



## **Trade and Sustainable Development: The Nigeria-China Experience**

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### **Abstract**

The significance of Nigeria-China bilateral trade relations has evolved over the years in nature, scope, and impact, making it imperative for mainstream research to analyze its potential implications for sustainable development. This paper assessed the impact of Nigeria-China bilateral relations on sustainable development for both countries from 1980-2020. The Autoregressive Distributive Lag (ARDL) model was used to evaluate how bilateral trade intensities influence sustainable development. Findings show that Nigeria's export to China yields a positive and significant impact on Nigeria's sustainable development while China's export to Nigeria has a negative and significant impact on Nigeria's sustainable development. Further findings reveal that Nigeria's export to China does not have any significant impact on China's sustainable development, while China's export to Nigeria produced a positive and significant impact on China's sustainable development. The paper concludes that while trade propels sustainable development, it can also be detrimental through over-reliance on imports and the employment of unsustainable trade practices. In terms of policy import, Nigeria needs to improve its value addition, product innovation, and production processes to improve product standards and international competitiveness. Furthermore, the Nigerian and Chinese governments should invest substantially in research and development of green transport modes for importation activities and ensure their commitment to the Voluntary Sustainability Standards (VSS) to make the Nigeria-China trade relations holistically sustainable.

**Keywords:** Bilateral Trade, China, Competitiveness, Nigeria, Sustainable Development.

**JEL Classification:** F10.

### **1. Introduction**

The relationship between China and Africa has undergone significant expansion in recent years, surpassing that of the United States since 2010, and establishing

China as Africa's leading trading partner. These trade relations are documented to be largely facilitated by China's Investible Export loan assistance to the tune of \$150 billion (Brautigam, 2009). Exports from China to Africa increased from \$4.4 billion in 2001 to a whopping \$56.3 billion in 2011 (Raji and Ogunrinu, 2018). As a top trading partner and major financier of infrastructure projects, China has invested about \$143 billion in total debt finance (loan) between 2000 and 2017. Also, 70% of Africa's trade export to China was estimated at \$350 billion in 2017 comprising of crude oil and mineral products (Wenjie and Nord, 2017). With Nigeria being the second richest country in Africa (IMF, 2021 in World Population Review, 2022), her relations with China have been of significant interest and magnitude, hitting \$10.62 billion which is about 60 times higher than the total bilateral trade in the last 20 years (Ibrahim et al., 2020).

China's relationship with Nigeria has focused on the areas of trade, agriculture, foreign aid, infrastructure, investment, information and telecommunication, manufacturing, policy change, and economic relations (Afolabi and Oji, 2021; Foster, 2008). According to Opusunju et al. (2020), Nigeria's trade relations date back to 1971 when the country agreed with China even though economic activities did not fully take off until 1994. The Nigeria-China trading gained prominence with the influx of Chinese imports of clothing items, electrical appliances, auto parts, and other capital and agricultural, and industrial equipment, and types of machinery. Raji and Ogunrinu (2018) estimated the net investment of China's trade relations with Nigeria to be \$15.42 billion compared to other African countries like Algeria (\$9.23 billion), South Africa (\$6.64 billion), and Niger (\$5.26 billion) among others. This vigorous Sino-Nigeria relationship has proven to be of mutual benefit as it provides foreign direct investment (FDI) for Nigeria and serves as a market for China's inputs and output products (Ibrahim and Iorember, 2018).

Given that the significance of Nigeria-China bilateral trade relations has evolved over the years in nature, scale, and impact, the implications for sustainable development cannot be overlooked. This is more so for four major reasons. First, attaining the Sustainable Development Goals (SDGs) has become a global priority as each nation races to reach the various targets by 2030 which is less than a decade away. Consequently, the globe is not only adopting sustainability measures in its economic activities but also cognizant of the sustainability implications of its various economic activities as it makes a concerted effort to achieve global goals.

Second, the bilateral relations between the two countries have the potential to directly propel or hinder the achievement of sustainable development as areas of relations extend across agriculture, manufacturing, telecommunications, energy, petroleum, transport, informal and private sectors (Adewumi and Akinnuga, 2021). These are sectors that are critical to the SDGs, particularly SDG 1 (no poverty), SDG 2 (zero hunger), SDG 7 (affordable and clean energy), SDG 8 (decent work and economic growth), SDG 9 (industry, innovation and infrastructure), SDG 11 (sustainable cities and communities), SDG 12 (responsible consumption and production) SDG 13 (climate action) and SDG 17 (partnerships for the goals). A critical look at these SDGs shows that bilateral trade between Nigeria and China covers all three dimensions of sustainable development – economic (SDGs 1, 2, 8, 12, and 17), social (SDGs 11), and environmental (SDGs 7 and 13). By implication, existing bilateral trade between the two countries has the potential to make or mar sustainable development in the two countries.

