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Trade Balance, Exchange Rate and Money Supply in Nigeria: Growth Implications and Lesson for African Countries

Kunle Bankole Osinusi[1] iD, Nurudeen Abiodun Lawal[2] iD,
Sodiq Olaide Bisiriyu[♦3]
[1]Senior Lecturer, Tai Solarin University of Education, Ogun State (Nigeria)
✉ bank_kunle77@yahoo.com
[2]Senior Lecturer, Tai Solarin University of Education, Ogun State (Nigeria)
✉ naf_lawal@yahoo.com
[3]Graduate Student, Tai Solarin University of Education, Ogun State (Nigeria)
✉ bisiriyusodiqolaide@gmail.com

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Abstract:

The significance of trade in developing nations made this study examine the impact of trade balance, exchange rate, and money supply on economic growth with reference to Nigeria's economy and serve as a lesson for other African countries. The study relies on the Mundell-Fleming BOP model for its framework with the use of secondary time-series data extracted from the statistical bulletin of the Central Bank of Nigeria from 1981 to 2020. The ARDL cointegration of the least square was adopted. The result showed a long-term relationship among trade balance, exchange rate, broad money supply, interest rate, inflation rate, and economic growth in Nigeria. Our

♦Corresponding author: Tai Solarin University of Education, Ogun State (Nigeria).
[✉ bisiriyusodiqolaide@gmail.com]

study thus concludes that the oil trade balance is the fundamental driver of Nigeria's economic growth, and appropriately, we suggested that to ensure economic growth in Nigeria and other African countries, the government should strategize on policies to develop trade in the non-oil sector; also the monetary authorities should design frameworks towards making money supply growth enhancer, and stabilization of the exchange rate for domestic countries to gain more from trade by intensifying the flux of credit to the real and exporting sector towards setting the economies on the track of expansion. **Keywords**: Trade Balance, Exchange Rate, Money Supply, Economic Growth, Autoregressive Distributed Lag (ARDL), Mundell-Fleming Model. **JEL Codes**: C19, E52, F31, F43.

1. Introduction

In recent decades, the focus of researchers has been centred around economic growth and issues relating to it, such as persistent inflation, fluctuating exchange rates and interest rates, uncertainty in the forex market, mismanagement, corruption, and terrorism in all its forms in African countries, including Nigeria. These issues are key macroeconomic variables to achieving government economic growth objectives (Amassoma, Sunday & Onyedikachi, 2018). For example, Nigeria's economy, which has remained the largest on the African continent over the last 30 years, has been witnessing fluctuations since her independence in 1960, with a recent recession in the last quarter of the year 2020 towards 2021 following the recovery from that of the year 2016 majorly as a result of unstable economic policies, unstable prices, and monetary issues among others. However, the economic theory posits that the growth of a country's money supply triggers inflation; and achieving economic growth requires maintaining relatively low or single-digit inflation. The expansion in the volume of money supply has the probability of rapidly depreciating the value of monetary units, resulting in a high cost of living for the country's population, destabilising businesses, and discouraging medium-term investment due to the increased cost of doing business. The long-run effect is capital flight and leakage in the economy, with the aftermath effect of shrinking economic growth (Mbongo, Mutasa & Msigwa, 2014).

Similarly, the money supply and economic growth are mutually correlated as they greatly influence economic activities. A rise in the money supply will make more money available to producers and consumers to generate more consumption and investment. However, the continuous rise in money supply spurs inflation, especially when the growth of output attains full capacity (Bello & Saulawa, 2013).

The monetarist economists argued that the money supply serves as an instrument to amplify economic growth based on the abrupt increase impact it has on the stock of money (Jawaid, Qadri & Ali, 2011), while the Keynesian school of thought argued that the money supply has a restricted influence on the growth of nations (Twinoburyo & Odhiambo, 2017). This argument has remained ambiguous for years as scholars found mixed empirical results; some found money supply to exert an insignificant impact on growth, such as Chipote and Pelesa (2014), Kanaan (2014), and Inam & Ime (2017) which are in line with the Keynesian economists' argument while some such as Nouri & Samimi (2011), Onyewu (2012), Havi & Enu (2014), Osasohan (2014), Prasert et al. (2015) and Mohamed & Aslam (2016), proved that money supply enhances economic growth of nations supporting the monetarist. However, monetarists argue that alterations in money supply impact output in the near term and price level in the long run. As a result, monetary policy objectives can be easily attained by focusing on the money supply. Contradictorily, according to the structuralists, devaluation policy by the monetary authority tends to harm the economy of developing countries like Nigeria and other African nations whose manufacturing sectors are import-dependent on raw materials (Karahan, 2020). As a result, an increase in the exchange rate will increase the cost of imported inputs like machinery and intermediate items utilised in the manufacturing process.

For this reason, rising production costs due to the home currency's depreciation will harm output, firm competitiveness, and administration performance. Thus, increasing production costs due to the depreciation of the domestic currency harm output level and firms' performance. These facts are evident recently in some developing countries as companies are moving part of their investment to countries/regions with low business costs.

