in favor of the alternative hypotheses of stationary. The tests are to be conducted with and without a deterministic trend (t) for each of the series. The general form of ADF test is as in the following regression.

$$\Delta Y_t = \alpha_0 + \alpha Y_{t-1} + \sum_{\alpha \Delta} Y_{t-1} + \varepsilon_t \dots\dots\dots (3.3)$$

$$\Delta Y_t = \alpha_0 + \alpha_{1t} + \alpha_2 Y_{t-1} + \sum \alpha_3 \Delta Y_{t-1} + \varepsilon_t \dots\dots\dots (3.4)$$

Where:

Y is a time series, t is a linear time trend,  $\Delta$  is the first difference operator,  $\alpha_0$  is a constant, n is the optimum number of lags in the dependent variable and  $\varepsilon$  is the random error term; the difference between equation (3.3) and (3.4) is that the first equation includes just drift. However. The second equation includes both intercept and time trend.

### 3.2.5 Co-integration test

The second step is the testing of the presence or otherwise of cointegration between the series of the same order of integration through forming a cointegration equation. The basic idea behind cointegration is that if, in the long-run, two or more series move closely together, even though the series themselves are trended, the difference between them is constant. It is possible to regard these series as defining a long-run equilibrium relationship, as the difference between them is stationary (Hurlin, and Henry, 1989). A lack of cointegration suggests that such variables have no long-run relationship: they can wander arbitrarily far away from each other (Dickey et.al, 1991).

As in the situation where a unit root test for stationarity shows that some of the variables are to be stationary at their level and some to be stationary at their first difference. This case requires to test whether the variables have a long run relation or not; i.e. conducting the co-integration test. To test for co-integration among the variables for analyzing the determinants of Trade Balance and its effects on the economy. There are different co-integration tests that are used by different researchers. Out of these testing instruments, the two steps Engle and Granger (1987) approach and the Johansen test (Johansen, 1988) method are some of the different instruments that are repeatedly used by different researchers.

The major advantage of the Johansen method is that it allows estimation of multiple co-integrating vectors where they exist. However, the application has its own pre request that the targeted independent variables are all expected to be stationary at their first difference of the ADF and PP tests. Meaning, estimations that are under taken with the presence of a combination of different level stationary series under the Johansen procedure may lead to biased results. The other problem associated with these instruments is that, the Engle -Granger method and the Johansen procedures are not reliable for relatively small samples (Bryan, 2004).

This approach tests for the existence of a co-integration relationship among the independent variables that can be applied regardless of whether the targeted variables are a combination of stationary series at a level and at first difference also the approach reconstructs the ARDL model through overcoming the problems associated with the presence of a combination of stationary variables at different level which are not possible in Engle and Granger and the Johansen approaches (Narayan, 2004). The second advantage with this approach is that, unlike the Engle-Granger method and the Johansen procedures; the bound test can give us reliable estimates in studies with small observations, (Narayan, 2004 and Harris, 2003). Third it reduces serial

correlation and endogeneity problems and provides unbiased estimates of the long run and short run model and valid t-statistics (Harris, 2003). Fourth, in its estimation, bound test can use OLS to identify the long run and short run effects simultaneously (Narayan, 2004 and Harris, 2003). The general form of ARDL model / ARDL bound test is specified as follows.

$$Y_t = \beta_0 + \sum \beta_i Y_{t-1} + \sum \beta_j X_{t-1} + \dots + \sum \beta_p X_{t-p} + e_t \dots \dots \dots 3.5$$

Where  $\beta$  is constant,  $Y_t$  is endogenous variable,  $X_t$  the 1<sup>st</sup> at period  $t^{th}$  independent variables,  $P$  is the maximum lag number to be used,  $\beta_i$  and  $\beta_j$  are coefficients of the independent variables, and  $e_t$  is the white noise error term.

