



## External Debts, Balance Of Payment and External Reserves —the Interrelationship in Nigeria.

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### Abstract

The study examined the interrelationship of external debt, balance of payment and external reserve in Nigeria utilizing yearly data from 1990 to 2021 sourced from World Bank Development Indicators, Debt Management Office and Central Bank of Nigeria Statistic. Incorporating exchange rate, gross domestic product and inflation rate as control variables, the method of analysis adopted was the vector autoregressive (VAR) technique and granger causality test. The findings reveal that external debts had a negative significant impact on external reserves while external reserves had a negative insignificant impact on external debts. Balance of payments had a positive insignificant impact on external reserves while external reserves had a negative insignificant impact on balance of payments. On the other hand, the granger causality revealed the presence of independent causality between external debts and external reserves and balance of payments and external reserves while a unidirectional causality runs from external debts to balance of payments. Major policy recommendations include that external debt should be contracted solely for productive economic reasons; the need to improve balance of payments through diversification of the economy and indicative planning by the federal government and thirdly, the Central Bank of Nigeria (CBN) should ensure an effective official multiple exchange rate system in Nigeria, with one exchange rate for the importation of luxury goods and the other for the importation of necessary and production-enhancing machinery or equipment.

**Keywords:** External Debts, Balance of Payment, External Reserves, Special Drawing Rights.

### I. INTRODUCTION

Over time, developing nations that have implemented effective policy measures to enhance their balance of payment positions, manage external

reserves, and handle external debt with the international community have ultimately transitioned into developed countries (Malik & Fardous, 2020). Notable examples include emerging Asian economies like South Korea, Singapore and China, which have successfully employed sound policies and strategies to effectively manage their balance of payments, external reserves, and external debt, leading to remarkable economic growth (Bank of Korea., 2020; IMF, 2020). Similarly, in Africa, countries like Mauritius and Rwanda have partly achieved substantial development and attained high-income status by proficiently managing their balance of payment positions, external reserves, and external debt through the implementation of effective policies, economic diversification, and strong governance (World Bank, 2020).

In the context of Nigeria, external reserves have witnessed a continuous rise since independence, with agriculture playing a significant role in its reserve accumulation (Akpan, 2016). However, with the discovery of oil and the bountiful experience during the global oil boom in the 1970s, the Nigerian economy became susceptible to oil prices. In the late 1990s, the Nigerian government experienced substantial growth in its external reserves surging from USD 4.98 billion in May 1999 to USD 59.37 billion by the end of the first quarter in 2007 (Nteegah & Okpoi, 2017) while balance of payment drifted from deficits to surplus as well as a reduced external debt due to debt forgiveness from US \$20477.97 million to US \$3544.49 million in 2006 (CBN statistical bulletin, 2021). Following the global economic crisis in 2008 and other subsequent events till this moment, Nigeria has witnessed more balance of payments deficits since 2009, increasing external debts and external reserves increasing at a decreasing rate (Adelegan & Abraham, 2022). According to Osadume (2021), this has been the trend between external reserves, balance of payments and external debts in Nigeria when an economic boom or burst occurs resulting from oil



price fluctuation. This is because the stock of assets in a country's foreign currency has a strong relationship with its balance of payment conditions and external debt (Rahim et al., 2019).

Although theoretically and empirically, the basic philosophy is that proper management of external debts, favourable balance of payment and external reserves should induce external balance in an economy. This is a visibly opposing feature for the Nigerian economy which from the trend of external debts, balance of payment and external reserves show that the economy is at a dire state. Despite implementing various reserve management policies and strategies, such as an autonomous exchange rate market, inter-bank foreign exchange market, and debt management initiatives, Nigeria has not been successful in achieving efficient reserve and debt management, as well as improving the balance of payments. This is evident from Nigeria's declining international ranking in terms of external reserves, ranking 46th out of 194 countries in 2021 compared to 24th in 2008 (IMF, 2022). According to World Bank statistics (2021), Nigeria's external reserves have not exceeded \$53 billion since 2008, while external debts have risen to approximately \$76 billion in 2021. These figures indicate a lack of significant productive investments and economic advancement, while the balance of payments has consistently shown negative values, with a high deficit of 1,150,132.58 million naira in 2015. These indicators suggest an economy that is stagnant and vulnerable to external shocks.