In addition, for example, in Nigeria, the increasing preference and demand for intercontinental goods have created undesired hardship for African countries resulting in the depreciation of currencies over time. Among the major consequences of this practice, aside from currency depreciation, are trade diversion, job loss in the home country, low per capita income, and relatively low living standards among Africans (Onakoya, Aworinde & Yinusa, 2019). The above-discussed problems can hamper the growth and achievement of development in Nigeria and other African countries. However, several policies had been put in place by governments, such as increased money supply and currency devaluation to attract export trade, efforts to stabilise the exchange rate and various trade policies. However, these seem not to have yielded the desired developmental objective. In this regard, the question becomes: are trade balance, exchange rate, and

money supply capable of controlling economic growth in Nigeria?

Existing literature on the relationship between economic growth and monetary variables such as exchange rate, money supply, interest rate, and inflation rate in Nigeria and across African countries has given various and divergent results with a summation of conclusions that seems misleading for decision making, probably as a result of a deficiency in methodology, data, scope, or theoretical interpretations. The uniqueness of Nigeria in terms of resource endowment, trade components, and the irregular pattern of economic wellbeing justifies a detailed study of this nature that incorporates cogent monetary and macroeconomic variables that the theory postulates to have a significant relationship with economic growth. Especially in an open developing nation with the intent of providing policy recommendations for other African countries. In addition, literature exploration revealed existing empirical evidence from Nigeria and other African countries that has not combined monetary variables to clarify their impact and relationship with economic growth. However, the individual link between economic growth and these variables has gained the attention of researchers from Nigeria and on the African continent with mixed empirical results. As such, this study explores how trade balances, exchange rates, and money supply have impacted the growth of Nigeria's economy over the years. Therefore, we believe this study will be among the front-line studies to provide empirical evidence on the trade balance, exchange rate, money supply, and economic growth. Our findings and recommendations will guide monetary authorities and economic policy planners across Africa to develop frameworks and policies for achieving economic growth. Finally, due to the timeless property of growth analysis, our work will provide information for future researchers on the relationship between trade balances, exchange rates, money supply, and economic growth.

2. Stylized facts

This sub-section provides stylized facts on major variables of our study interest (trade balance, exchange rate, money supply, and gross domestic product).

2.1. Trade balance

The below figure presents an overview of the trade balance in Nigeria over the past four decades. As shown in the graphical trend, Nigeria's trade balance was negative in 1981, 1982, and 1983 while it turned positive until 1998, when the import value again exceeded imports to have a negative trade

balance. Following this year, the country experienced a favourable trade balance from 1999 to 2014, meaning the value of its exports during these years exceeded the imports' value. This favourable trade balance during this period resulted from export promotion policies put in place when the democratic government came into power in 1999 to ensure rapid economic growth and development. Unfortunately, the country witnessed another unfavourable balance in trade after decades of trade surplus. The trade balance value was negative in 2015 and 2016 successively, while the country was able to export more in 2017 and 2018 to have a positive value. Surprisingly, in 2020 the country suffered a large trade deficit after the one suffered in 2019. The unfavourable trade balance experienced in 2020 is attributed to the global coronavirus pandemic. Nigeria, an oil-dependent economy whose export commodity is mainly crude oil, could not sell its product as global demand reduced drastically from the country's trading partners.
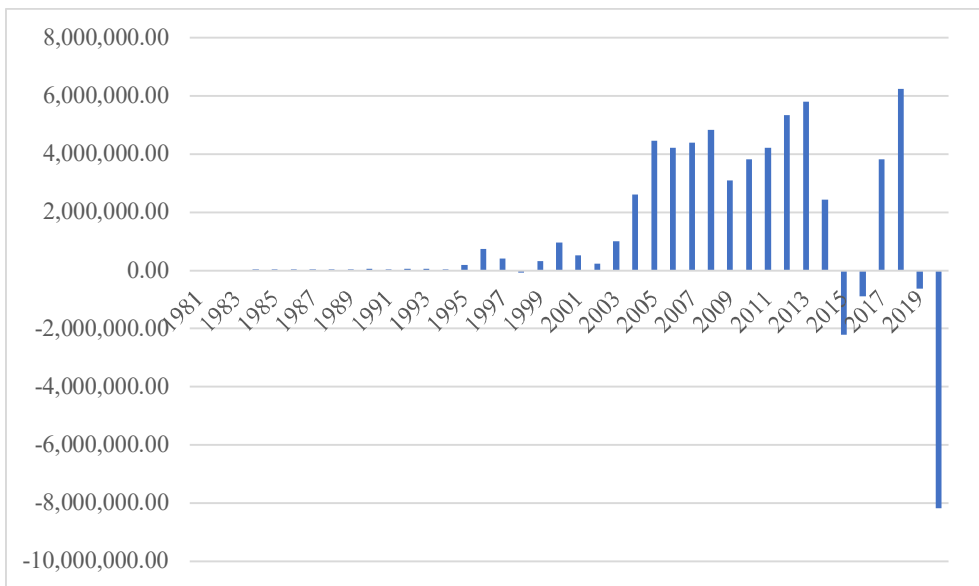

