Determinants of International Trade in Nigeria

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Abstract: Nigeria has consistently contended with an increasingly volatile and trade flow imbalance for the past one decade which was partly exacerbate by the succession of crises buffeting the global economy, with the COVID-19 pandemic that gave way to the war in Ukraine, inflation, monetary tightening, and widespread debt distress. This study examines the determinants of international trade in Nigeria from 1999-2022 using econometric regression technique of the Ordinary Least Square (OLS) to model the extent to which cost of doing business, import tariff, inflation rate, infrastructure and exchange rate has influenced international trade proxied by trade openness in Nigeria. All data used are secondary data obtained from the Statistical Bulletin of Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) annual publications and World Bank DataBank. Results of the OLS revealed that infrastructure and exchange rate have a positive impact on international trade in Nigeria. On the other hand, import tariff, cost of doing business and inflation has a negative impact on international trade in Nigeria. Thus, increase in import tariff, cost of doing business and inflation will bring about a decline in foreign trade in Nigeria. The study revealed that cost of doing business, import tariffs, inflation rate, infrastructure and exchange rate are good and are the major determinants of international trade in Nigeria because the coefficient of determination (R^2) is given as 53%, which shows that the explanatory power of the variables is moderately strong. The study recommends that the government should create an environment that fosters business growth by investing in energy-efficient technologies and advocating for improvements in the energy sector to reduce costs and ensure a stable power supply. The government

should simplify import and export procedures to facilitate international trade by aassessing the economic impact of existing tariffs on both domestic industries and consumers. This will help to consider the potential benefits of reducing tariffs, such as increased competition, lower prices for consumers, and improved market access for exporters among others.

Keywords: Cost of Doing Business, Import Tariffs, Inflation Rate, Infrastructure, Exchange Rate, International trade.

1. Introduction

International trade is a key driver of globalization, connecting economies and societies around the world. It has led to increased interdependence among nations and has both benefits and challenges. International trade refers to the exchange of goods, services, and capital across national borders. It plays a crucial role in the global economy, fostering economic growth, creating job opportunities, and enabling nations to specialize in the production of goods and services in which they have a comparative advantage (Magaji & Abubakar, 2023; Okenna & Adesanya, 2020). UNCTAD, 2018). Countries export goods and services they can produce efficiently, often due to factors like abundant natural resources, skilled labor, or advanced technology. Conversely, they import goods and services that are more efficiently produced by other nations (Bulut & Yasar, 2023). International trade has both advantages and disadvantages. On the positive side, it promotes economic efficiency, stimulates innovation, and allows consumers to access a wider variety of goods. However, it can also lead to job displacement, income inequality, and economic vulnerability in certain industries or regions. Effective trade policies and international cooperation are essential for harnessing the benefits of international trade while addressing its challenges (Abinabo & Abubakar, 2023). Global trade has lost dynamism in the last decade and its growth is not expected to regain traction. While global trade as a share of GDP increased rapidly before the Global Financial Crisis (GFC), from around 41% in 1996 to more than 60% in 2008, it has stalled since then (Wozniak and Galar, 2018). Taking into account the more complex and, sometimes, more hostile global environment for trade relations, as well as changing economic drivers, going forward world trade growth is set to be in line or slightly below global output (WTO, 2022; BCG, 2022). Today, the global trade has continued to face multiple challenges as inflation and high interest rates, debt distress and geopolitical frictions weigh on many economies. The downside risks to the global economy and international trade are significant, ranging from an escalation of Russia's war on Ukraine to deepening tensions between the US and China (Schneider-Petsinger, 2023). This challenges was corroborated by Okonjo-Iweala (2023) who posited the succession of crises buffeting the global economy, with the COVID-19 pandemic that gave way to the war in Ukraine, inflation, monetary tightening, and widespread debt distress have made world trade to lost momentum particularly from 2022 and remaining weak into early 2023. That said, global trade growth has remained positive, underscoring how trade has been a force for economic recovery and resilience. Nevertheless, numerous downside risks, from geopolitical tensions to potential financial instability, are clouding the mediumterm outlook for both trade and overall output. Global trade reached a record US$ 32 trillion in 2022. Trade in goods was about US$ 25 trillion (an increase of about 10 per cent from 2021) and trade in services totalled about US$ 7 trillion (an increase of about 15 per cent from 2021). Those record levels are largely due to robust growth in the first half of 2022. Conversely, trade growth has been subpar during the second half of 2022, especially in the last quarter of 2022. In Q4 2022 trade in goods declined by about US$ 250 billion relative to Q3 2022. Trade in services remained virtually constant. The UNCTAD nowcast for Q1 2023 indicates global trade in goods to increase by about 1 per cent, while trade in services is expected to increase by about 3 per cent on the same basis (UNCTAD, 2023).