Therefore, our first models (3.1) will become

$$TBC = f(CDV, INR, IMP, EXP) \dots \dots \dots 3.6$$

Explicitly the above equation can be stated as

$$LnTBC = \beta_0 + \beta_1 LnCDV + \beta_2 LnINR + \beta_3 LnIMP + \beta_4 LnEXP + \epsilon \dots \dots \dots 3.7$$

### 3.2.6 Vector Error Correction mechanism

After testing for the co-integration relationship and co-integration is proven to exist between the variables, then the third step will require a construction of an Error Correction Mechanism (ECM) to model the short run dynamic relationship. The reason behind ECM is to indicate the speed of adjustment from the short-run equilibrium to the long-run equilibrium state. The greater the co-efficient of the parameter, the higher the speed of adjustment of the model from the short-run to long-run equilibrium. In addition to that in order to separate the short run and the long run effects, a Vector Error Correction Model (VECM), is included in the equation. VECM is the residual obtained from the dependent variable of the equation; i.e. TBC.

## 4.0 Result and Discussions

### 4.3 Unit Root Test Result

The variable of interest are the Log of currency devaluation(LCDV), Log of import rate(LIMPT), Log of export rate(LEXPT) Log of interest rate(LINTR) Log of trade balance(LTBC) were subjected to a unit root test in order not only to determine the stationarity condition of the variables, but to ascertain their order of integration. The augmented Dickey-Fuller test has been employed for the purpose of the Unit root test. The log of some of these variables were found to be non-stationary at level but stationary at first difference while interest rate is stationary at level.

This indicate that log of TBC, Log of EXPT, Log of IMPT, & Log of CDV are integrated of order one i.e. they are 1(1) variables and Log of INTR is integrated of order zero i.e. 1(0). The ADF Test statistics for Log TBC, Log CDV, LOG EXPT, LOG IMPT and LOG INTR are -4.396(0.0017), -3.576(0.0125), -5.890(0.0000), -5.022(0.0003) and -3.144(0.0335) respectively where the value in parenthesis are their respective probability value which indicate that the null hypothesis of a unit root can be rejected at the 5%. The variables LTBC, LCDV, LEXPT, and LIMPT are non-stationary at level while LINTR is stationary at level therefore the null hypothesis of LTBC, LCDV, LEXPT & LIMPT will be accepted and LINTR null hypothesis will be rejected.]



**Table 4.1: ADF UNIT ROOT TEST**

Variables	ADF Stat	5% Critical Value	Probability Value	Status	Order of Integration
At Level Variables					
LTBC	-1.489037	-2.963972	0.5253	Non-Stationary	Unknown
LEXPT	-1.967735	-2.960411	0.2987	Non-Stationary	Unknown
LIMPT	-2.363919	-2.976263	0.1608	Non-Stationary	Unknown
LCDV	-0.552474	-2.963972	0.8668	Non-Stationary	Unknown
LINTR	-3.144709	-2.960411	0.0335	Stationary	1(0)
AT FIRST DEFERENCE					
LTBC	-4.396508	-2.967767	0.0017	Stationary	1(1)
LEXPT	-5.890294	-2.963972	0.0000	Stationary	1(1)
LIMPT	-5.022004	-2.963972	0.0003	Stationary	1(1)
LCDV	-3.576785	-2.963972	0.0125	Stationary	1(1)
LINTR					

**Source:** Authors computation using E-view 10

#### 4.4 Vector Auto-regression (VAR)

##### 4.4.1 Lag Selection Criteria

The choice of the lag length is a critical part of empirical research based on the Vector Auto Regression Lag (VAR) model since all inferences in this model hinge on correct model Specification. The process requires that the choice of deterministic variable and maximum Lag length (K) be such that to prevent serial correlation in the disturbance process as shows in the table below.