Figure 1. Overview of trade balance in Nigeria from 1981 to 2020

2.2. Exchange rate

The overview of the exchange rate, as presented in Figure 2, showed that the Nigeria exchange rate was stable from the early 1980s to 1990 before it started to depreciate. The value depreciated from N0.61/$1 in 1980 to N9.91/$1 in 1991, majorly due to the adoption of the World Bank Structural

Adjustment Programme of Gen. Ibrahim Babangida in 1986. Since then, the amount of naira exchanged for a dollar has always been increasing. In 1992, N17.30 was against a dollar, while the value increased to N21.89/$1 in 1998. After the military leadership was handed to the civilian government in 1999, the exchange rate depreciated to N92.69/$1 as a result of the deregulation policy adopted by the government in October 1999 with the establishment of the Interbank Foreign Exchange Market (IFEM). The figure has since increased until it appreciated N128.65, N125.83, and N118.57 to $1, respectively, in 2006, 2007 and 2008. This appreciation was witnessed after the foreign exchange market was deregulated in 2002 by the government and the introduction of the Dutch Auction System (DAS) in 2006. However, unfortunately, the exchange rate has depreciated since its last appreciation in 2008—the rate depreciated to N158.55/$1 in 2014 while it jumped to N193.28/$1 and N253.49/$1 in 2015, respectively. Furthermore, the exchange rate depreciated to N305.79/$1 in 2017 and N358.81/$1 in 2020. The recent depreciation of the currency against the dollar is attributed to various factors, including central bank devaluation policy, increasing government debt, unfavourable terms of trade, recent recessions, and political instability.
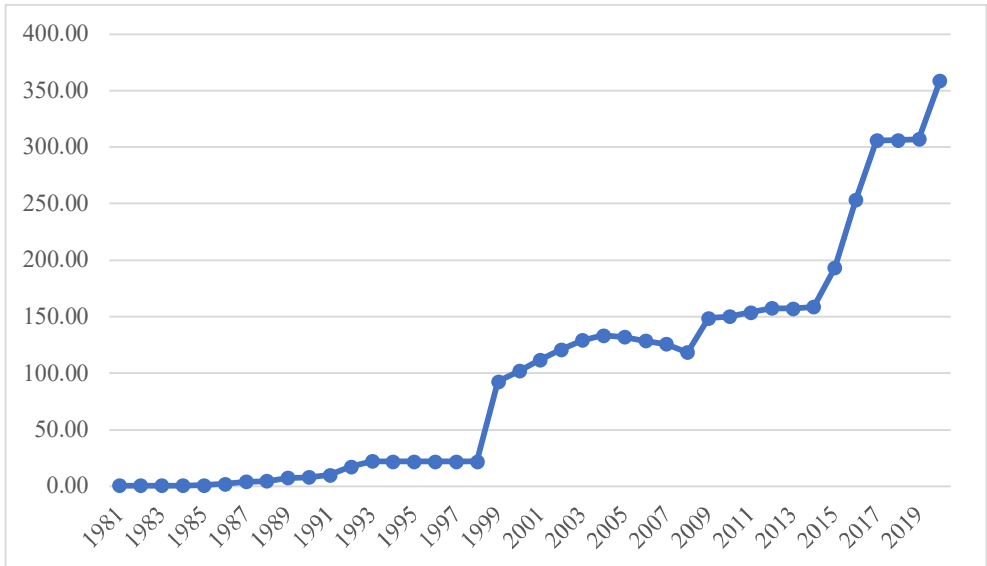

Figure 2. Nigeria exchange rate at a glance (1981 – 2020)