Previous studies have solely examined the one sided relationship of external debts, balance of payments and external reserves. Studies such as Akpan, (2016) and Tsenkwo & Gukat, (2018) focused on the impact of external debt on external reserves leaving out balance of payment while other studies focused on balance of payment and external reserves leaving out external debts in their specified and estimated models (Chikelu, 2021; Usman et al., 2016). Though Syukri (2020) was able to investigate the mutual relationship between external debts, exports, imports, and external reserves in Indonesia using the Granger causality. But he used export and imports which is still a fraction of the balance of payment. Hence leaving a critical gap in literature that is yet to be filled. Based on these, the study is interested in reconstructing the research model by placing the external reserves, balance of payments and external debt variable as the endogenous variables which would be achieved by using the structural vector autoregressive system and the pairwise granger causality test. Therefore, it is in an attempt to add to the existing body of knowledge

that motivated this study to examine and understand the significant and causal relationship amongst external debt, balance of payment and external reserves in Nigeria. This above issue gave rise to the following question.

1. What is the relationship between external debts and external reserves in Nigeria?
2. What is the relationship between balance of payments and external reserves in Nigeria?
3. What is the direction of causality between external debts, balance of payment and external reserves in Nigeria?

## II. LITERATURE REVIEW

### 2.1.1 Conceptual Framework:

#### a) Concept of External Reserves

The external reserve is a crucial element that serves as a safeguard for both national and international economies. It refers to the foreign currencies held by a government or its central bank and is also known as foreign exchange reserves or international reserves. According to the IMF (2007), international reserves are official public sector foreign assets that can be readily accessed and controlled by monetary authorities for various purposes, including financing payment imbalances and regulating exchange rates. The accumulation of foreign reserves occurs when foreign exchange receipts exceed disbursements (Nzotta, 2004).

Components of foreign reserves include monetary gold, reserve positions at the IMF, special drawing rights (SDRs), convertible currencies of other countries, as well as treasury bills, bonds, bank deposits, banknotes, and government securities. The primary sources of external reserves are similar to those of foreign exchange, including earnings from exports of goods and services, capital inflows such as loans and investments, and monetary gifts. The importance of accumulating external reserves stems from various reasons, such as supporting the domestic currency, enhancing creditworthiness, acting as shock absorbers during oil price shocks, and providing funds for emergencies and maintaining international confidence. The motives for accumulating external reserves vary depending on a nation's economic needs and objectives.

#### b) Concept of Balance of Payment

The balance of payments (BOP) is a record of economic transactions between residents and non-residents of an economy for a specific period. It summarizes the flow of imports, exports, services, and capital between a country and its trade partners. The BOP consists of several components: the current account, capital account, financial account,



and net errors or omissions (IMF, 2009). The current account reflects the balance of trade, including goods, services, net foreign income, and unilateral transfers. The capital account records transactions related to non-financial assets, capital transfers, and debt. The financial account tracks financial assets and liabilities between residents and foreigners.

The BOP account follows double-entry bookkeeping, where transactions bringing foreign currency are credited and spending of foreign currency is debited (Gebeyehu, 2017). It can be in equilibrium or disequilibrium. A surplus occurs when receipts exceed payments, increasing foreign exchange reserves. A deficit happens when payments exceed receipts, reducing reserves. A current account deficit can lead to a balance of payment crisis, resulting in decreased reserves or increased external debts. Two policy measures can address this crisis: expenditure-switching policies and expenditure-reducing policies (Imoisi et al., 2013). The former aims to shift consumer spending from foreign to domestic goods, while the latter uses contractionary fiscal and monetary policies to reduce consumer spending.

### c) Concept of External Debts

External debt, also known as foreign debt, refers to money borrowed by a government, corporation, or household from another country or foreign lenders. Gross external debt represents the outstanding amount of actual liabilities that require repayment in the future and are owed to non-residents. External debt can be in the form of money, goods, or services repayable in foreign currency (World Bank, 2014). It includes borrowings from commercial banks, governments, and international financial institutions.

Governments incur external debt for various reasons, including financing budget deficits, funding wars, addressing natural disasters, implementing development plans, and supporting public enterprises Bamidele & Joseph (2013). Nigeria has two main categories of external creditors: private and official creditors. Private creditors include promissory note holders and the London Club group, while official creditors comprise international organizations such as the International Fund for Agricultural Development (IFAD), International Bank for Reconstruction and Development (IBRD) (Eme & Johnson, 2012). Bilateral creditors include the Paris and Non-Paris clubs, with the Paris Club being a major creditor to the Nigerian government. As of December 31, 2007, the Paris Club accounted for 85.82% of Nigeria's

external debt, which amounted to US\$35.94 billion (Eduardo, 2009).

### 2.1.2 Review of basic theories

This section examines theories that deal with external reserves accumulation which include the precautionary theory of demand for international reserves and the macro-prudent theory of international reserves.

#### a) Precautionary Theory of Demand for International Reserves

The theory of precautionary demand for international reserves has been a prominent concept in international economics since the mid-20th century. The theory gained attention after the Asian financial crisis in the 1990s, which led to a surge in reserve accumulation. The theory states that countries hold reserves as a precautionary measure to protect against external shocks, uncertainties related to external debt, and imbalances in the balance of payments. The assumption of this theory includes that international reserves perform stabilizing role by helping countries manage temporary imbalances from foreign currency inflows and outflows. Secondly, the level of reserves can also affect perceptions of a nation's financial capability to settle its foreign debt.