Third and consequently, it is crucial that any undesirable or potentially negative impact of the Nigeria-China bilateral relations be prevented to consolidate and improve the growth, profitability, and sustainability of the Nigeria-China trade relations. Lastly, it is the trend to incorporate sustainable development objectives in trade agreements to ensure there is social justice in development, resources are utilized optimally, the environment is preserved and economic growth is pursued sustainably (Cosbey et al., 2004). Given these potential links and sustainability objectives, it becomes pertinent that the implications of Nigeria-China relations for sustainable development be examined to ascertain that the bilateral relation is aligned with sustainable development and does not jeopardize the attainment of SDGs for either nation.

Based on the foregoing, this paper aims to assess the impact of Nigeria-China bilateral relations on sustainable development for both countries over the period 1980 and 2020. Findings from this study are generalizable as the study utilizes the ARDL technique to evaluate how bilateral trade intensities influence sustainable development. The ARDL is the preferred methodology for this study as it has been credited with the merit of yielding consistent long-run estimates which makes results obtained therefrom robust and generalizable (Pesaran and Shin, 1997). Also, the study employs the sustainable development index (SDI) for both countries as the dependent variable which captures the efficiency of human development in ecological terms thereby accounting for economic, social, and

environmental factors that have been established to influence sustainable development (Abdulkareem et al., 2022). This study therefore provides a comprehensive and in-depth analysis that captures the concept of sustainable development holistically with important implications for all the areas and sectors covered by trade relations between Nigeria and China. This will guide the government, international organizations as well and the private sector on how to improve upon export products, conduct trade more sustainably, and utilize the export medium to boost the achievement of SDGs.

The study improves on scholarly literature on Nigeria-China bilateral relations in several areas. First, this is one of the foremost studies to examine the impact of bilateral trade on sustainable development. Aside from Oluwabiyi and Duruji (2021) and Zhao et al. (2022) which examined the impact of bilateral trade on sustainable development such as sustainable food security and energy, respectively, studies have not dwelled on this critical association. More so, this research departs from these aforementioned studies that centered on specific aspects of sustainable development by focusing on sustainable development in its entirety which allows for holistic and comprehensive analysis. Second, although several studies have been conducted to examine the Nigeria-China trade relations, these studies have not examined the impact of this particular relation on sustainable development. Rather, attention has been on aspects such as the balance of trade (Afolabi and Oji, 2021), perception and acceptability (Imanche et al., 2021), trends, composition, and intensity (Ibrahim & Sari, 2019), infrastructure investment (Eyitope, 2020), and its impact on economic security (Raji and Ogunrinu, 2018), economic growth (Opusunju et al., 2020), sustainable food security (Oluwabiyi and Duruji, 2021) among several others.

To fill the above-identified lacunas in the literature, this study examines the impact of Nigeria-China trade on sustainable development for both countries from 1980-2020 using the Autoregressive Distributive Lag (ARDL). The study discovered that Nigeria's export to China positively influences Nigeria's sustainable development while China's export to Nigeria has the opposite effect on Nigeria's sustainable development. Further findings reveal that Nigeria's export to China does not significantly influence China's sustainable development, while China's export to Nigeria exerts a positive and significant impact on China's sustainable development. Based on these findings, Nigeria and China must invest substantially in research and development of green transport modes for importation

activities and also ensure avowed commitment to the Voluntary Sustainability Standards (VSS) to make the Nigeria-China trade relations holistically sustainable which will boost the achievement of the SDGs.

The paper is organized in five sections, starting with this introductory section. The second section focuses on the theoretical and empirical review of relevant literature in the field while the third expounds the methodology employed for the paper. The fourth section presents the result analysis and ensuing discussions with the fifth section containing study conclusions and policy recommendations.