2.3. Money supply

The figure below shows the narrow and broad money supply trend in Nigeria from 1981 to 2019. The graphical trend shows that the broad money supply (M2) has always been increasing over the years, but a rapid increase was shown from the graph within the last decade (2009 - 2019). While the narrow money supply (M1), on the other hand, has also been increasing, the growth rate was not as rapid as demonstrated by the broad money supply. One important characteristic of the trend is that both narrow and broad money supply was growing slowly until early 2000 when it witnessed a rapid increase. Conclusively from the trend, the money supply in Nigeria has been increasing over the last four decades, with a sharp rise within the last decade.
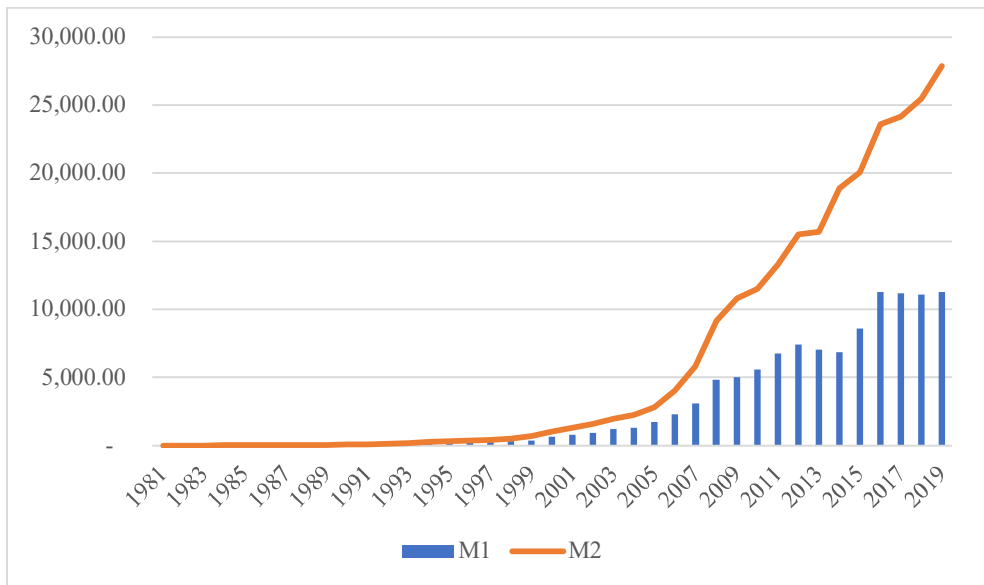

Figure 3. The trend of money supply in Nigeria from 1981 to 2020

2.4. Economic growth

Nigeria is a developing country in West Africa with a population of about 210 million as of the last quarter of 2021, as reported by United Nations. The country was categorised and remained a lower-middle-income country by the World Economic Situation and Prospects publication in 2014. Despite this classification, the country maintained the 27th position in the world ranking based on the nominal gross domestic product (IMF, 2021). Its growing manufacturing sector is one of the largest on the African continent.

Nigeria is a mono-product economy that depends heavily on crude oil though agriculture contributes significantly before the discovery of oil, contributing about 40% of the country's GDP. The country's agricultural production is a major employer of labour and the mainstay of Nigeria's economy besides its dependence on oil. For sustainable development to be achieved in every economy, constant economic growth, i.e., economic growth, catalyses sustainable development. Nigeria's economic growth has witnessed several fluctuations due to mismanagement and corruption. However, economic reforms of the past decades seem to have put the economy back on track towards achieving its full economic potential. By 2030, the economy will become one of the world's top 20 economies.

The economic vibrancy was witnessed in 2010 with the increase in domestic output due to sound economic policy management and vast economic reforms. Growth since 2010 was accredited mainly to the turnover in non-oil sector output which grew by 8.5 per cent and continues to rise since then, complemented by a significant increase in oil sector output. Nigeria's economy is the best on its continent despite fluctuation in GDP growth in recent years due to institutional changes, recession, policy implementation, and mismanagement in the country. The country's GDP at purchasing power parity in 2011 stood at $413.4 billion, more than twice the value in 2005 ($170.7 billion). Recently, before the country's 2016 recession, Nigeria's economy was growing at 6.3%. After it sustained the crisis, the economy grew by 2.2% before the global pandemic (COVID-19), which struck in late 2019 (World Bank, 2020). The Nigerian economy was recessed again in 2020, reversing three years from 2016 due to a drop in crude oil price, resulting in a drop-down in global need and containment measures to fight the spread of the global disease. These measures affected several sectors and spheres of life, like sports, aviation, trade, tourism, manufacturing, and many others. Conclusively, looking at the country's real gross domestic product performance in Figure 4 below, it is evident that the economy has grown its output level, especially in recent years, amidst uncertainties. The country's real gross domestic product was N54,612.26 billion in 2010; the figure almost doubled within five years to N94,144.96 in 2015, while it grew to N152,324.07 billion in 2020 which implies an over 50% increase in the value of 2015.
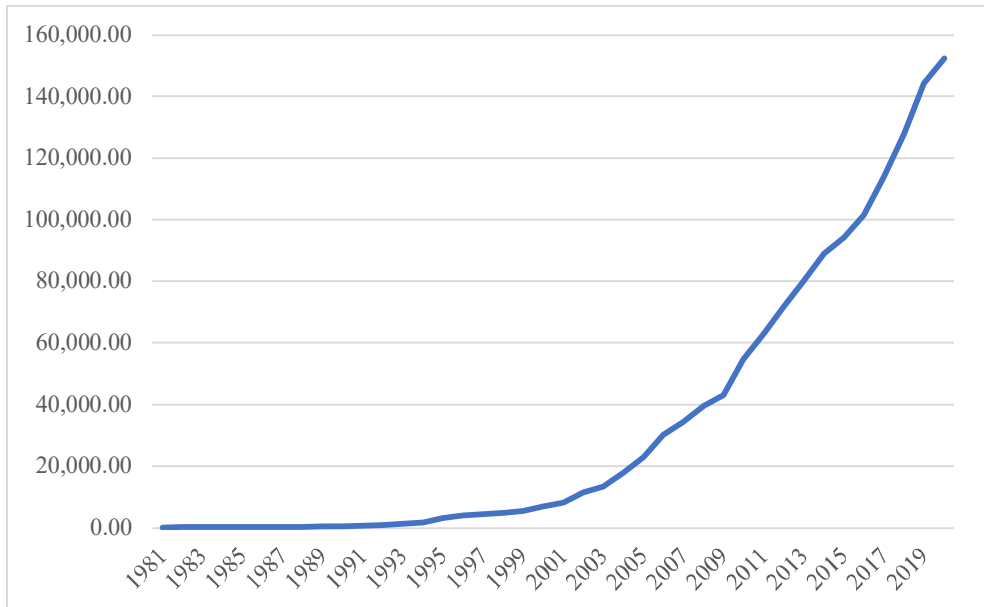
Figure 4. Nigeria's gross domestic product performance from 1981 to 2020
Source: Researchers' computation, 2022