In Nigeria, a number of indices are perceptibly responsible for the volatile and misaligned international trade and growth nexus. Some common challenges associated with international trade in Nigeria include: changes

in political leadership or unstable governments in trading partners which create uncertainties for businesses and unfavourable regulations and legal systems that complicate trade and increase compliance costs. The changes in exchange rates have serious impact on the cost of goods, profits, and competitiveness of businesses engaged in international trade. There are the challenges of tariffs, quotas, and non-tariff barriers imposed by governments to protect domestic industries, making it harder for foreign businesses to access certain markets. Again is the events such as natural disasters, political unrest, or global health crises which disrupt the supply chain, leading to delays and increased costs for international businesses. Nigeria, inadequate infrastructure and logistical challenges in some regions has hindered the efficient movement of goods and increase transportation costs coupled with the challenges in navigating diverse ethical standards and social responsibility expectations in different countries. Another issue is the perceived unfavourable labour laws, practices, and costs that affect the competitiveness of businesses and may lead to ethical concerns, such as exploitation of cheap labour and disparities in technological capabilities and innovation levels between trading partners that create challenges for businesses trying to stay competitive. Consequently, addressing these challenges often requires effective diplomatic efforts, international cooperation, and strategic business planning to navigate the complexities of the global marketplace.

In line with the preceding challenges, the Nigeria foreign trade remains volatile. Empirical evidence showed that in the first quarter of 2023, Nigeria's total trade stood at ₦12,046.92 billion of which total exports stood at ₦6,487.04 billion and total imports amounted to ₦5,559.88 billion. Total exports increased in the first quarter by 2.00% but declined by 8.66% when compared to the amount recorded in the fourth quarter of 2022 (₦6,359.61billion) and the corresponding quarter in 2022 (₦7,102.11 billion) respectively. In the same vein, total imports increased by 3.67% in the first quarter of 2023 compared to the value recorded in the fourth quarter of 2022 (₦5,362.83 billion) but then again declined by 25.83% when compared to the value recorded in the corresponding quarter of 2022 (₦7,495.67 billion). The value of total imports stood at ₦5,559.88 billion in the first quarter of 2023, this represents a 3.67% rise when compared with the value recorded in Q4, 2022 (₦5,362.83 billion) but declined by 25.83% compared to the value recorded in the corresponding quarter of 2022 (₦7,495.67 billion) (National Bureau of Statistics [NBS], 2023). International trade in Nigeria, like in any other country, is influenced by various determinants. These factors can be economic, social, political, and technological in nature. While Nigeria rich natural resources, including oil, natural gas, agricultural products, and minerals remain a major and obvious factors factor, there are other propelling factors like political stability which is crucial for fostering an environment conducive to international trade. Government economic policies, including trade policies, tariffs, and subsidies, can influence international trade. Political instability and uncertainty that can deter foreign investment and disrupt trade relations. Advancements in technology which can enhance the efficiency of production processes and facilitate international trade. The level of education and skills of the workforce can influence the types of goods and services that Nigeria can produce and trade. The study will take a cursory look at high cost of doing business, import tariff, inflation rate, the state of infrastructure, including transportation, communication, and energy infrastructure and the exchange rate volatility to ascertain its influence on international trade in Nigeria. It's important to note that these determinants are interconnected, and changes in one factor can have ripple effects across the entire international trade landscape. Additionally, the effectiveness of policies and strategies in response to these determinants plays a crucial role in shaping Nigeria's international trade outcomes.

2. Statement of the Problem

This study was informed by the volatile trade and increasing slowed trade flows in Nigeria in the past one decade as a result a number of companies have closed down and some exited the country. Among some of the reasons cited by extant literature are high cost of doing business, import tariff, inflation rate, the state of infrastructure, including transportation, communication, and energy infrastructure and the exchange rate volatility. It is however uncertain the extent to which these variables have influenced trade flows in Nigeria thus warranting an empirical investigation. Today, the high cost of doing business is evidenced in the

skyrocketed price of diesel. In the first half of 2022, manufacturing firms listed on the Nigeria Exchange Limited incurred N207.54 billion as energy cost thus making it difficult for some businesses to survive. According to a survey conducted by the Manufacturers Association of Nigeria (MAN), which covered the period from 2018 to 2021, close to 400 big businesses had collapsed due to the rising cost of doing business in Nigeria. Opuala-Charles & Oshilike (2023) posits that a large majority of newly established small and medium-sized businessesin the country have a difficult time staying afloat past the three-year mark. As a result, many foreign investors and business owners have decided to withdraw their investments and move their operations. In 2019, out of 190 countries, Nigeria was ranked 131st in the World Bank's Ease of Doing Business Report. 80% of new businesses and startups in Nigeria fail within the first 3 years (https://invoice.ng/blog/challenges-of-doing-business-in-nigeria). Another, variable that have perceptibly influenced international trade is import tariff. The government charge high tariffs thus this increase the price of goods and services in domestic markets by applying a tax on imported goods that is paid by the domestic importer. To cover the increased costs, the domestic importer then charges higher prices for the goods and services. Inflation in Nigeria has been in double digits since 2016, eroding savings and incomes and prompting the central bank to hike interest rates to their highest level in nearly two decades. Today, the level of inflation has hit the rooftop as the government scrapped a popular but costly petrol subsidy, causing prices to triple, and ended restrictions on foreign exchange trading, which has weakened the naira more than 40%. Food inflation, which accounts for the bulk of Nigeria's inflation basket, rose to 26.98% in July from 25.25% in June. in addition to higher consumer prices which especially harms lower income households, inflation has could case harmful macroeconomic consequences of triggering higher interest rates, lower exports, lower savings, mal-investments and inefficient government spending in infrastructural development including transportation, communication, and energy infrastructure. Again is the exchange rate volatility that negatively impact Nigeria's economic growth. A fall in the value of Naira relative to the US Dollar has adversely affected Nigeria's economic growth and vice-versa. This study sets out to examine the determinants of international trade in Nigeria by modelling the extent to which high cost of doing business, import tariff, inflation rate, infrastructure and exchange rate has influenced trade openness in Nigeria.