## **2. Literature Review**

### **2.1 Theoretical Review**

Several theoretical underpinnings have been proposed to explain international relations like that subsisting between Nigeria and China such the Theory of Cooperation and the Dependency theory. The theory of cooperation as espoused by Keohane and Nye (2001) posits that international relations are occasioned by cooperation and interdependence of relating partners. To this end, cooperating economies are positioned to both benefit from the relation leading to a win-win situation. Hence, both the country regarded as relative strong, and the ones regarded as relative weak, will both gain from the symbiotic relationship (Raji and Ogunrinu, 2018). The second theory is that of Dependency Theory of 1949 by Singer and Prebisch which posits that trade relations between developed and developing economies have worsened due to the unequal, exploitative relationship that exists among those countries. Dependency theorists regard this disadvantaged relationship in favor of the strong countries to be the major cause of the underdevelopment of the developing economies.

Both of these theories are particularly relevant in the Nigeria-China bilateral trade relations. Evidence supports the fact that the two countries cooperate for mutual benefits which is characterized by a win-win situation for both countries and this is supported by studies such as Ibrahim and Iorember (2018) and Abada et al. (2021). On the other hand, further analysis of the Sino-Nigeria relations reveals that even though the ensuing economic relations between the two countries are that of mutual benefit, economic gains have been largely unequal with China being the dominating party. Studies such as Afolabi and Oji (2021) and Raji and Ogunrinu (2018) lend empirical credence to the Dependency theory. These papers among others attest to China not only being the ‘superior’ trade partner but also

reaping larger gains from the bilateral relationship with Nigeria. Conclusively, both China and Nigeria are cooperating to boost the development of their respective nations with the aim of optimal cooperation which has yielded economic gains for both parties. While economic, political, and institutional factors are of significance, the proportion and quality of gain, (inter)dependence, and dynamics of equality of relationship however remain important aspects of international relations that cannot go unnoticed.

## **2.2 Empirical Review**

In their analysis of the effect of bilateral trade on fossil energy consumption in Brazil, India, China, and South Africa (BRICS), Chen et al. (2022) employed data from 2000 to 2019 analyzed using a gravity model. Findings indicate trade worsens sustainable development through high consumption of fossil fuels owing to high volumes of transportation. On the contrary, the study of Zhao et al. (2022) disagrees with Chen et al. (2022). Zhao et al. (2022) evaluated the impact of bilateral trade on SDGs through energy poverty for 27 countries in Europe. Data gathered from 2000-2019 were analyzed using cross-sectional autoregressive distributed lag (CS-ARDL), common correlated effects generalized method of moments (CCE-GMM), and instrumental variable regression. Findings established a positive and significant relationship between bilateral trade and energy accessibility thereby boosting the achievements of the SDGs.

Ogbonna and Ichoku (2022) assessed how the exchange rate and oil price fluctuations influence the bilateral trade relations between Nigeria and Belgium, China, the United Kingdom, and the United States. The paper employed the nonlinear autoregressive-distributed lag (NARDL) to analyze quarterly data gathered from 1999 to 2019. Results reveal that while Nigeria's bilateral trade with the UK and the USA responds asymmetrically to changes in oil price, the country's trade balance with China is influenced asymmetrically and significantly by exchange rate changes in the long run. Similarly, the study of Afolabi and Oji (2021) which examined the balance in Nigeria-China bilateral relations over the period of 2006 to 2016 using quantitative and qualitative analysis, findings indicated an unequal trade relationship between the two countries. This result partially aligns with the study of Abada et al. (2021) where the nexus between Nigeria-China trade relations and the development of Nigeria's manufacturing sector was investigated. Employing documentary method and content analysis, the

study indicated that Nigeria's economy improved by about 20% in the first quarter of 2019 of which the manufacturing industry accounted for 11%. This led to the conclusion that Nigeria benefits immensely from the Nigeria-China relations through trade gains and revenue.

In 2021, Oluwabiyi and Duruji (2021) investigated the impact of the Nigeria-China trade on food security in Nigeria using both primary and secondary data analyzed through descriptive statistics. Results reveal a relatively balanced bilateral relationship between the two countries albeit unequal. This agrees with Omotoso et al. (2020) who, while attempting to establish the inter(dependency) in the Nigeria-China bilateral relationship from 1999 to 2019, concluded that there exists an unequal relationship between the two nations with China being the dominant partner. With a non-probabilistic and qualitative approach, the drivers and impact of China's infrastructure investment and development in Nigeria were investigated by Eyitope (2020). The study discovered that the Nigeria-China economic relationship yields mixed effects influenced by economic, political, and institutional factors. Analyzing the effect of China-Nigeria trade relations on economic growth, Opusunju et al. (2020) adopted the cointegration technique and Vector Error Correction Model (VECM) to analyze data gathered from the Central Bank of Nigeria. Results indicated that long-run relations exist between Nigeria's GDP and Nigerian exports to China as well as between real GDP and China's imports to Nigeria. A causal relationship was also established between Nigerian exports and GDP to Nigeria's GDP and imports from China, respectively. Raji and Ogunrinu (2018) are in concurrence with Afolabi and Oji (2021) as the authors found that an unequal relationship exists between China and Nigeria which has not only heightened the dependency of the latter on the former but also hindered the economic security of Nigeria.