3. Review of literature

From the theoretical perspective, the Mundell-Fleming model (MFM) explains the interaction among exchange rate, interest, money supply, and economic growth of a country. The model depicts the operation of a small economy that is open to foreign commerce in products and financial assets, as well as providing a framework for analysing monetary and fiscal policies. The core structure is a fixed, non-micro-founded Keynesian IS-LM model that has been extended. The philosophical and methodological approach, as well as the core aspects, are shared with the IS-LM model (Carlin & Soskice, 1990). The Mundell-Fleming model analysis which is an extension of IS-LM has been widely used by economists to claim that an economy cannot have a fixed exchange rate, unfettered capital movement, and an independent monetary policy at once. The model variables of analysis are the real GDP, consumption, real physical investment, government spending, nominal money supply, price level (inflation), nominal interest rate, real money demand, taxes, and net exports. The work of the model explains that an increase in money supply will directly reduce the local interest rate relative to the global interest rate and subsequently increase capital outflows which will lead to a decrease in the real exchange rate, and thus affects the national output.

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On the empirical ground, the review of various scholarly works on the trade balance, exchange rate, and money supply related to economic growth showed that different variables and methodologies had been employed for data analysis, and the empirical results had been mixed and divergent. For example, on the relationship between exchange rate and economic growth in Nigeria, Ehikioya (2019) and Obi et al. (2016) used the generalised method of the moment to find a significant negative effect, while Ufoeze et al. (2018) and Owolabi and Adegbite (2014) both adopted ordinary least square multiple regression and found a significant positive effect. Similarly, according to their findings, Inam and Ime (2017) found money supply and economic growth to have a minor positive link. At the same time, Omodero (2019) found an insignificant negative influence. However, conventionally, the results from empirical literature informed that trade balance, exchange rate, and money supply are key factors that are capable of influencing (positive/negative) the growth of an economy depending on the monetary policy and balance of payment which is also proved by theory (see Karahan, 2020; Antwi et al., 2020; Fatbardha, 2020; Koirala, 2018; Achouak et al., 2018; Rasaqque et al., 2017; Fassil, 2017; Eze & Atuma, 2017; Ingebire et al., 2020; Abdul et al., 2018; Hussain & Zafar, 2018; Ditim et al., 2018; Diemante et al., 2020; Onakoya et al., 2019; Hicham, 2018; George et al., 2018; Adeyemi et al., 2020; Ezeaku et al., 2018; Anoke et al., 2016; Sushil, 2020; Abille & Mpure,

2020; Cambodia et al., 2018; Ibi et al., 2019; Owolabi & Adegbite, 2014).

Based on the afore explanations, the underlying question is how can the interdependence among these variables of interest – trade balance, exchange rate, and money supply pave the way for and translate to economic growth in Nigeria, as previous empirical analysis has not considered the interdependence among these variables with respect to growth. In answering this question to confirm whether interdependence influences growth, this present empirical study becomes necessary. Its empirical result with inferences will constitute a policy formulation basis for monetary economists and economic growth planners. However, the major gap identified from the exploration of literature is in terms of data. All consulted works within and outside Nigeria only considered the total trade balance without considering the uniqueness of some countries, like Nigeria being a mono-product economy that is oil-dependent. As such, the use of the total trade balance will not reflect the true impact of the oil and non-oil trade on the economy. In addition to this deficiency, most existing works do not simultaneously model trade balance, money supply, exchange rate, and economic growth with the intent of establishing the relationship that exists among them. As an improvement to previous studies and to fill the identified gaps, our study disaggregates trade balance into oil and non-oil trade balance considering the peculiarity of the Nigerian economy. This disaggregation unveils the impact and significance of oil and non-oil trade balance on economic growth, shifting from other studies that conventionally looked at the aggregate trade balance impact on economic growth.