3. Objectives of the Study

The objective of the study is to examine the determinants of international trade in Nigeria. Specifically the study intends to:

i. Examine the effect of cost of doing business on trade openness in Nigeria.

ii. Determine the effect of import tariff on trade openness in Nigeria.

iii. Ascertain the effect of inflation rate on trade openness in Nigeria.

iv. Evaluate the influence of infrastructure on trade openness in Nigeria.

v. Examine the effect of exchange rate on trade openness in Nigeria

4. Hypotheses of the Study

Ho_1: Cost of doing business has no significant influence on trade openness in Nigeria.

Ho_2: Import tariff has no significant influence on trade openness in Nigeria.

Ho_3: Inflation rate has no significant influence on trade openness in Nigeria.

Ho_4: Infrastructure has no significant influence on trade openness in Nigeria.

Ho_5: Exchange rate has no significant influence on trade openness in Nigeria

5. Literature Review

Determinants of International Trade in Nigeria

International trade in Nigeria is influenced by a variety of factors, including macroeconomic conditions, trade policies, and market dynamics. Economic growth, political stability, and resource endowments are critical determinants of Nigeria's trade performance. According to Adegbite and Adeniyi (2021), Nigeria's trade patterns are significantly shaped by its dependency on crude oil exports, which account for the majority of its foreign exchange earnings. Furthermore, trade policies such as the African Continental Free Trade Agreement (AfCFTA) aim to reduce barriers and promote regional integration, thereby enhancing trade volumes. The role of institutional quality, including governance and regulatory efficiency, also critically impacts Nigeria's ability to attract foreign investment and expand export markets (Ighodaro et al., 2020). Additionally, global economic conditions and trade relations with key partners influence Nigeria's trade. For instance, the demand for Nigerian oil products in international markets fluctuates with global oil prices, affecting the country's export revenues. Similarly, restrictions such as non-tariff barriers in importing countries often hinder the competitiveness of Nigerian exports (Ojo et al., 2019). Diversification into non-oil sectors, including agriculture and manufacturing, is increasingly recognized as a crucial strategy for sustainable trade growth, as highlighted by Ezeaku et al. (2022).

Cost of Doing Business

The cost of doing business in Nigeria remains a significant challenge, influencing the nation's trade performance and investment climate. High operating costs, driven by inadequate infrastructure, bureaucratic inefficiencies, and energy costs, hinder business growth. As noted by Alabi et al. (2021), businesses in Nigeria face high logistics and transportation expenses due to poor road networks and unreliable power supply, which raises production costs and reduces competitiveness. Moreover, cumbersome regulatory requirements and corruption contribute to the cost burden on enterprises. Efforts to reduce the cost of doing business have been championed by the government through initiatives such as the Presidential Enabling Business Environment Council (PEBEC). According to Akinpelu and Onyekwena (2020), these reforms have improved Nigeria's ranking in the World Bank's Ease of Doing Business Index, particularly in areas like starting a business and obtaining credit. However, further improvements in infrastructure, governance, and the judicial system are critical for creating a conducive business environment.

Import Tariff

Import tariffs play a dual role in Nigeria's trade policy, serving as a tool for revenue generation and domestic industry protection. While tariffs on certain imports aim to safeguard local industries, they often lead to increased costs for businesses relying on imported raw materials. According to Nwosu et al. (2021), high tariffs on essential inputs can discourage investment in manufacturing and undermine export competitiveness. Conversely, lowering tariffs under regional agreements like the AfCFTA can foster trade and reduce smuggling activities. Empirical evidence shows that tariff liberalization has mixed effects on the Nigerian economy. Ajayi et al. (2019) found that while reduced tariffs have boosted trade volumes, the lack of corresponding industrial policy measures to enhance domestic production capacity limits the benefits. Policymakers are encouraged to strike a balance between protecting local industries and promoting an open trade regime to maximize economic gains.

Inflation Rate

Inflation is a critical macroeconomic variable that affects Nigeria's trade dynamics by influencing the cost of goods and services. High inflation erodes purchasing power and increases production costs, making exports less competitive in international markets. Okafor et al. (2020) observed that Nigeria's inflationary pressures are largely driven by exchange rate volatility and supply chain disruptions. These factors increase the price of

imported goods, further exacerbating inflationary trends. Efforts to stabilize inflation in Nigeria include monetary policy interventions by the Central Bank of Nigeria (CBN), such as adjusting interest rates and managing money supply. According to Umeh and Igwe (2022), controlling inflation is crucial for maintaining export competitiveness and ensuring price stability in domestic markets. A stable inflation rate enhances Nigeria's ability to attract foreign investment and integrate effectively into global value chains.