In Ibrahim and Sari (2019), the trends, composition, and intensity of bilateral trade between Nigeria and China were investigated from 1992-2016, results of which showed that the share of Nigeria's major exports was insignificant while that of imports from China was significant. With a focus on the effect of the One China Policy and the Nigeria Naira – China Yuan currency swap on the growth and development of Nigeria, Oke et al. (2019) utilized the random sampling method to gather primary data from relevant Nigerian trade organizations, ministries, departments, and agencies. Findings show that although Nigeria benefits in terms of infrastructural development and finance, this gain can be larger

through capacity building, training and knowledge transfer, prevention of dumping as well as a currency swap.

In addition, the sectoral and commodity comparative advantage in the Nigeria-China trade relations were evaluated by Ibrahim and Iorember (2018) using the Sectoral Comparative Advantage Index and Trade Complementarity Index. The study found that Nigeria's comparative advantage lies in the petroleum sector while China's is in the industrial sector. Further findings revealed that Nigeria is only able to meet 32.6% of China's import demand over the period 1988-2017 while China meets 57.4% of Nigeria's export demand. A similar conclusion was reached by Owuru and Farayibi (2016) who discovered that while China's exports to Nigeria experienced a rapid increase, the opposite is the case for Nigeria's exports to China leading to worsening trade imbalances between the two countries.

The empirical literature review conducted reveals several gaps in mainstream literature as regards the subject matter in two folds - trade and sustainable development and Nigeria-China bilateral relations. It is observed that academic literature is bereft of studies on trade and sustainable development. Studies close to this are those of Chen et al. (2022), Zhao et al. (2022), and Oluwabiyi and Duruji (2021) who examined the effect of bilateral trade on fossil fuel consumption, energy, and food security, respectively. These represent only a meager fraction of sustainable development which neither provides a holistic analysis nor produces generalizable findings. Secondly, even though several studies have been conducted to examine the Nigeria-China trade relations, these studies have not examined the impact of this particular relation on the sustainable development of the two countries. Rather, attention has been dwelled on aspects such as the balance of trade (Afolabi and Oji, 2021), perception and acceptability (Imanche et al., 2021), trends, composition and intensity (Ibrahim and Sari, 2019), infrastructures investment (Eyitope, 2020), and its impact on economic security (Raji and Ogunrinu, 2018) and economic growth (Opusunju et al., 2020). These gaps expose the need for not only further but extensive studies on the critical relationship between Nigeria-China trade and sustainable development. This research fills the aforementioned gaps by conducting a comprehensive and in-depth analysis that captures the concept of sustainable development holistically with important implications for all the areas and sectors covered by the Nigeria-China trade relations using the SDI and ARDL approach.



### 3. Methodology

#### 3.1 Sources and Nature of Data

This study utilizes annual data which is sourced from the direction of trade statistics of the IMF, footprint network and World development Indicators of the World Bank. The data include the import and export of Nigeria to/from China, foreign direct investment and sustainable development index. All data will be from 1990 to 2020. The descriptions, justifications and a priori expectations are explained in Table 1.

**Table 1.** The Description of Variables and a Priori Expectations

Variables	Description	A priori expectations
SD	This represents sustainable development index. It is a comprehensive index used to assess the progress of countries towards sustainable development. It measures the progress in three dimensions: economic, social, and environmental.	-
TInt	This is used to explain the level of trade interdependence between Nigeria and China. $X_{NC} = \frac{x_{NC}/X_{NW}}{x_{CW}/(M_W - M_{NW})}$ , where $X_{NC}$ is the export intensity of Nigeria to China, $x_{NC}$ is Nigeria's export to China, $X_{NW}$ represents Nigeria's export to the world, $x_{CW}$ is China's export to the world, $M_W$ represents world's import and $M_{NW}$ represents Nigeria's import from rest of the world (Wu and Zhou, 2006).	Positive/Negative
FDI	This represents foreign direct investment which refers to investments made by companies or individuals from one country into businesses or assets in another country. The pollution haven and halo hypotheses suggest that FDI can have positive or negative impact on sustainable development.	Positive/Negative

**Source:** Research finding (2022).

#### 3.2 Techniques of Data Analysis

This study adopts a descriptive and inferential statistics to investigate the effect of bilateral trade between China and Nigeria trade relations on the attainment of sustainable development. Graphs and tables are used to show the trends of import and export of Nigeria to/from China and their respective bilateral trade intensities.