Based on the order selection criteria given in the table above, three lags have been selected for the estimation of the VAR Model. The selected lags are based on Akaike Information Criteria Test Statistic, the residual diagnostic test given in the table has been done to ensure that we are dealing with the right lags

**Table 4.2 Result of Residual Diagnostic Checking**

	VAR Residual Normality Test		
Chi-Square	DF	Probability	
315.6500	300	0.2562	
	VAR Residual Normality Test		
Component	Jarque-Bera	DF	Probability
Joint	100	10	0.0000
	VAR Residual Serial Correlation Test		
Lags	LM Statistic	Probability	
1	47.42988	0.0044	
2	42.54010	0.0157	

3	39.45912	0.0331
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Residual diagnostic check test has been conducted for the lags selected to ensure that the selected lags are free of serial correlation and to ensure that the residual of the selected lags are normally distributed. However, the test for heteroscedasticity indicates 315.6500 with the probability value of 0.2562 which makes it impossible to reject the null hypothesis of heteroscedasticity. Jarque-Bera test for the normality of the residuals indicates that probability value is 0.0000 which is less than one hence, this means that the residuals are normally distributed and good for VAR analysis

Therefore, as shown in the table above we accept the null hypothesis of no serial correlation at all lags at 5% given in the LM Statistics and the probability value of less than 0.05.

#### 4.4.1 Vector autoregression (VAR)

However, integrating VAR estimate is not always appealing while the main reason why impulse response function and variance decomposition are most appropriate way of explaining VAR result. Using the past values of the variables of interest, we should be able to tell something about the current values, this is little what can be obtained from VAR.

**Table 4.3 Vector Auto regression Estimation Result**

Regressor	D(LTBC)	D(LEXPT)	D(LIMPT)	D(LINTR)	D(LCDV)
Regressor					
D(LTBC)(-1)	0.869550 [4.72046]	2.861852 [1.75214]	0.720596 [0.88126]	2.04E-10 [1.32048]	-1.15E-12 [-2.31821]
D(LTBC)(2)	-0.232527 [-0.83446]	-2.515536 [-1.01811]	1.960547 [1.58501]	-1.26E-11 [-0.39581]	-1.77E-12 [-2.34646]
D(LEXPT)(1)	0.076565 [2.88496]	0.035328 [0.15013]	-0.194488 [-1.65091]	3.00E-11 [1.34635]	2.02E-13 [2.81251]
D(LEXPT)(2)	0.086001 [1.61148]	-0.187338 [-0.39589]	-0.377084 [-1.59176]	-6.84E-11 [-1.52687]	-3.56E-13 [-2.47236]
D(LIMPT)(1)	0.137372 [2.62358]	1.687693 [3.63514]	0.741739 [3.19130]	5.81E-12 [0.13214]	-5.45E-13 [-3.85204]
D(LIMPT)(2)	0.188141 [2.25839]	-0.314721 [-0.42606]	0.491434 [1.32893]	-6.82E-11 [-0.97485]	1.23E-14 [0.05482]
D(LINTR)(1)	-8.01E+08 [-3.55358]	7.26E-08 [0.36323]	-1.27E+09 [-1.26416]	0.496820 [2.62336]	8.48E-05 [0.13922]
D(LINTR)(2)	3.79E+80 [1.62240]	-5.19E+08 [-0.25035]	1.86E+09 [1.78861]	0.150944 [0.76893]	0.000263 [0.41700]
D(LCDV)(-1)	1.39E+10 [2.14786]	5.97E+11 [1.04272]	2.66E+11 [0.92844]	69.77078 [1.28638]	0.479250 [2.74773]
D(LCDV)(-2)	-1.04E+10 [-0.24754]	-6.45E+11 [-1.73816]	8.87E+10 [0.47735]	-102.2077 [-2.90587]	-0.237564 [-2.10034]
Interrupt©	-5.30+10 [-2.87240]	2.09E+10 [1.27663]	1.47E+10 [1.79200]	4.444671 [2.86645]	0.007487 [1.50149]
Fit measure					
R2	0.970391	0.781410	0.842377	0.625690	0.992993
R2	0.954808	0.666362	0.759418	0.428685	0.989305
S	46.57903	50.94366	49.55985	4.783617	-6.695765