The theory was criticized for lacking clear guidelines to determine the optimal level of reserves and the opportunity cost of excessive reserves. They argue that resources could be invested in infrastructure or social development instead. Over-accumulation of reserves can also distort monetary and fiscal policies, leading to inflation, resource misallocation, and an overvalued exchange rate. Despite these criticisms, the theory remains significant in understanding why countries hold international reserves and their role in financing international transactions and debt settlements. It contributes to a comprehensive understanding of international financial stability by exploring the interrelationship of external reserves, external debt, and balance of payments.

#### b) Macro-prudent Theory of International Reserves.

The macro prudent theory of international reserves can be traced to the works of Arce et al (2019). While the precautionary theory of international reserves explains the reasons behind emerging market economies' reserve accumulation, the macro-prudential theory emerged after the 2008 financial crisis to explain why developed nations also increased their external reserves. This theory



states that maintaining adequate reserves is vital for financial stability, managing external debt risks, addressing balance of payments challenges, and bolstering macroeconomic resilience.

The theory operates under the assumption of a systemic risk perspective, recognizing that risks in the external sector have broader implications for financial stability and the overall economy. It also assumes the interdependencies of external reserves, external debts and balance of payments given that excessive external debts and imbalances in the balance of payments can create vulnerabilities and risks that require prudential management. Hence, by adopting a proactive and risk-focused approach to reserves management, countries can protect themselves from external shocks and navigate turbulent global economic conditions. Critics have questioned the effectiveness and efficiency of using reserves as a policy tool and argue that excess reserves come with opportunity costs. Despite the criticisms, the macro-prudential theory emphasizes the interconnectivity of economic systems in which external debts, balance of payments and external reserves are variables that influence the macroeconomic environment in every nation.

## 2.2 Empirical Literature Review

The empirical review was done in a thematic chronological order to achieve the objective of this study.

### External debts and External reserves.

Tsenkwo and Gukat (2018) empirically analysed debt stock, debt servicing, and foreign reserves accretion in Nigeria using cointegration Analysis. The variables used were domestic debt stock, external debt stock, debt servicing and Foreign Reserves from 1986 – 2016. The study applied the error correction methodology and Engle-Granger Co-integration test as estimation techniques. They discovered that there is a long-run relationship between Nigeria's debt profile and foreign reserves accretion. Also, domestic debt and debt servicing have a positive impact while external debt has a negative impact on external reserves in the long run.

Ayunku and Markjackson, (2020) carried out a study on the impact of external debt on Nigeria's foreign reserve portfolios in Nigeria from 1981 to 2018. The variables used for analysis are external debt, exchange rate, lending interest rate, and international reserves and the least square technique was employed as the method of analysis. The findings indicated that external debt stock had a negative significant impact while external debt

servicing had a positive insignificant impact on external reserves.

The research carried out by Andriyani et al. (2020) on the determinants of foreign exchange reserves in Indonesia span from a period of 2016 to 2018. Their study considered variables of external debt, exchange rate, inflation, and exports and foreign exchange reserves. The estimation technique used was the Autoregressive Distributed Lag approach, which revealed that foreign debt and exports have a significant and positive effect on foreign exchange reserves, exchange rate has a significant and negative effect on foreign exchange reserves in Indonesia while inflation does not significantly affect foreign exchange reserves in Indonesia.

Menza, Getachew, and Kuma (2021) studied the short-run and long-run dynamics between external public debt and foreign exchange reserve of Ethiopia's Economy from 1981 to 2019. The variables used in the study include foreign exchange reserve, external public debt, debt servicing, share of agriculture, share of manufacturing, share of service, financial development indicator, and trade tariff rate. The study employed the Autoregressive Distributed Lag model with error correction models. The result indicates that the share of agriculture and service sectors significantly affected the foreign exchange reserve in the short run while financial development indicators, debt service payments, and average trade tariff rate were predicting foreign exchange reserve in the long run for the Ethiopian economy.

Rangkuty and Hidayat (2021) examined the impact of foreign debt on external reserves in Indonesia. Using foreign debt, foreign exchange reserve, gross domestic product, investment and net export as variables during the period 1988-2017, the simultaneous approach of Two-Stage Least Square (TSLS) was employed as the method of analysis to achieve the objective of the study. The findings show that foreign debt and reserves have a two-way relationship. This means that foreign debt had a positive impact on foreign exchange reserves while on the other hand, foreign exchange reserves positively impacted foreign debt.