Also, the Autoregressive Distributive Lag (ARDL) model is employed to examine how bilateral trade intensities influence sustainable development.

### 3.3 Theoretical Framework

This study relies on the pollution or environmental haven hypothesis. The Environmental Haven Theory suggests that increased trade can have both positive and negative impacts. On one hand, increased trade can provide economic incentives for countries to improve their environmental regulations in order to attract investment and participate in international markets. On the other hand, increased trade can lead to the outsourcing of environmental degradation to countries with weaker environmental regulations, hindering the overall progress towards sustainable development (Bommer, 1999). While trade can provide important economic benefits, it is necessary to ensure that these benefits are not achieved at the expense of the environment and future generations.

### 3.4 Model Specifications

The baseline model for this study is specified to test whether bilateral trade between China and Nigeria influences sustainable development in the two countries. The baseline model is presented below:

$$SD_{Nig} = \beta_0 + \beta_1 TInt_{Nct} + \beta_2 FDI_t + \varepsilon_t \quad (1)$$

$$SD_{Chi} = \beta_0 + \beta_1 TInt_{Nct} + \beta_2 FDI_t + \varepsilon_t \quad (2)$$

where SD represents sustainable development index,  $Tint$  is the trade intensity index (export intensities) between Nigeria and China as presented in equation 4, FDI represents foreign direct investment. Finally,  $\beta_s$  captures the parameters to be estimated while  $\varepsilon_t$  is the stochastic disturbances.

### 3.5 Method of Data Analysis

This study utilizes the Autoregressive distributive lag model (ARDL) which combines the features of both autoregressive (AR) models and distributed lag (DL) models. It allows for the estimation of both the short-run and long-run effects of one variable on another, as well as the presence of feedback effects between the variables. One of the advantages of ARDL model is that it accounts for endogeneity. This makes the ARDL model well suited for studying causal relationships between variables, particularly in cases where there is a feedback mechanism between the variables (Iwata et al., 2010).

In the ARDL model, the dependent variable  $\Delta SD$  is regressed on the independent variables and its own lagged values. The lagged values capture the short-run effects, while the error correction term captures the long-run effects. The coefficients of the ARDL model are estimated using a variety of techniques, including ordinary least squares (OLS), maximum likelihood (ML), or generalized method of moments (GMM). Since this study employs the ARDL method, the lags of the dependent and independent variables are captured in the estimation. The ARDL versions of Equations 1 and 2 are presented in Equation 3 below:

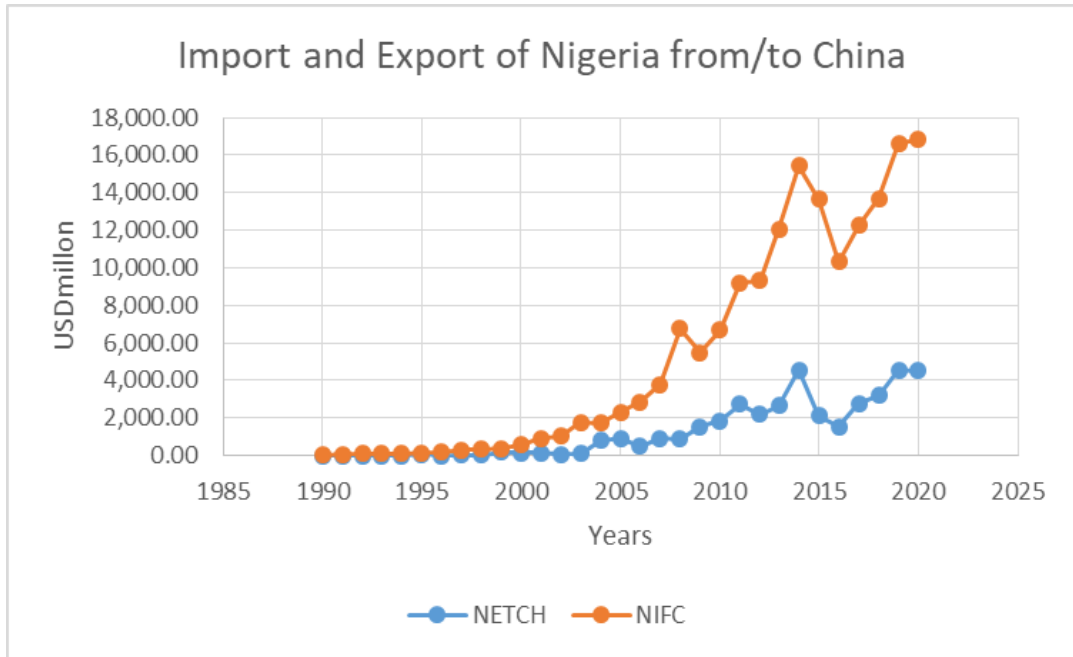
$$\Delta SD_t = \alpha_0 + \sum_{k=1}^n \alpha_1 \Delta Tint_{Nct-k} + \sum_{k=1}^n \alpha_2 \Delta Tint_{CNt-k} + \sum_{k=1}^n \alpha_3 \Delta FDI_{t-k} + \phi ECM_{t-1} + \varepsilon_t \quad (3)$$