Infrastructure

Infrastructure plays a pivotal role in determining the competitiveness of Nigeria's trade and business environment. Poor infrastructure, particularly in transportation, energy, and logistics, increases the cost of doing business and limits access to international markets. Adepoju et al. (2019) highlighted that Nigeria's inadequate infrastructure significantly hampers export potential by increasing transit times and reducing the reliability of supply chains. Investments in infrastructure development are critical for enhancing trade efficiency. According to Bello and Akinola (2021), public-private partnerships (PPPs) have emerged as a viable model for bridging Nigeria's infrastructure gap. Improved infrastructure, including roads, ports, and telecommunications, would not only reduce transaction costs but also attract foreign direct investment (FDI), thereby fostering trade expansion.

Exchange Rate

Exchange rate fluctuations profoundly impact Nigeria's international trade by influencing export and import prices. A depreciating currency makes exports cheaper and more competitive globally, but it also increases the cost of imports, leading to inflationary pressures. According to Olayemi and Ezeh (2021), exchange rate volatility is a significant concern for Nigerian businesses, particularly those reliant on imported inputs. Policies aimed at stabilizing the exchange rate, such as the adoption of a managed float system, have been implemented to mitigate adverse effects on trade. Adebayo et al. (2022) emphasized that maintaining exchange rate stability is crucial for attracting investment and boosting export performance. A stable exchange rate regime enhances trade predictability, fostering economic growth in the long run.

Trade Openness

Trade openness, measured by the ratio of trade to GDP, reflects the extent to which an economy integrates into the global market. In Nigeria, trade openness has been both an opportunity and a challenge. On the one hand, it facilitates access to international markets and technology; on the other hand, it exposes domestic industries to stiff competition. According to Akinwale and Yusuf (2020), increased trade openness under the AfCFTA is expected to enhance regional integration and drive economic growth. However, Nigeria's trade openness is hindered by structural issues, including low industrial capacity and over-reliance on crude oil exports. Diversifying the export base and enhancing value addition in agricultural and manufacturing sectors are critical for realizing the benefits of trade openness (Okeke et al., 2019). Strategic trade policies and capacity-building initiatives are necessary to position Nigeria as a competitive player in global markets.

6. Methodology

Model specification

International trade will be proxied by trade openness and will serve as the dependent variable of the model while the explanatory variables include high cost of doing business, import tariff, inflation rate, infrastructures and exchange rate. Therefore, the model for this study is stated as followed:

The functional form of the model is:

INTL = f (BIX, IMT, INF, FRA, EXR)   …   …   …   (1)

The mathematical form of the model 1 is:

$$INTL = \beta_0 + \beta_1 BIX + \beta_2 IMT + \beta_3 INF + \beta_4 FRA + \beta_5 EXR \qquad \ldots \qquad (2)$$

The econometric form of the model 1 is:

$$INTL = \beta_0 + \beta_1 BIX + \beta_2 IMT + \beta_3 INF + \beta_4 FRA + \beta_5 EXR + \mu_i \qquad \ldots \qquad (3)$$

Where; INTL = International trade measured by sum of export and imports of goods and services measured as a share of gross domestic product

BIX = High cost of doing business

IMT = Import tariff

INF = Inflation proxy by inflation rate

FRA = Infrastructure proxied by government expenditure on power

EXR = Exchange rate measured by real exchange rate

f = Functional relationship

β_0 = intercept of the model

β_1 - β_5 = parameters of the regression coefficients

μ_i = Stochastic error term

μ_i = Stochastic error term

Explanation of variables

a. International Trade (INTL): While international trade is an external trading between two or more countries. Foreign trade is the sum of exports and imports of goods and services. Thus, international trade will be proxied by the sum of export minus import divided by GDP), which refers to the degrees to which countries or economies permit to have trade with other countries or economies.

b. Cost of doing business (BIX): The cost of doing business refers to all the required activities or engagement that is needed to run a business that will eventually have a profitable return. It can also be regarded as the worth of doing a viable and profitable business. High cost of doing business is expected to have a negative impact on international trade while low cost of doing business is expected to have a positive impact on international trade in Nigeria.

c. Import Tariffs (IMT): An import tariff is a tax placed by governments on commodities that are shipped into a country from a foreign country. These taxes are often a way to discourage a country's consumers from buying products from another country and to support domestic products and services. Governments generally have the right to determine what products will have a tariff and how much that tax will be. Tariffs are used to restrict trade, as they increase the price of imported goods and services, making them more expensive to consumers. They are one of several tools available to shape trade policy. TARF will be proxied by prices of imported goods.

c. Inflation (INF): Inflation is defined as a sustained increase in the general level of prices for goods and services in an economy over a time period. It is measured as an annual percentage increase. Inflation is also the rate at which the general level of prices for goods and services is rising and, consequently, the purchasing power of currency is falling. Hence, this study proxied inflation by inflation rate.

d. Infrastructure (FRA): this refers to basic equipment and structures (such as roads and bridges, etc) and facilities (housing, power supplies etc) that are needed for a country, region or organisation to function and perform properly and work effectively.

e. Exchange rate (EXR): The exchange rate of a country is a measure of the price that the local currency exchanges with specific convertible foreign currency. An exchange rate (also known as a foreign-exchange rate, forex rate, FX rate) between two currencies is the rate at which one currency will be exchanged for another. It is also regarded as the value of one country's currency in terms of another currency. EXR is expected to have either positive or negative impact on both international trade and economic growth in Nigeria.