### Balance of payment and External reserves.

Usman, Addah and Jerimiah (2016) examined the relationship between external reserves and balance of payment in Nigeria from 1995 to 2014. The study used the Ordinary Least Square (OLS) multiple regression techniques to regress external reserves on balance of payment, exchange rate and Gross Domestic Product (GDP). The study



revealed a negative relationship between the external reserve and balance of payment while exchange rate impact positively on external reserves.

Chikelu (2021) examined the impact of macroeconomic variables on external reserves in Nigeria (1981- 2019). The study adopted an autoregressive distributed lag model and the variables used were gross domestic product, balance of payment, trade openness (independent), and external reserve (dependent). His findings stated that trade openness and exchange rate had a positive and non-significant impact on external reserves while Gross domestic product positively and significantly impacted external reserves. On the other hand, the balance of payment had a negative and insignificant impact on external reserves in Nigeria from 1981 to 2019.

#### **External debts, balance of payment and external reserves**

Nor, Azali and Law (2008) examined the relationship between international reserves, current account imbalance and external debt using Malaysia as a case study from 1970-2004. The variables used for the study were real reserves, real GDP per capita, the average propensity to import (imports/GDP) and variability in export receipts, real current account balance and real short-term external debt. Their study used autoregressive distributed lag (ARDL) as the method of analysis to test the existence of a co-integration relationship. The empirical results revealed that current account balance and short-term external debt significantly and positively affect the demand for international reserves both in the long run and short run.

In another study, Nor, Azali and Law (2011) carried out a comparative study on International Reserves, Current Account Imbalance and Short Term External Debt in East Asia, ASEAN5, and non-ASEAN countries during the period 1970-2005 using Fully Modified Ordinary Least Squares (FMOLS) as methods of analysis. The variables used in this study were ratio of international reserves to GDP, real GDP per capita (scale variable), average propensity to import (imports/GDP), variability in real export receipts, ratio of current account balance to GDP, ratio of short term external debt to GDP. The results identified that current account balance had a positive coefficient in East Asia, ASEAN5, and non-ASEAN countries. Short-term external debt was negatively and positively related to international reserve holdings in the ASEAN5 and non-ASEAN countries respectively.

Syukri (2020) evaluated the relationship between gross domestic products with international balance of payment in Indonesia from 1978 to 2018. The gross domestic product, exports, imports, foreign exchange reserves, and foreign debt were the variables used for the study. The method of analysis used was Vector Auto Regression (VAR) and Granger Causality. The results obtained showed that there is no bi-directional causal relationship, but there are six one-way relationships. The IRF and VD tests used for 10-year forecasting showed foreign exchange reserves provide a positive response to exports and foreign debt.

### **III. Research Methodology**

#### **3.1 Theoretical Framework.**

The study adopts an eclectic theoretical framework that is based on the theory of precautionary demand for international reserves and the macro-prudent theory of international reserves due to their emphasis on external debts, balance of payment, external reserves and interrelationships.

#### **3.2 Model Specification and Estimation Technique.**

To meet the core objective of this study, the task of this section is to construct a model relating to the various key variables identified as factors within the context of the topic. Hence, for this purpose, we adopt the model used by Abuh-Amasi et al. (2022) which is specified thus:

$$RES = f(GDP, OPN, FPN, EXR, OPC, EXPT, INST)$$

(3.1)

The above model will be modified to incorporate relevant variables to reflect the current study's objective. Hence, the Gross Domestic Product (GDP) represents the scale variable, trade openness (OPN) and financial openness (FPN) will be replaced with balance of payment (BOP) to denote current account and capital account variability which are derived from the precautionary theory of external reserves. Exchange rate (EXCHR) is derived from the precautionary theory which reflected exchange rate flexibility. We extend this model by incorporating two additional variables: inflation and external debt which can be thought to have a relationship with foreign exchange reserves. The existence of stable inflation can increase foreign exchange reserves because Nigerian goods can compete abroad and vice versa. The incorporation of external debts reflect the importance of the precautionary motive for holding reserves in Nigeria as an emerging nation. Thus, in relation to this study, the model is re-specified as



FER= f (EXTDBT, BOP, EXCHR, GDP, INF)

(3.2)

Mathematically, the model is specified as;

$$FER = EXTDBT + BOP + EXCHR + RGDP + INF$$

(3.3)

The econometric form will be

$$FER_t = \beta_0 + \beta_1 FER_{t-1} + \beta_2 EXBT_t + \beta_3 BOP_t + \beta_4 EXCHR_t + \beta_5 GDP_t + \beta_6 INF_t + \mu_t$$

(3.4)

Where FER is foreign exchange reserves, EXDBT is external debt, BOP is balance of payment, EXCHR is the exchange rate, GDP is gross domestic product, INF is inflation,  $\mu$  is the stochastic disturbance or Error term,  $\beta_0$  is the constant term (i.e., the intercept) and  $\beta_1 - \beta_5$  is the coefficients of the explanatory variables.