where  $\Delta$  represents the first difference while  $\phi$  is the coefficient of ECM for the short-run dynamics, which shows the speed of adjustment to long-run equilibrium.

## 4. Results and Discussion

### 4.1 Trend Analysis

This sub-section shows the trend of import and export of Nigeria from/to China over the years. It is evident from Figure 1 that Nigeria's import is greater than her export from China. The difference between Nigeria's import and export from China was not huge in the early 1990's. The trend shows that the difference widens from year 2000 and continues to rise at an increasing rate.



**Figure 1.** Bi-lateral Trade Flows between Nigeria and China

**Source:** Direction of Trade statistics of the IMF (2022).

**Note:** This picture is for where NETCH and NIFC denote Net Export to China and Net Import from China, respectively.

#### 4.2 Trade Intensities between China and Nigeria

The trade intensity index of China and Nigeria reflect the ratio of the share of China's trade with Nigeria relative to the share of World's trade. A country's trade intensity index greater than one implies that the country trades larger than expected with the counterpart country, if otherwise, it means that the country trades lesser than expected with the counterpart country. Table 2 below presents the trade intensities between Nigeria and China, showing the export intensities between Nigeria and China for some selected years. The export intensity index shows that Nigeria export to China was below expectations during the year under review as evident from the indexes which are less than one for Nigeria's export to China. Although, the intensity moved very close to one in the year 2020, implying that Nigeria's export intensity to China has improved in recent time. On the other hand, China's export intensity to Nigeria was below expectations for the earlier years captured in this study, it improved to surpass expectations in the year 2000 and remains above 1 till year 2020.

**Table 2.** Export Intensity between Nigeria and China

Intensity	1990	1995	2000	2005	2010	2015	2020
Nigeria to China	0.0364	0.2764	0.1554	0.3541	0.2677	0.4117	0.9838
China to Nigeria	0.4662	0.9467	2.4560	1.9645	2.1521	2.8074	2.9755

**Source:** Authors' computation; using data extracted from the DOTS of the IMF (2022).

To check the unit root of all the variables employed, this study employed the Augmented Dickey-Fuller (ADF) and Philip Peron (PP) tests as shown in Table 3. The result shows that the series is stationary at the level and first difference. Also, the Johansen cointegration result in Appendix 1 establishes a long-run association among the variables used, while the Akaike Information Criterion (AIC) used selected a maximum lag length of 2.

**Table 3.** Unit Root Test

Variables	ADF	PP	ADF	PP	Order of Integrations
XIN	0.724	7.750***	-2.0352**	8.141***	I(0)
XIC	-1.256	-1.530	2.970	-4.225***	I(1)
FDI	-1.883	-3.464	7.720***	14.570***	I(1)
SDN	0.452	-1.119	-5.205***	8.539***	I(1)
SDC	-4.596***	-5.373***	-6.718***	-10.880**	I(0)

**Source:** Research finding (2022).

The short and long-run estimates of the impact of bilateral trade relations between China and Nigeria on the sustainable development of the two countries are presented in Table 4. Model 1 shows how trade intensities between the two countries influence sustainable development in Nigeria, while Model 2 shows how trade intensities affect sustainable development in China.