4. Methodology

The theoretical framework of our study is based on the Mundell-Fleming model (MFM), also known as the IS-LM-BOP model. The economic model proposed by Robert Mundell and Marcus Fleming improves the traditional IS-LM model, which analyses an economy in autarky. This model was chosen because its analysis was based on an open economy where foreign transactions occur, and Nigeria is considered one. The model portrays the relationship between an economy's nominal exchange rate, interest rate, and output in the short run which contradicts the focus of the IS-LM closed economy analysis based on the relationship between interest rate and output. The traditional model is based on the following equations.

$$Y = C + I + G + NX \qquad \text{(The IS curve)} \qquad (1)$$

Where: Y = GDP; C = Consumption; I = Investment; G = Government Spending, and NX = Net Export.

$$\frac{M}{P} = L(i, y) \qquad \text{(The LM curve)} \qquad (2)$$

Solving equations 1 and 2 to get the general equilibrium equation, it becomes:

$$Y = C(Y - T) + I(Y, i) + G + NX(Y, Y*, E) \qquad (3)$$

In the MFM analysis, higher GDP leads to more spending on imports and fewer exports; higher foreign income leads to more spending on the country's exports by foreigners, resulting in higher net exports. A higher nominal exchange rate, on the other hand, leads to larger net exports. The model also claimed that in the very short run, the supply of money is determined by the history of international payment flows and that if the central bank adopts a consistent exchange rate with a balance of payment surplus, money will flow into the country over time, the money supply will rise. Economic development will be facilitated (and vice versa for payment deficit). After the theoretical foundation above and in conformity with the literature of Adeyemi, Oseni, and Tella (2020); Alawattage (2009); Agbola (2004), and Dhilwayo (1996), our study aims at modelling the long-run association among trade balance, exchange rate, money supply and economic growth in Nigeria. Thus, we specify economic growth to be determined by the trade balance, exchange rate, money supply, inflation, and interest rate as given in its functional form below:

$$GDP = f(TB, REER, MS, INF, INT) \qquad (4)$$

Where:
RGDP = Real Gross Domestic Product.
OTB = Oil Trade Balance.
NOTB = Non-Oil Trade Balance.
REER = Real Effective Exchange Rate.
MS = Money Supply.
INF = Inflation Rate.
INT = Interest Rate.
$\sum$ = Error term.
In estimating our model, the unit root test considered necessary but not a sufficient condition in time series analysis, especially for long-run relationship analysis, was carried out to ascertain the stationarity of our model

data to avoid spurious outputs. The Augmented Dickey-Fuller (ADF) test, the most commonly adopted technique for testing unit root, was applied. The general ADF model is set out as follows:

$$\Delta y_t = \mu + \delta y_{t-1} + \sum \beta i\, \Delta y_{t-1} + e_t \tag{5}$$

To test the long-run connection of our specified model, the Autoregressive Distributed Lag (ARDL) cointegration technique was employed as it is applicable for non-stationary time-series and time-series with differing order of cointegration (Pesaran & Pesaran, 1997; Pesaran & Shin, 1999). The ARDL version of our model is then specified as follows::

$$\ln(GDP)_t = \beta_0 + \sum_{i=1}^{p1} \beta_i\, \Delta\ln(GDP)_{t-1} + \sum_{i=1}^{p2} \beta_i\, \Delta\ln(OTB)_{t-1} +$$
$$\sum_{i=1}^{p3} \beta_i\, \Delta\ln(NOTB)_{t-1} + \sum_{i=1}^{p4} \beta_i\, \Delta\ln(REER)_{t-1} + \sum_{i=1}^{p5} \beta_i\, \Delta\ln(MS)_{t-1} +$$
$$\sum_{i=1}^{p6} \beta_i\, \Delta\ln(INF)_{t-1} + \sum_{i=1}^{p7} \beta_i\, \Delta\ln(INT)_{t-1} + \lambda_1 GDP_{t-1} + \lambda_2 OTB_{t-1} + \lambda_3 NOTB_{t-1} +$$
$$\lambda_4 REER_{t-1} + \lambda_5 MS_{t-1} + \lambda_6 INF_{t-1} + \lambda_7 INT_{t-1} +$$
$$\varepsilon_t \tag{6}$$

Where Δ is a first difference operator and ε_t is a white noise error term identically and independently distributed. The error correction dynamics are represented by the term with the summation sign in equation (6), while the second component (the term with λs in the equation) reflects the long-term connection. The stated null hypothesis in equation (6) holds when $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = \lambda_7 = 0$, which indicates the long-run relationship does not exist. Our study's secondary data originated from the bulletin of the Central Bank of Nigeria from 1981 to 2020.