Method of data analysis

The economic technique employed in the study is the ordinary least square (OLS). This is because (i) the OLS estimators are expressed solely in terms of the observable (i.e. sample) quantities. Therefore, they can be easily computed. (ii) They are point estimators; that is, given the sample, each estimator will provide only a single value of the relevant population parameter. (iii) The mechanism of the OLS is simple to comprehend and interpret. (iv) Once the OLS estimates are obtained from the same data, the sample regression line can be easily obtained. The Economic views (E-views) software will be adopted for regression analysis.

Stationarity (unit root) test

The importance of this test cannot be overemphasized since the data to be used in the estimation are time-series data. In order not to run a spurious regression, it is worthwhile to carry out a stationary test to make sure that all the variables are mean reverting that is, they have constant mean, constant variance and constant covariance. In other words, that they are stationary. The Augmented Dickey-Fuller (ADF) test would be used for this analysis since it adjusts for serial correlation.

Decision rule: If the ADF test statistic is greater than the MacKinnon critical value at 5% (all in absolute term), the variable is said to be stationary. Otherwise it is non stationary.

Evaluation of parameter estimates

The estimates obtained from the model shall be evaluated using three (3) criteria. The three (3) criteria include:

1. The economic a priori criteria.
2. The statistical criteria: First Order Test
3. The econometric criteria: Second Order Test

Evaluation based on economic a priori criteria

This could be carried out to show whether each regressor in the model is comparable with the postulations of economic theory; i.e., if the sign and size of the parameters of the economic relationships follow with the expectation of the economic theory. The a priori expectations, in tandem with the manufacturing sector growth and its determinants are presented in Table 3.1 below, thus:

Table 1: Economic a priori expectation

Parameters	Variables		Expected Relationships
	Regressand	Regressor	
β_0	INTL	Intercept	+/-
β_1	INTL	BIX	-
β_2	INTL	IMT	-
β_3	INTL	INF	-
β_4	INTL	FRA	+
β_5	INTL	EXR	+/-

Source: Researchers compilation

A positive '+' sign indicate that the relationship between the regressor and regressand is direct and move in the same direction i.e. increase or decrease together. On the other hand, a '-' shows that there is an indirect (inverse) relationship between the regressor and regressand i.e. they move in opposite or different direction.

Evaluation based on statistical criteria: First Order Test

This aims at the evaluation of the statistical reliability of the estimated parameters of the model. In this case, the F-statistic, Co-efficient of determination (R^2) and the Adjusted R^2 are used.

(a). The square of the coefficient of determination R^2 or the measure of goodness of fit is used to judge the explanatory power of the explanatory variables on the dependent variables. The R^2 denotes the percentage of variations in the dependent variable accounted for by the variations in the independent variables. Thus, the higher the R^2, the more the model is able to explain the changes in the dependent variable.

However, if R^2 equals one, it implies that there is 100% explanation of the variation in the dependent variable by the independent variable and this indicates a perfect fit of regression line. While where R^2 equals zero. It indicates that the explanatory variables could not explain any of the changes in the dependent variable. Therefore, the higher and closer the R^2 is to 1, the better the model fits the data. Note that the above explanation goes for the adjusted R^2.

(b). F-Test: The F-statistic is a measure of the overall significance of the estimated regression. It is used to compare two population variances. Thus, in verifying the overall significance of the estimated model, the hypothesis tested is:

H_0: The model has no goodness of fit

H_1: The model has a goodness of fit

Decision rule: Reject H_0 if $F_{cal} > F_\alpha$ (k-1, n-k) at $\alpha = 5\%$, accept if otherwise.

Evaluation based on econometric criteria: Second Order Test

This aims at investigating whether the assumption of the econometric method employed are satisfied or not. It determines the reliability of the statistical criteria and establishes whether the estimates have the desirable properties of unbiasedness and consistency. In this case, Autocorrelation, Multicolinearity and Heteroscedasticity will be tested.

Test for Autocorrelation

Autocorrelation can be regarded as "correlation between members of series of observations ordered in time (as in time series data) or space (as in cross-sectional data)". This test is carried out to see if the error or disturbance term (μ_t) is temporarily independent. It tests the validity of non autocorrelation disturbance. The Durbin-Watson (DW) test is appropriate for the test of First-order autocorrelation and it has the following decision criteria.

1. If d* is approximately equal to 2 (d* =2), we accept that there is no autocorrelation in the function.

2. If d*= 0, there exist perfect positive auto-correlation. In this case, if 0<d*< 2, that is, if d* is less than two but greater than zero, it denotes that there is some degree of positive autocorrelation, which is stronger the closer d* is to zero.