**Sources:** Authors Computation using E-view 10

Based on the result in table 4.3 past values of LTBC have positive impact on its current value with the exception of its second lag value impacted negatively, the past value of LEXPT, LIMPT, LINTR and LCDV have positive influence on the current value of LTBC with the exception of first lag value of INTR and second lag value of LCDV impacted negatively. The past value of LTBC has positive influence on the current value of LEXPT with the exception of its second lag value impacted negatively similarly first lag value of LEXPT, LIMPT, LINTR and LCDV have positive influence on current value of LEXPT with the exception of second lag value of LEXPT, LIMPT, LINTR and LCDV which appears to have negative influence on LEXPT. The impact of LTBC and LCDV on current value of LIMPT is positive, the past value of LEXPT has negative influence on the current value of LIMPT, also LIMPT appears to exert a positive influence on its current value, LINTR has positive influence on current value of LIMPT with the exception of its first lag value appears to be negative.

The past value of LTBC has positive influence on the current value of LINTR with the exception of its second lag value which is negative. However, the past value of LEXPT, LIMPT and LCDV have positive influence on current value of LINTR with the exception of second lag value of LEXPT, LINTR and LCDV which impacted negatively however past value LINTR, has positive impact on its current value. The past value of LTBC has negative influence on the current value of LCDV and past value of LEXPT has positive influence on current value of LCDV with the exception of its second lag value impacted negatively. The past value of LIMPT has negative influence on the current value of LCDV with the exception of its second lag value impacted positively and the past value of INTR has positive influence on the current value of LCDV while past value of LCDV has positive influence on its current value with the exception of its second lag value impacted negatively.

#### 4.5 Correlation Matrix

**Table 4.4**

Variables	LTBC	LEXPT	LIMPT	LINTR	LCDV
LTBC	1.0	0.79072	0.79755	0.32053	-0.86548
LEXPT	0.79072	1.0	0.85038	0.23456	-0.62092
LIMPT	0.79755	0.85038	1.0	0.16695	-0.65589
LINTR	0.32053	0.23456	0.16695	1.0	-0.36530
LCDV	-0.86548	-0.62092	-0.65589	-0.36530	1.0

**Source:** Authors Computation using E-view 10

Based on the result of correlation matrix, it can be observed that Trade Balance (TBC) has positive relationship with Export Rate (EXPT) similarly it has positive relationship with Import Rate (IMPT) and Interest Rate (INTR) but has negative relationship with Currency Devaluation (CDV). The variable Export Rate (EXPT) has positive relationship with Import Rate (IMPT), Trade Balance (TBC) and Interest Rate (INTR) but negative relationship with Currency Devaluation (CDV). However, the variable Import Rate (IMPT) has positive relationship with Trade Balance (TBC), Export Rate (EXPT) and Interest Rate (INTR) but negative relationship with Currency Devaluation. Furthermore, the variable Interest Rate has positive relationship with all variables Trade Balance (TBC), Export Rate (EXPT) and Import Rate (IMPT) except Currency Devaluation which has negative relationship with interest rate. Lastly, Currency Devaluation has negative relationship with Trade Balance, Export Rate, Import Rate and Interest Rate.

#### 4.7 VAR Co-integration Analysis

Since four(4) out of the five variables are not stationary at level, VAR Co-integration test was conducted to determine the possible long run relationship among the variables of interest in this study as presented in the table below

**Table 4.5 VAR Co-integration Test (Unrestricted Cointegration Rank Test (Trace))**

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Probability
<b>None*</b>	0.147138	4.297237	3.841466	0.0382

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

VAR Co-integration test shows that the trace statistics one co-integration equation(s) at 5% level of significance, therefore, there is long run equilibrium relationship among Trade balance(TBC) Proxy by BOP, Export rate(EXPT), Import rate(IMPT), Interest rate(INTR) and Currency devaluation(CDV) in Nigeria from 1986 to 2021.