5. Empirical results

Table 1. Summary of descriptive statistics

	RGDP	OTB	NOTB	M2	REER	INF	INT
Mean	3.7439	0.9659	-1.1564	2.9311	2.0789	1.1626	1.0130
Median	3.8445	0.8758	-1.1682	3.0154	2.0022	1.0870	1.0012
Std. dev.	1.0342	0.3767	0.2742	1.1099	0.2656	0.3011	0.2095
Skewness	-0.2288	1.8973	-0.1283	-0.1223	0.9993	0.8756	-1.0780
Kurtosis	1.6147	6.6697	1.8775	1.5913	3.0089	2.8693	5.2106
Jarque-Bera	3.4587	45.2818	2.1544	3.3219	6.4912	5.0111	15.4944
Probability	0.1774	0.0000	0.3405	0.1899	0.0389	0.0816	0.0004

The Table above shows the descriptive properties of the variables included in the model, focusing on mean, median, skewness, kurtosis, and Jarque-Bera probability value. The analysis reveals that the mean values of

RGDP, OTB, NOTB, M2, REER, INFL, and INT are 3.7439, 0.9659, -1.1564, 2.9311, 2.0789, 1.1626 and 1.013 respectively with the median of 3.8445, 0.8758, -1.1682, 3.0154, 2.0022, 1.0870 and 1.0012. The standard deviation of RGDP, OTB, NOTB, M2, REER, INFL, and INT from their respective long-term mean values every year point stood at 1.0342, 0.3767, 0.2742, 1.1099, 0.2656, 0.3011, and 0.2095 respectively. The skewness value, which measures the asymmetry distribution of the variables from a normal distribution with an expected value of zero, shows that RGDP, NOTB, M2, and INT are negatively skewed. At the same time, OTB, REER, and INF are positively skewed. The kurtosis statistics results, which measure the peakedness or flatness of the distribution of the series, indicate OTB, REER, and INT are highly leptokurtic for their values are greater than three. At the same time, RGDP, NOTB, M2, and INF are highly platykurtic relative to the normal. Conclusively from the Table, it can be seen that RGDP, NOTB, M2, and INF have residuals that are normally distributed because their Jarque-Bera probability values are more than 5 per cent, while the residuals of OTB, REER, and INT are not normally distributed (probabilities < 5%).

With the Augmented Dickey-Fuller (ADF) approach, Table 2 below shows the unit root test outcome. The results show that the data had a combination of order zero I(0) and one I(1) of integration. Categorically, INF and OTB are stationary at a 5% significance level, while INT, M2, NOTB, REER, and RGDP are constant at the first difference of 5% critical level. Based on the unit root test result, we therefore confidently engaged the Autoregressive Distributed Lag technique (ARDL) as put forward by Pesaran, Shin, and Smith (2001) since none of the model variables is I(2). Having established stationarity among the variables, we then examine the long-run relationship among the variables of our study model.

Table 2. Summary of unit root test

Variables	Test for unit root	ADF statistics	Critical Values			Prob	Inference
			1%	5%	10%		
INF	Level	-4.4020	-4.2268	-3.5366	-3.2003	0.0064	Stationary I(0)
	1st difference	------	-------	--------	--------	-------	--------
INT	Level	-3.4486	-4.2119	-3.5296	-3.1964	0.0596	Not stationary
	1st difference	-5.2650	-4.2436	-3.5443	-3.2047	0.0007	Stationary I(1)
M2	Level	-0.9001	-4.2268	-3.5366	-3.2003	0.9453	Not stationary
	1st difference	-3.8020	-4.2268	-3.5366	-3.2003	0.0277	Stationary I(1)
NOTB	Level	-2.4794	-4.2119	-3.5296	-3.1964	0.3359	Not stationary
	1st difference	-6.5419	-4.2191	-3.5331	-3.1983	0.0000	Stationary I(1)
OTB	Level	-4.4029	-4.2119	-3.5298	-3.1964	0.0061	Stationary I(0)
	1st difference	-------	-------	-------	-------	-------	-------
REER	Level	-2.8276	-4.2191	-3.5331	-3.1983	0.1968	Not stationary
	1st difference	-4.7340	-4.2191	-3.5331	-3.1983	0.0026	Stationary I(1)

GDP	Level	0.1853	-4.2119	-3.5398	-3.1964	0.9971	Not stationary
	1st difference	-3.5360	-4.2191	-3.5331	-3.1983	0.0497	Stationary I(1)

The findings of the ARDL bounds testing were used to see if there was a long-run relationship between the variables, shown in Table 3 below. The evidence of long-run co-movement among the variables is shown in the Table. The F-statistics value of (8.029) presented in the ARDL bound test was significantly greater than the critical bounds value of I(0) and I(1) at a 5% critical value. Hence, it infers a long-run connection among the variables; on this account, they have a long-run complementary and long-run connection.

Table 3. ARDL bound test result

Test statistic	Value	K
F-statistic	5.28	6
Critical value bounds		
Significance	I0 Bound	I1 Bound
10%	2.53	3.59
5%	2.87	4
2.5%	3.19	4.38
1%	3.60	4.90

The explanation of the short and long-run relationship is presented in Table 4 below. The short-run coefficient of OTB and INF has positive relation and was statistically significant at 5%. The positive relation shown by the coefficients of OTB and INF informed that a unit increase in oil trade balance and inflation would cause a corresponding increase in Nigeria's economic growth. In addition, the coefficient of the lag of GDP indicates the positive impact of past GDP on the present at a 5% significant level. The coefficients of NOTB and INT are negative and insignificant at the 5% level, meaning both variables does not impact economic growth in the short run. By implication, these variables are growth retarding in the short run. In addition, the short-run coefficients of the REER and M2 have a positive but insignificant impact, meaning changes in both variables does not account for the expansion of Nigeria's productivity. The cointegrating equation with a negative coefficient being significant means that in the short run, 26% disequilibrium in the past year is adjusted in the present. The F-statistic value of 6251.45 with a probability value of 0.0000 informed that the model variables jointly influence Nigeria's economic growth.