To illustrate the VAR modelling approach adopted for the study, equation 3.4 will be restated as follows:

$$LnFER_t = \beta_0 + \beta_1 LnFER_{t-1} + \beta_2 LnEXBT_{t-1} + \beta_3 LnBOP_{t-1} + \beta_4 LnEXCHR_{t-1} + \beta_5 LnGDP_{t-1} + \beta_6 LnINF_{t-1} + \mu_{t1}$$

$$LnEXBT_t = \beta_0 + \beta_1 LnFER_{t-1} + \beta_2 LnEXBT_{t-1} + \beta_3 LnBOP_{t-1} + \beta_4 LnEXCHR_{t-1} + \beta_5 LnGDP_{t-1} + \beta_6 LnINF_{t-1} + \mu_{t2}$$

$$LnBOP_t = \beta_0 + \beta_1 LnFER_{t-1} + \beta_2 LnEXBT_{t-1} + \beta_3 LnBOP_{t-1} + \beta_4 LnEXCHR_{t-1} + \beta_5 LnGDP_{t-1} + \beta_6 LnINF_{t-1} + \mu_{t3} \quad (3.5)$$

In the above VAR equation above,  $t-1$  means 1 lag value and Ln is natural logarithm. Thus this is a VAR (1) equation which shows a system of equations.

### 3.3 Data Sources and Explanation of Variables.

The study used secondary data obtained from the publications of the Central Bank of Nigeria (CBN), Debt Management Office (DMO) and World Bank Indicators (WDI). The data span from 1990 to 2021. The major variables for which data were collected include: foreign exchange reserves (FER) which refer to assets including gold, special drawing, and other reserves currencies held by the monetary authority of a nation as a backup fund in cases of emergencies; external debts as a portion of a country's debt from foreign countries, organizations and individuals; balance of payments (BOP) involves a country's financial transactions with other nations; exchange rate is the relative price of a domestic currency; gross domestic product (GDP) which measures the value of goods and services produced within an economy in a specific period; and inflation (INF) which is the sustained rise in general price levels.

## IV. DATA PRESENTATION, ANALYSIS AND RESULT

The study employed the use of econometric tools in the analyses of the variables as shown in the model. The E-views package was used in the estimation process and results are presented in tables.

### 4.1 Data Analysis and Presentation.

#### 4.1.1 Unit root test

The Phillip Perron (PP) unit root was used to determine the stationarity of all the variables as seen in Table 4.1.

**Table 4.1: Summary of PP Unit root test.**

Variable	PP Critical value @ 5%	PP Statistic	Order of Integration
FER	-3.568379	-3.933668	I (1)
EXBT	-2.963972	-3.245333	I (1)
BOP	-2.963972	-8.044845	I (1)
EXCHR	-3.568379	-4.02824	I (1)
GDP	-3.568379	-3.528119	I (1)
INF	-3.568379	-4.414423	I (1)

Source: Author's Computation from E-views 10.

Table 4.1 shows that all the variables are stationary at first difference since their PP statistic are greater than their PP critical values at a 5% level of significance. This enhances the use of Johansen cointegration test.



#### 4.1.2: Cointegration Test

The study employs the Johansen cointegration test to identify the presence of a long run relationship which can be seen in Table 4.2.

**Table 4.2: Cointegration test using Johansen Test.**

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.967371	296.8115	117.7082	0
At most 1 *	0.946764	197.5574	88.8038	0
At most 2 *	0.863098	112.4995	63.8761	0
At most 3 *	0.631686	54.83337	42.91525	0.0022
At most 4	0.497202	25.86759	25.87211	0.0501
At most 5	0.184879	5.928129	12.51798	0.4695

Source: Authors' computation from E-views 10.

Evidence from Table 4.2 shows that there are three cointegrating equations given that the trace statistics is greater than the critical value of 5%. Thus, there is a long-run relationship in the model.

#### 4.1.3 Vector Autoregressive technique (VAR):

The study employs the Vector Autoregressive technique as the method of analysis for a major purpose. The VAR technique can be used to investigate a system of equations and allows every variable to be endogenous. Thus it was very suitable to investigate the interrelationship of external debts, balance of payments and external reserves.