3. If d* is equal to 4 (d*=4), there exist a perfect negative autocorrelation, while if d* is less than four but greater than two (2<d*< 4), it means that there exist some degree of negative autocorrelation, which is stronger the higher the value of d*.

Test for Multicolinearity

Multicolinearity means the existence of a "perfect," or exact, linear relationship among some or all explanatory variable of a regression model. It is use to determine whether there is a correlation among variables.

Decision Rule: From the rule of Thumb, if correlation coefficient is greater than 0.8, we conclude that there is multicolinearity but if the coefficient is less than 0.8 there is no multicolinearity. Also, reject the null hypothesis (H_0), if any two variables in the model are in excess of 0.8 or even up to 0.8. Otherwise we reject.

Test for Heteroscedasticity

The essence of this test is to see whether the error variance of each observation is constant or not. Non-constant variance can cause the estimated model to yield a biased result. White's General Heteroscedasticity test would be adopted for this purpose.

Decision Rule: We reject the null hypothesis (H_0) that there is a heteroscedasticity in the residuals if F calculated is greater than F tabulated ($F_{cal} > F_{tab}$) at 5% critical value, otherwise accept at 5% level of significance.

Test for research hypotheses

This study will test the research hypothesis using t-test. The t-statistics test tells us if there is an existence of any significance relationship between the dependent variable and the explanatory variables. The t-test will be conducted at 0.05 or 5% level of significance.

Decision rule: Reject H_0 if $t_{cal} > t_{\alpha/2}$, (n-k). Otherwise, we accept.

Nature and source of data

All data used in this research are secondary time series data which are sourced from the Central Bank of Nigeria (CBN) statistical bulletin and National Bureau Statistics (NBS) annual publications and World Bank DataBank.

7. Presentation of Empirical Results

Summary of Stationary Unit Root Test

Establishing stationarity is essential because if there is no stationarity, the processing of the data may produce biased result. The consequences are unreliable interpretation and conclusions. The study test for stationarity using Augmented Dickey-Fuller (ADF) tests on the data. The ADF tests are done on level series, first and second order differenced series. The decision rule is to reject stationarity if ADF statistics is less than 5% critical value, otherwise, accept stationarity when ADF statistics is greater than 5% criteria value. The result of regression is presented in table 2 below.

Table 2: Summary of ADF test results

Variables	ADF Statistics	Lagged Difference	1% Critical Value	5% Critical Value	10% Critical Value	Order of Integration
INTL	-6.615297	1	-3.769597	-3.004861	-2.642242	*I*(1)
BIX	-4.787660	1	-3.769597	-3.004861	-2.642242	*I*(1)
IMT	-6.102123	1	-3.769597	-3.004861	-2.642242	*I*(1)
INF	-4.647699	1	-3.769597	-3.004861	-2.642242	*I*(1)
FRA	-4.076851	1	-3.769597	-3.004861	-2.642242	*I*(1)
EXR	-4.540188	1	-3.769597	-3.004861	-2.642242	*I*(1)

Source: Researcher computation

Evidence from unit root table above shows that none of the variables are stationary at level difference that is, $I(0)$, rather all the variables are stationary at first difference, that is, $I(1)$. Since the decision rule is to reject stationarity if ADF statistics is less than 5% critical value, and accept stationarity when ADF statistics is greater than 5% criteria value, the ADF absolute value of each of these variables is greater than the 5% critical value at their first difference but less than 5% critical value in their level form. Therefore, they are all stationary at their first difference integration.

Presentation of Result

The results of the regression test are presented in table 3 below.

Table 3: Summary of regression results

Dependent Variable: INTL

Method: Least Squares

Sample: 1999 2023

Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	68.50092	16.43617	4.167692	0.0006
BIX	-0.808351	0.216674	-4.038542	0.0009
IMT	-0.141284	0.491785	-2.287289	0.0302
INF	-0.290707	0.179895	-1.615976	0.1235
FRA	3.14E-06	1.86E-06	2.690849	0.0298
EXR	0.028955	0.098345	2.294419	0.0318
R-squared	0.531126	F-statistic		12.72824
Adjusted R-squared	0.437106	Prob(F-statistic)		0.000685
S.E. of regression	11.25609	Durbin-Watson stat		1.774397

Source: Researcher computation
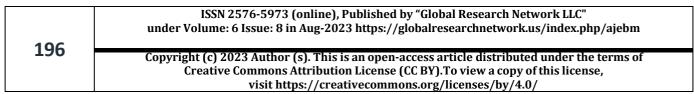
Evaluation of Findings

To discuss the regression results as presented in table 3, we employ economic a priori criteria, statistical criteria and econometric criteria.

Evaluation based on economic a priori criteria

This subsection is concerned with evaluating the regression results based on a priori (i.e., theoretical) expectations. The sign and magnitude of each variable coefficient is evaluated against theoretical expectations.

From table 3, it is observed that the regression line have a positive intercept as presented by the constant (c) = 68.50092. This means that if all the variables are held constant or fixed (zero), the Nigerian foreign trade will be valued at 68.5. Thus, the a-priori expectation is that the intercept could be positive or negative, so it conforms to the theoretical expectation.