**Table 4.** Estimates of Autoregressive Distributive Lag Model (ARDL)

Variables	Model 1	Model 2
<b>Short run</b>		
ECM	-0.652** (0.030)	-2.087*** (0.046)
SD(-1)	0.922*** (0.155)	0.051 (0.042)
DXIN	-0.001 (0.009)	2.743 (2.311)
DXIC	-0.050* (0.002)	5.536*** (1.889)

DFDI	5.186*** (1.682)	13.001*** (4.010)
<b>Long run</b>		
SD (-1)	-0.120** (0.001)	-0.771*** (0.020)
XIN	12.036* (5.498)	2.091 (2.066)
XIC	-19.044** (6.439)	4.900*** (1.029)
FDI	0.209*** (0.088)	5.671*** (2.001)
R squared	0.8425	0.3949

**Source:** Research finding (2022).

The coefficients of error correction terms (ECM) in the two models, which represent the speed of adjustment, are negative and significant as expected. The first lag of the sustainable development index has a positive and significant impact on sustainable development in Nigeria in the short run, whereas it does not have a significant impact in the case of China. In the short run, China's export intensity to Nigeria has a negative impact on Nigeria's sustainable development, while Nigeria's export intensity to China has a positive impact on Nigeria's sustainable development. In model 2, China's export intensity to Nigeria has a positive impact on China's sustainable development, while Nigeria's export intensity to China does not have a significant impact on China's sustainable development. The foreign direct investment produced a positive and significant impact on the sustainable development in China and Nigeria in the short run.

In the long run, the coefficient of Nigeria's exports to China shows that it has a positive and significant impact on Nigeria's sustainable development. A unit increase in Nigeria's exports increases sustainable development by 12.036 units. This indicates that exports have an incremental effect on sustainable development in Nigeria. This can be explained by the fact that export improves the country's productive capacity and efficiency and increases foreign exchange; both of which will improve economic growth and by extension, the sustainable development agenda. This study conforms with the assertion of the WTO (2018) which established that international trade is a vehicle for inclusive growth and sustainable development and Selvanathan et al. (2020) who found evidence of export-led growth. China's export to Nigeria on the other hand has a negative and significant impact on Nigeria's sustainable development. This implies that the over-reliance

of Nigeria on China's exports hurts the attainment of sustainable development goals in Nigeria. Importation can also increase environmental pollution as discovered by Harris (2004) which will hamper sustainable development. This result could also be explained by the heavy reliance on fossil fuels in the production of export goods which will reduce environmental quality (Rasoulinezhad, 2020) and negatively influence the sustainable development impact of trade.

However, in the case of China, Nigeria's exports to China did not have any significant impact on China's sustainable development, while China's exports to Nigeria produced a positive and significant impact on China's sustainable development. The result shows that a unit increase in China's exports to Nigeria increases China's sustainable development by 4.9 units. The result shows that Nigeria's exports to China are not substantial enough to have a meaningful impact on the latter's sustainable development. This finding is in agreement with the study of Ibrahim and Sari (2019) which showed that the share of Nigeria's major exports was insignificant while that of imports from China was significant. It also shows a huge trade imbalance between the two countries as Nigeria imports more than she exports to China, whereas China exports more than she imports from Nigeria. The coefficient of FDI in the two models produced a positive and significant impact on the sustainable development of both Nigeria and China. This is in agreement with the study of Shittu et al. (2021) which showed that FDI has a positive impact on the growth of resource-abundant countries. This finding also confirms Phung et al. (2022) who showed that FDI wields a positive impact on sustainable development in Southeast Asian countries through the path of green growth.

## **5. Conclusion and Policy Recommendation**

The significance of Nigeria-China bilateral trade relations has evolved over the years in nature, scope, and impact. As a result, it behooves mainstream research to analyze the potential implications for sustainable development. This becomes imperative as the areas of trade relations extend across sectors critical to the attainment of the SDGs which the global world, Nigeria and China inclusive, race to achieve by 2030. Hence, this paper aims to assess the impact of Nigeria-China bilateral relations on sustainable development for both countries over the period 1980 and 2020. Findings show that Nigeria's export to China wields a positive and significant impact on Nigeria's sustainable development while China's export to Nigeria on the other hand has a negative and significant impact

on Nigeria's sustainable development. Further findings reveal that Nigeria's export to China does not have any significant impact on China's sustainable development, while China's export to Nigeria produced a positive and significant impact on China's sustainable development. For FDI, it is shown to have a significant incremental impact on the sustainable development of both countries.