**Table 4.3: Summary of Vector Autoregressive technique.**

Variables	LNEXBT	LNBOB	LNFER
LNFER(-1)	-0.256054 [-1.40166]	-0.883429 [-0.67931]	0.109449 [0.48539]
LNEXBT(-1)	0.87475 [6,43940]	1.155568 [1.19493]	-0.348645 [-2.07929]
LNBOB(-1)	-0.0847 [-0.30462]	-0.105947 [-0.53522]	0.02951 [0.85995]
LNEXCHR(-1)	0.043968 [0.32071]	0.510499 [0.52307]	0.554029 [3.27399]
LNGDP(-1)	0.207251 [1.05102]	0.416336 [0.29658]	0.144873 [0.59521]
INF(-1)	-0.002103 [-0.37946]	-0.013112 [0.33229]	-0.004553 [-0.66554]
C	-1.69988 [-0.35279]	0.326767 [0.00953]	5.453904 [0.91701]
<b>R-squared</b>	0.824406	0.164157	0.858012
<b>Adj. R-squared</b>	0.780507	-0.044803	0.822514
<b>F-statistic</b>	18.77977	0.78559	24.1713

Source: Authors' computation from E-views 10

Table 4.3 presents the estimates of external debts, balance of payment and external reserves when they are made endogenous variables. Thus,

when external debt is the endogenous variable, a percentage increase in past values of external debts exerts a significant positive influence on external



debts as opposed to past values of foreign exchange reserves (LnFER) and balance of payments (LnBOP) which had a negative insignificant influence of 0.26% and 0.08% respectively on external debt averagely *ceteris paribus*.

However, when balance of payment is assumed to be the endogenous variable, a percentage increase in the past values of external debt (LnEXBT) exerts a positive increase of 1.19% on balance of payments while past values of foreign exchange reserves and past values of balance of payment exert a negative influence of 0.88% and 0.10% on balance of payment respectively and averagely, *ceteris paribus*.

To discuss equation 4.1 which has foreign external reserves as an endogenous variable specified by this study, the economic criterion, statistical criterion and econometric criterion will be used.

$$\text{LNFER} = 5.453904 + 0.109449\text{LNFER} (-1) - 0.348645\text{LNEXBT} (-1) + 0.02951\text{LNBOP} (-1) + 0.554029\text{LNEXCHR} (-1) + 0.144873\text{LnGDP} (-1) - 0.004553\text{LNINF} (-1) + \mu \quad (4.1)$$

For the economic criteria, it is observed that the regression line has a positive intercept as presented by the constant (c) = 5.45. This means that if all the variables are held constant or fixed (zero), foreign exchange reserve in Nigeria will increase at a rate of about 5.45% per annum. Thus, the a priori expectation is that the intercept could be positive or negative, so it conforms to the theoretical expectation.

The result showed that lag values foreign exchange reserves increase, balance of payment, exchange rate and gross domestic product have shown to exhibit a positive relationship with foreign

exchange reserves in Nigeria. Thus, an increase in past values of foreign exchange reserves, balance of payment, exchange rate and gross domestic product by 1% will cause an average increase in foreign exchange reserves in Nigeria by 0.109%, 0.03%, 0.55% and 0.145% respectively and vice versa.

On the other hand, lagged values of external debt and inflation have negative impact on the foreign exchange rate in Nigeria, implying that an increase in external debt and inflation, leads to an average decrease in foreign exchange reserves in Nigeria. Thus 1% increase in past values of external debt and inflation, on average, bring about a decline in foreign exchange reserves by 0.35% and 0.004% respectively and vice versa. This occurs under the condition of *ceteris paribus* meaning all things being equal. As a matter of fact, all the variables had a positive relationship with foreign exchange reserves, with the exception of external debt and inflation. The regression analysis shows that observed all the variables conform to the a priori expectation of the study.

For the statistical criteria, the  $R^2$ , adjusted  $R^2$  and F-statistics will be examined and can be seen in Table 4.3. The study passed the statistical criteria since the  $R^2$  of 0.85 shows that the model is a good fit and the independent variables account for the variations in the dependent variable at 85%; the adjusted  $R^2$  supports this given that it has a value of 0.82 showing that the independent variables (the regressors) explain the foreign exchange reserves and the F- statistics having the F calculated as 24.17 which is greater than the F- tabulated at a 5% level of significance of 2.49. This shows the overall significant impact of the independent variables on foreign exchange reserves in Nigeria.

#### 4.1.4 Impulse response and variance decomposition.

The impulse response function also shows the response of external debts, balance of payment and foreign exchange reserves.