The analysis further revealed in table 3 that adequate infrastructure and exchange rate have a positive impact on international trade in Nigeria. This means that if adequate infrastructure and exchange rate increases and improve, it will bring about more improvement and growth in Nigeria through foreign trade. On the other hand, import tariff, cost of doing business and inflation has a negative impact on international trade in

Nigeria. Thus, increase in import tariff, cost of doing business and inflation will bring about a decline in foreign trade in Nigeria.

From the regression analysis, it is observed that all the variables conform to the a priori expectation of the study. Thus, table 4 summarises the a priori test of this study.

Table 4: Summary of economic a priori test

Parameters	Variables		Expected Relationships	Observed Relationships	Conclusion
	Regressand	Regressor			
β_0	INTL	Intercept	+/-	+	Conform
β_1	INTL	BIX	-	-	Conform
β_2	INTL	IMT	-	-	Conform
β_3	INTL	INF	-	-	Conform
β_4	INTL	FRA	+	+	Conform
β_5	INTL	EXR	+/-	+	Conform

Source: Researchers compilation

Evaluation based on statistical criteria

This subsection applies the R^2, adjusted R^2 and the f–test to determine the statistical reliability of the estimated parameters. These tests are performed as follows:

From our regression result, the coefficient of determination (R^2) is given as 0.531126, which shows that the explanatory power of the variables is moderately high and/or strong. This implies that 53% of the variations in the growth of foreign trade in Nigeria are being accounted for or explained by the variations in the cost of doing business, import tariff, inflation, infrastructure and exchange rate in Nigeria. While other determinants of foreign trade growth not captured in the model explain just 47% of the variation in international trade in Nigeria.

The adjusted R^2 supports the claim of the R^2 with a value of 0.437106 indicating that 44% of the total variation in the dependent variable (international trade) is explained by the independent variables (the regressors). Thus, this supports the statement that the explanatory power of the variables is moderately high and strong.

The F-statistic: The F-test is applied to check the overall significance of the model. The F-statistic is instrumental in verifying the overall significance of an estimated model. The hypothesis tested is:

H_0: The model has no goodness of fit

H_1: The model has a goodness of fit

Decision rule: Reject H_0 if $F_{cal} > F_\alpha$ (k-1, n-k) at α = 5%, accept if otherwise.

Where

V_1 / V_2 Degree of freedom (d.f)

$V_1 = n-k$, $V_2 = k-1$:

Where; n (number of observation); k (number of parameters)

Where k-1 = 6-1= 5

Thus, n-k = 25-6　　= 19

Therefore, $F_{0.05(5,19)} = 2.74$　　(From the F table)　　… F-table

F-statistic = 12.72824   (From regression result)   … F-calculated

Since the F-calculated > F-table, we reject H_0 and accept H_1 that the model has goodness of fit and is statistically different from zero. In other words, there is significant impact between the dependent and independent variables in the model.

Evaluation based on econometric criteria

In this subsection, the following econometric tests are used to evaluate the result obtained from our model; autocorrelation, heteroscedasticity and multicolinearity.

Test for Autocorrelation

Using Durbin-Watson (DW) statistics which we obtain from our regression result in table 3, it is observed that DW statistic is 1.774397 or approximately 2. This implies that there is no autocorrelation since d* is approximately equal to two. 1.774397 tends towards two more than it tends towards zero. Therefore, the variables in the model are not autocorrelated and that the model is reliable for predications.

Test for Multicolinearity

This means the existence of a "perfect," or exact, linear relationship among some or all explanatory variable of a regression model. This will be used to check if collinearity exists among the explanatory variables. The basis for this test is the correlation matrix obtained using the series. The result is presented in table 5 below.

Table 5: Summary of multicollinearity test

Variables	Correlation Coefficients	Conclusion
BIX and IMT	-0.372952	No multicollinearity
BIX and INF	-0.354700	No multicollinearity
BIX and FRA	0.712879	No multicollinearity
BIX and EXR	0.720692	No multicollinearity
IMT and INF	0.480088	No multicollinearity
IMT and FRA	-0.539975	No multicollinearity
IMT and EXR	-0.370143	No multicollinearity
INF and FRA	-0.478818	No multicollinearity
INF and EXR	-0.609324	No multicollinearity
FRA and EXR	0.757878	No multicollinearity

Source: Researchers compilation

Decision Rule: From the rule of Thumb, if correlation coefficient is greater than 0.8, we conclude that there is multicolinearity but if the coefficient is less than 0.8 there is no multicolinearity. We therefore, conclude that the explanatory variables are not perfectly linearly correlated.
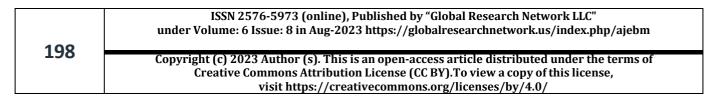
Test for Heteroscedasticity

This test is conducted using the white's general heteroscedascity test. The hypothesis testing is thus:

H_0: There is a heteroscedasticity in the residuals

H_1: There is no heteroscedasticity in the residuals

Decision rule: Reject H_0 if the the probability of F- statistic of the white test is greater than the 0.05 significance level. We observe that the probability of F- statistic of the white test is 0.5834. Since the probability of F-test is greater than the 0.05 significance level, the test is we therefore reject the null hypothesis that there is a heteroscedasticity in the residuals. Hence, we reject H_0 and accept H_1 that the model

has no heteroscedasticity in the residuals and therefore, the data is reliable for predication.