#### 4.8 Vector Error Correction Mechanism (VECM)

Having establish the existence of the equilibrium relationship among the variables by the result of co-integration at 5% level of significance, the error correction modelling was undertaken to examine the speed of adjustment and to examine the short run dynamics and long run equilibrium, however Error Correction is a means of reconciling the short run behavior of the economic variables with its long run behavior or value (Babalola, 2011). Vector Error Correction Mechanism (VECM) allow the term behavior of the endogenous variables of interest to converge to long term equilibrium , while allowing wide range of short terms dynamics (Yinusa and Akinlo, 2008). The purpose of VECM is that it combines long run equilibrium relationship between them.

However, with short run adjustment process because when two or more variables are co-integrated then there exist a long run equilibrium relationship between them, hence, here may be disequilibrium in short run. However, our VECM regression is seen as the “equilibrium error” which is used to capture the disequilibrium and the speed of adjustment toward equilibrium level. The coefficient of Vector Error Corretion Mechnism (VECM) or adjustment parameter which reflect he speed of adjustment towards equilibrium is expected to be negative to restore the equilibrium (Gujarati and Porter, 2009) if the parameters is positive it means that the variable is above its equilibrium level. It is essential to note that the close the value of VECM parameters to -1 (minus one), the faster the adjustment towards the equilibrium level while the faster away the value of the adjustment parameter from -1 (minus one) the slow the speed of adjustment toward equilibrium level

**Table 4.6 Summary of VECM reduced from the result**

Error Correction:	D(LBOP)	D(LEXPT)	D(LIMPT)	D(LINTR)	D(LCDV)
CointEq1	-0.023174	-0.42265	-0.174834	0.104496	0.000151
	(0.16067)	(1.8E+08)	(1.6E+08)	(0.02489)	(0.00015)
	[-0.14423]	[ 2.32671]	[-0.11012]	[ 4.19886]	[ 1.00297]
C	1.055234	4.24E+09	5.66E+08	0.470727	-0.001053
	(2.19500)	(2.5E+09)	(2.2E+09)	(0.33998)	(0.00205)
	[ 0.48074]	[ 1.71094]	[ 0.26089]	[ 1.38457]	[-0.51231]
R-squared	0.308405	0.734718	0.397160	0.750112	0.755380
Adj. R-squared	-0.198764	0.540178	-0.044922	0.566860	0.575992
S.E. equation	8.690590	9.82E+09	8.59E+09	1.346070	0.008135
F-statistic	0.608091	3.776690	0.898386	4.093345	4.210867

Source: Author's computation using E-view 10

Based on the result of the Error Correction Mechanism presented in table 4.15 The result shows that about 2% of short-run disequilibrium has been corrected by Trade Balance (TBC) annually though it is statistically significance in correction for the deviations from the long-run relationship, meaning that the adjustment process takes a shorter time to converge towards equilibrium in the long-run. Export rate (EXPT) have adjusted for the deviation from the long term path by positive and statistically insignificant at 5% level of significance, Import Rate (IMPT) being negative also correctly signed and statistically significance at 5% in correcting error or deviation in the long-run relationship between Trade balance and other endogenous variables in the system and INTR are correctly signed (being negative) and CDV as well is correctly signed also statistically insignificant.

In general, the result indicates that Trade balance and Import rate adjust to the deviations in short run disequilibrium within the annual period, unlike Export rate, Interest rate, Currency devaluation which show absence of convergence to the equilibrium path, hence longer adjustment process or lower speed of adjustment

The R -square ( $R^2$ ) suggest that all the endogenous variables in the model have explained 30%, 73%, 39%, 75%, and 76% of the total variation in Trade Balance, Export rate, Import rate, Interest rate and Currency devaluation in Nigeria from 1986 to 2021 but the Standard Error (SD) for Trade balance, Export rate, Import rate is consistently high with except for Interest rate and Currency devaluation which is very low (1.3 and 0.0).