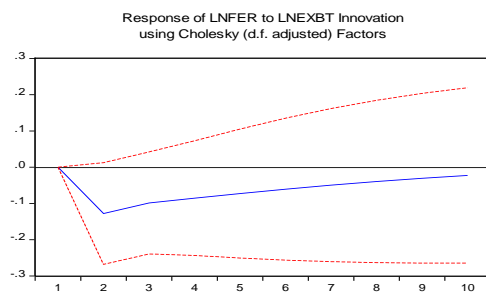


Fig 4.1

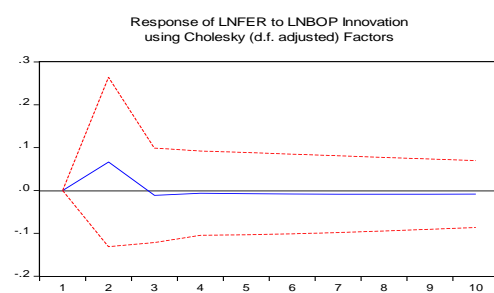


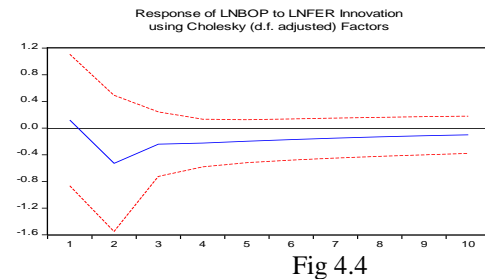
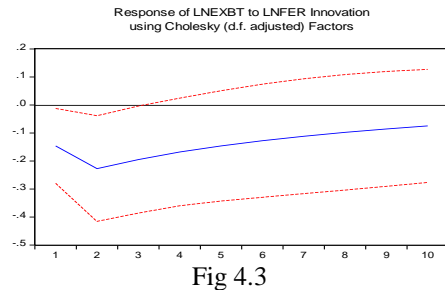
Fig 4.2

Fig 4.1 shows the response of foreign exchange reserves to a one standard deviation shock of external debt which indicate that in the first two time periods, foreign exchange reserves declined sharply and negatively but then increases at a continuous rate and still maintain a negative value till the last time period. The response of





LNFER to shocks in balance of payment shows that at the initial time period as seen in Fig 4.2, foreign exchange rate increased till the second period then reduced after which it remained slightly stable from time period 3 to 10.



In Fig 4.3, the response of external debt to a one standard deviation shock foreign exchange reserves caused in an early stage a decline in external debt to time period 2 after which there was a continuous increase in external debt which still possess a negative value up until period 10. On the other end, as seen in fig 4.4, the response of balance of payment to innovations from foreign exchange reserves in period 1 indicated a decrease in balance of payment from positive values to negative values which later increased from time period 2 to 3 and since then has been having slightly stable increase but still remained in negative values.

variable to the dependent variable by assuming periods 1 – 2 as the short run, period 4 -6 as the medium run and 7 - 10 as the long run. In line with the research question, the study found that the past values of external debts, balance of payment and foreign exchange reserves accounts for a high variation in external debts, balance of payment and foreign exchange reserves respectively from the short to long run.

More so, the variance decomposition result uses 10 periods to explain the variability of each

#### 4.1.5 Granger causality test

The pairwise ganger causality is used to determine the ability of a time series to predict the values of another time series.

**Table 4.4: Summary of Pairwise Granger Causality Test**

Null Hypothesis:	Obs	F-Statistic	Prob.
LnEXBT does not Granger Cause LNFER	31	0.40382	0.5303
LNFER does not Granger Cause LNEXBT		0.15035	0.7011
LnBOP does not Granger Cause LNFER	31	0.19225	0.6644
LNFER does not Granger Cause LNBOP		1.56014	0.222
LnBOP does not Granger Cause LNEXBT	31	0.08319	0.7751
LnEXBT does not Granger Cause LNBOP		4.47749	0.0434

Source: Authors' computation 2023.

Evidence from Table 4.4 show that there is independent causality between external debts and foreign exchange reserves and balance of payment and foreign exchange reserves. However, external debt is seen to granger cause balance of payments.

the model. The analysis was concluded with the VAR stability test which showed that the model is stable

The econometric criteria involve testing this model for autocorrelation, heteroscedasticity and multicollinearity. The study passed all econometrics tests: LM serial correlation test (0.1707); heteroscedasticity test (0.2108) and the variance factor multicollinearity test shows there is no correlation among the independent variables in

#### 4.2 Discussion of Findings

The discussion is done based on the analysis and results of the study. The study analysed the interrelationship of external debts, balance of payment and external reserves in Nigeria. Starting from the descriptive statistics, the Jacque Bera results foreign exchange reserves, external debts, exchange rate and gross domestic product were



normally distributed while balance of payment and inflation were not normally distributed. The findings of the PP test showed that all the variables are stationary at first difference while the Johansen cointegration test showed the presence of a long run relationship. The Vector Autoregressive technique showed the estimates of the independent variables when external debts, balance of payments and external reserves are endogenous variables.