Test of Research Hypotheses

The t-test is used to know the statistical significance of the individual parameters. Two-tailed tests at 5% significance level are conducted. The Result is shown on table 6 below. Here, we compare the estimated or calculated t-statistic with the tabulated t-statistic at t $_{\alpha/2} = t_{0.05} = t_{0.025}$ (two-tailed test).

Degree of freedom (df) = n-k = 25-6 = 19

So, we have:

$T_{0.025(19)} = 2.093$ …Tabulated t-statistic

In testing the working hypotheses, which partly satisfies the objectives of this study, we employ a 0.05 level of significance. In so doing, we are to reject the null hypothesis if the t-value is significant at the chosen level of significance; otherwise, the null hypothesis will be accepted. This is summarized in table 6 below.

Table 6: Summary of test of overall significance of the model

Variable	t-calculated (t_{cal})	t-tabulated ($t_{\alpha/2}$)	Conclusion
Constant	4.167692	±2.093	Statistically Significant
BIX	-4.038542	±2.093	Statistically Significant
IMT	-2.287289	±2.093	Statistically Significant
INF	-1.615976	±2.093	Statistically Insignificant
FRA	2.690849	±2.093	Statistically Significant
EXR	2.294419	±2.093	Statistically Significant

Source: Researchers computation

We begin by bringing our working hypothesis to focus in considering the individual hypothesis. From table 4.5, the t-test result is interpreted below;

For BIX, $t_{cal} > t_{\alpha/2}$, therefore we reject the null hypothesis and accept the alternative hypothesis. This means that BIX has a significant impact on INTL.

For IMT, $t_{cal} > t_{\alpha/2}$, therefore we reject the null hypothesis and accept the alternative hypothesis. Thus, IMT do have a significant impact on INTL.
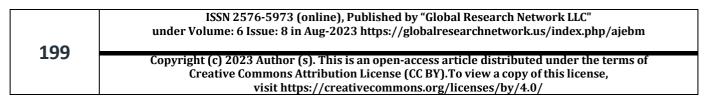
For INF, $t_{cal} < t_{\alpha/2}$, therefore we accept the null hypothesis and reject the alternative hypothesis. This means that INF does not have an impact on INTL.

For FRA, $t_{cal} > t_{\alpha/2}$, therefore we reject the null hypothesis and accept the alternative hypothesis. This means that FRA has a significant impact on INTL.

For EXR, $t_{cal} > t_{\alpha/2}$, therefore we reject the null hypothesis and accept the alternative hypothesis. Thus, EXR have a significant impact on INTL.

8. Conclusions and Recommendations

The study attempted to explain the determinants of international trade in Nigeria from 1999-2023 using Ordinary least Square (OLS) technique method. All data used are secondary data obtained from the Statistical Bulletin of Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) annual publications and World Bank DataBank. From the result of the OLS, it is observed that adequate infrastructure and exchange rate have a positive impact on international trade in Nigeria. This means that if adequate infrastructure and exchange rate increases and improve, it will bring about more improvement and growth in Nigeria through foreign trade. On the other hand, import tariff, cost of doing business and inflation has a negative impact on

international trade in Nigeria. Thus, increase in import tariff, cost of doing business and inflation will bring about a decline in foreign trade in Nigeria. From the regression analysis, it is observed that all the variables conform to the a priori expectation of the study.

The study revealed that cost of doing business, import tariffs, inflation rate, infrastructure and exchange rate are good and are the major determinants of international trade in Nigeria because the coefficient of determination (R^2) is given as 53%, which shows that the explanatory power of the variables is moderately strong. The F-test conducted in the study shows that the model has a goodness of fit and is statistically different from zero. In other words, there is a significant impact between the dependent and independent variables in the model. Finally, both R^2 and adjusted R^2 show that the explanatory power of the variables is moderately high and/or strong in explaining the international trade in Nigeria.

The study recommends that the government should create an environment that fosters business growth by investing in energy-efficient technologies and advocating for improvements in the energy sector to reduce costs and ensure a stable power supply. The government should simplify import and export procedures to facilitate international trade by aassessing the economic impact of existing tariffs on both domestic industries and consumers. This will help to consider the potential benefits of reducing tariffs, such as increased competition, lower prices for consumers, and improved market access for exporters. Apart from the use of fiscal and monetary policy, the central bank and government officials can communicate effectively with the public about their commitment to controlling inflation. This can help manage expectations and influence behavior. The government should invest in infrastructure development, including transportation, energy, and telecommunications, to improve logistics and connectivity. The government should maintain political stability and implement structural economic reforms that can improve investor confidence and attract foreign capital and consequently strengthening the exchange rate.

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