## 5.0 Conclusion and Policy recommendations

This study examined the effect of naira devaluation on Nigerian balance of trade using time series data from 1986 to 2021. The variables used in this study are balance of payment proxies for Trade balance (TBC), export rate (EXPT), import rate (IMPT), interest rate (INTR) and currency devaluation (CDV). The study employed the use of unrestricted vector auto-regression (VAR) because it has the forecasting power relative to large structural models. The VAR cointegration technique was used to test for long run relationship between naira devaluation and balance of trade whereas VAR granger causality test was used to established the direction of causality between naira devaluation and trade balance. The effect of shocks has also been explored using impulse response function and variance decomposition. The result of unit root test in table 1 indicate that, trade balance, export rate, import rate and currency devaluation

are non-stationary at level that is they are I(1) variables. Whereas, interest rate appear to be stationary at level, that is they are I(0) variables.

The result of vector autoregression indicates that Trade Balance (TBC) have positive impact on its current value. This implies that the past value of trade balance has positive influence on its current values. This means as the past values of TBC decreases, the present values increases. However, the past value of EXPT, IMPT and CDV have positive influence on the current value of TBC, this signifies that as past values of EXPT, IMPT and CDV increases, so also the current value of TBC increases which means there have positive relationship while the past value of INTR have negative influence on current value of TBC, this means as the past value increases the present value decreases.

The cointegration test indicates that, existence of long run equilibrium relationship between Naira devaluation and Trade balance. The result show that, the variables examined are cointegrated and hence share a common linear trend. In the framework of error mechanism given in table and there is long run relationship between the variables and there is a valid error correction. Therefore, the ARDL model showed that, the study concluded that naira devaluation have positive and significant impact on Nigerian balance of trade over the period under study.

Therefore, the study concludes that, for the economy to benefit from the devaluation of the domestic currency, efforts should made to diversified the economy from monoculture economy and develop other sectors of the economy that can contribute positively to the national development. The issue of instability in world oil market couple with the crisis in the oil producing area in the country seriously affects the volume of revenue accrued to the country.

Therefore, for naira devaluation to be effective to the Nigeria's trade balance our fiscal and monetary policies need to be active and respond to the realities of the economy. The more competitive manufacturing sector is will reduce the cost of production and raise the volume of output. But the problem identified from the study is that the nation's productive and manufacturing capacity is very low to cater for need of the society and engage Nigerians in productive ventures. the government should concentrate on policy that would standardized and raise money supply to the real sector which has the tendency to increase volume of goods available for exports and reduce demand for imported goods.

However, the VAR model showed that devaluation have positive and significant impact on Nigerian trade balance over the period under study. Therefore, the study concluded that devaluation have positive and significant impact on Nigerian trade balance has indicated by the Vector auto regression Model (VAR) coefficient of T-statistics also the research indicates that naira devaluation have positive impact on current value of export rate (EXPT) which implies that when naira is devalued so also export rate increases vis-à-vis.

The result of the Vector auto regressive (VAR) model showed that, devaluation has positive and significant impact on the Nigerian economy. The result of cointegration suggest that there is a long run relationship between devaluation and Nigerian trade balance. Since naira devaluation has positive and significant impact on Nigerian balance of trade, policies that will enhance balance of trade should be pursued. To achieve this, government should focus on:

Nigeria as a country needs to step up its productive capacity to meet up with the international standard in producing competitive goods and services needed both locally for domestic consumption and abroad for export to other countries. The recent African Continental Free Trade Agreement (AFCFTA) is a pointer to this fact. Since Nigeria have its indigenous innovations which requires upgrading to meet up with the international standard, then as a means

to reduce dependence on import, government should expand this indigenous innovations to a quality grade/level. However, the most critical problem that plunged Nigeria into the economic crisis that resulted to the recent depreciation of the Naira is the sole dependence on oil as a source of revenue for the country. Nigeria should learn from this and diversify the economy as part of effort to halt the possibility of the same problem occurring in future.

### **Suggestion for Further Study**

Based on this research outcome it is of paramount important to suggest further area of study in order to keep academic research flowing. Therefore, the researcher recommends if possible to investigate the impact of naira devaluation on trade balance of developing countries using panel data.

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