Specifically, external debt had a negative and statistically significant impact on foreign exchange reserves in the short run which conforms to the a priori expectation as expected. This is in line with the findings of Tsenkwo & Gukat (2018) and Akpan (2016) in Nigeria but contradict findings of Rangkuty & Hidayat (2021) who found positive impact in Indonesia. This indicates that Indonesia borrow for productive investment which spurs growth that trickles down to increasing foreign exchange reserves compared to Nigeria whose borrowing becomes a cost and liability to the country that has to be resolved by using the external reserves. In addition, the impact of foreign exchange reserves on external debt is negative and insignificant. Thus, decline in foreign exchange reserves accumulated by Nigerian government is accompanied by more external debt accumulated and vice versa. This contradicts the findings of Rangkuty & Hidayat (2021) who found a positive impact which can be traced to the fact that the research was conducted in Indonesia. This negative impact of foreign exchange reserves on external debt in Nigeria can be attributed to the substitutability of external debts for foreign exchange reserves in terms of financing either internal or external imbalance in the economy.

The findings also showed that balance of payment had a positive and statistically insignificant impact on foreign exchange reserves in Nigeria which conforms to theoretical expectations. This means that an increased balance of payment tends to record improvement in Nigeria's foreign exchange reserves. This result contradicts that of Chikelu (2021) and Usman et al. (2016) because they both found a negative impact. This results align with reality given that Nigeria's balance of payment transactions majorly rely on crude oil sale, when there is oil boom, balance of payment surplus form majority of the foreign reserves. Furthermore, the study found that foreign exchange reserves had a negative and statistically insignificant impact on balance of payment in Nigeria. This can be deduced from the estimate that an increase in foreign reserves, on average, would decrease balance of payment and vice versa. This result contradicts

Fukuda & Kon, (2012) postulations "that increase in foreign exchange reserves improves the current account". Also this result is insignificant because the foreign exchange reserves policies have not been sustained to have a significant impact on balance of payment in Nigeria.

Further estimation of external debt on balance of payment revealed a positive and statistically insignificant impact in Nigeria. This finding is aligns with the findings of Nwani & Island (2006) in terms of the insignificant impact but contradicts since they found negative impact of external debt on balance of payment in Nigeria. This study's result can relate to Nigeria because accumulation of new external debt goes into the capital account which increase the balance of payment. In advancement, the impact of balance of payments on external debts was identified as negative and insignificant. This results tallies with the findings of Shafi et al. (2015) and Danish et al. (2022) which were conducted in Romania and SAARC countries which all found a negative but significant impact. Thus, the continuous balance of payments deficits in Nigeria has led to increasing external debt since Nigeria is more of a consuming than a producing nation. Also, the insignificant impact implies that Nigeria's BOP deficit does not exert much influence on external debts.

To buttress the relationship between external debts, balance of payments and external reserves. The study using the Granger causality test discovered the third major finding which is the presence of majorly independent causality with an exception of a unidirectional causality from external debts to balance of payments. This implies that past values of external debts cannot be used to forecast foreign exchange reserves and past vales of foreign exchange reserves cannot be used to forecast external debts. On the other hand, past values of balance of payments cannot be used to predict current values of foreign exchange reserves. Also, past values of foreign exchange reserves cannot be used to predict balance of payments. Furthermore, past values of balance of payments cannot predict external debt but past values of external debts predict balance of payments. This explains the ability of external debts to forecast balance of payments in Nigeria. Thus given that the country over the years have accumulated external debts without proper investments to show for it. The balance of payment can be seen to have maintained more deficit values over the years.



## V. CONCLUSION, POLICY IMPLICATION AND RECOMMENDATION.

The policy implication from the above findings during the period under review is that policy shifts on the significant variable (external debts and exchange rate) should be expected to bring about significant changes in foreign exchange reserves in Nigeria. However, the general conclusion of this study is that the nature of the interrelationship existing amongst external debt, balance of payment and external reserves were more insignificant than significant. Thus, policies should be directed toward each variable individually rather than looking at the impacts of other variables on it. This is evident from the variance composition results which show that past values of external reserves, balance of payment and external debts account for a higher variation in themselves.

Based on the above conclusions, the following recommendations are hereby made: firstly, the federal government should ensure that borrowing from the rest of the world is reduced to the barest minimum level by ensuring that external debts are contracted solely for productive economic reasons also the Debt Management Office should adequately keep track of the debt payment obligations and the debt should not be allowed to exceed a maximum limit so as to avoid debt overhang. Also, the federal government should as a matter of urgency improve the balance of payments through the process of diversifying away from the oil sector to the non-oil sector and adopt indicative planning which encourages private sector involvement in the development and diversification of the economy. Finally, for favorable balance of payment and external reserves, the Central Bank of Nigeria (CBN) should ensure an effective official multiple exchange rate system in Nigeria, with one exchange rate for the importation of luxury goods and the other for the importation of necessary and production-enhancing machinery or equipment.

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