In contrast, the Akaike info criterion, Schwarz, and Hannan-Quinn negative value talk about the betterment of the model with the Durbin Watson statistic of 2, which reveals no problem of serial autocorrelation in the model. The long-run coefficient of OTB has a significant positive impact on Nigeria's economic growth, with M2, REER, and INF having an insignificant positive

impact. In contrast, NOTB and INT have insignificant negative impacts. The positive sign of OTB tells that, in the long run, expansion in the economic growth of Nigeria is influenced by changes in the oil trade balance. Summarily, the result implies oil trade balance is the only growth-inspiring variable in the long run.

Table 4. ARDL short and long-run regression results

Variables	Short-run			Long-run		
	Coefficients	t-statistics	Probability	Coefficients	t-statistics	Probability
NOTB	-0.0106	-0.6328	0.5318	-0.0397	-0.66450	0.5116
OTB	0.1094**	3.1473	0.0038	0.4090**	2.627418	0.0136
M2	0.0912	1.2528	0.2203	0.3411	1.752052	0.0903
REER	0.0032	0.0996	0.9214	0.0118	0.102068	0.9194
INT	-0.0019	-0.0626	0.9505	-0.0071	-0.062524	0.9506
INF	0.0683**	3.5973	0.0012	0.2554	1.709486	0.0980
TREND	0.0023	0.5438	0.5907	0.0085	0.591149	0.5590
COINTEQ (-1)/C	-0.2675	-2.5018	0.0182	-0.4547	-0.989837	0.3304
GDP(-1)	0.7325	6.8506	0.0000	Adj. R^2 = 0.9993	F-stat Prob. = 0.0000	DW = 2.1297

** Values are statistically significant at an alpha level of 0.05

Furthermore, the Table below summarises the result of the diagnostic tests to confirm the originality of the derived outcomes from the autoregressive distributed lag (ARDL) estimate. The conducted tests include the normality test, linearity test, serial correlation LM test, and heteroskedasticity test. The Jarque-Bera value of 3.56 with a probability value of 0.168 revealed that the model data were normally distributed as the probability value is greater than 10%. Therefore, the normality assumption is accepted. The Breusch-Godfrey statistic of the serial correlation LM test revealed that the time series data employed in the analyses had no serial correlation problem for the p-value is greater than the 10% significance level. Furthermore, the Breusch-Pagan-Godfrey heteroscedasticity probability value is greater than the 10% significance level, therefore accepting the alternate hypothesis of constant variance. The stability test result, as given by statistic and probability value of the Ramsey RESET test, showed that the series is free from non-linearity (p-value is greater than 10% significance level).

Table 5. Summary of post-estimation tests

Test	Statistics	Value	Probability
Linearity	Ramsey RESET	2.2466	0.1451
Serial correlation LM	Breusch-Godfrey	0.0743	0.9286
Heteroscedasticity	Breusch-Pagan-Godfrey	0.7561	0.6429
Normality	Jarque-Bera	3.5697	0.1678

6. Conclusion and recommendation

Expanding the frontier of knowledge on the relationship between trade balance, money supply, exchange rate, and economic growth by using disaggregated data has been the major research thrust of this study, considering the peculiarity of Nigeria and other developing countries in Africa where trade, especially in the non-oil sector has not been fully developed and institutionalised. Among the selected variables of the study model, the oil trade balance is the largest contributing factor to the growth of Nigeria's economy over the years in the short term. Following that, the lag value of GDP with the oil trade balance influences long-run growth. Another major result is that trade in the non-oil sector and money supply by monetary authority has not accounted for Nigeria's national productivity expansion. This contrasts with the monetarist argument that the money supply affects output in the short run. Finally, the long-run relationship among the variables informed that appropriate adoption and usage of monetary and trade policies would trigger economic growth and possibly put African countries on the path of sustainable growth. Our study thus recommends that the government of Nigeria and other African countries strategise on policies to develop trade in the non-oil sector; the development of the sector is necessary amidst global uncertainties (such as demand and price fluctuations as witnessed recently) affecting proceed from trade. We also advised monetary authorities to formulate frameworks for making money supply growth enhancers and stabilising the exchange rate for countries to gain more from trade by intensifying the flux of credit to the real and exporting sector toward setting the economies of Africa on the track of sustainable growth and development. Finally, our study recommends that efforts be made to diversify the African countries' economic base to develop manufacturing and agriculture sectors, among others, to have a favourable balance of trade that will spur growth on the continent.

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