Taking a cue from the above, it can be concluded that while trade (through exports) propels sustainable development, it can be detrimental to sustainable development through over-reliance on imports and employment of unsustainable trade practices. This paper, therefore, lends empirical credence to the assertion of the World Trade Organization (WTO, 2018) that trade is a means towards inclusive growth and the attainment of sustainable development. This is more so as export expands a country's income-generating activities thereby providing finance for investment and implementation of sustainable development objectives. Exports also improve the welfare of citizens - by availing them of diversity, competitive pricing, and quality goods and services - and facilitate long-term investment, boosting the countries' productive capacity, employment, and foreign exchange. These have the potential to facilitate the achievement of SDG 1 (no poverty), SDG 2 (zero hunger), SDG 3 (good health and wellbeing), SDG 8 (decent work and economic growth), SDG 9 (industry, innovation and infrastructure) and SDG 10 (reduced inequalities), for both Nigeria and China. Environmentally, exports can improve resource efficiency and conservation and also enhance the flow of environmentally friendly practices and technologies which are likely to drive the attainment of SDG 7 (affordable and clean energy), SDG 11 (sustainable cities and communities) SDG 12 (responsible consumption and production), SDG 13 (climate action) and SDG 17 (partnerships for the goals).

On the other hand, over-dependence on imports is unfavorable to sustainable development in the Nigeria-China trade relation based on the empirical investigation. Hence, the observed trade imbalance does not allow the two countries to fully exploit the gains of trade. Environmentally, the components, transportation mode, production method, and technology of importation may also be responsible for the harmful effect on sustainable development. This study has, therefore, brought to the fore, how trade has the potential to both positively and negatively influence sustainable development. This will guide the countries in the study context and other stakeholders on how to consolidate the positive gains of



trade, mitigate its negativities, and benefit mutually and optimally from the bilateral relation.

Important policy implications can be drawn from the foregoing. First, Nigeria needs to coordinate her macroeconomic policies to expand and stimulate her economy to boost demand for her products which constitute imports to China. This can be achieved by improving macroeconomic stability and value addition to her products and innovation in its production processes to improve product standards and international competitiveness. To fulfill these, the government may need to increase the credit guarantee ratio for enterprises to improve export activities and further stimulate the economy (Taghizadeh-Hesary et al., 2022). This will not only improve the country's export intensity, trade balance, and trade gain, but also improve foreign exchange. Second, there is a dire need for both Nigeria and China to adopt sustainable practices, technology, and transportation in the production of goods and services. For instance, increased adoption of green manufacturing technologies and renewable energy in the production of import goods to reduce waste and environmental pollution while simultaneously supporting technological advancement and sustainable development (Saboori et al., 2022). Also, Rasoulinezhad and Taghizadeh-Hesary (2022) and Yoshino et al. (2021) have found green bonds and carbon tax, respectively to be instrumental in boosting environment-related SDGs. Thus, Nigeria and China can encourage green bonds and a carbon tax to stimulate green exports and mitigate carbon dioxide emissions from foreign trade.

Furthermore, the Nigerian and Chinese governments need to invest substantially in research and development of green transport modes that use renewable energy sources like solar and hydroelectric to explore such modes for importation activities. Lastly, Nigeria and China should ensure avowed commitment to the Voluntary Sustainability Standards (VSS) policy instrument that guarantees products meet sustainability criteria using certain economic, social, and environmental measures (UNCTAD, 2021) to make the Nigeria-China trade relations holistically sustainable.

This study is by no means exhaustive in the analysis of bilateral trade and sustainable development and the study can be extended both in scope and methodology. The study employed SDI, which is only one of the alternative measures for sustainable development, to proxy sustainable development. Hence, other studies can adopt alternative measures of sustainable development such as

Adjusted Net Savings to analyze the sustainable development impact of such bilateral trade relations. Future studies can also explore other bilateral trade relations or consider multilateral trade relations thereby employing a panel analysis to examine how trade affects sustainable development across time and countries or regions. Moderating effects of variables that have been found to influence sustainable development (e.g. FDI) could also be examined to see how they tilt the effect of trade on sustainable development.

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## Appendix 1

### Johansen tests for cointegration

Trend: constant

Number of obs = 28

Sample: 1990-2020

Lags = 2

5%

maximum

trace critical

rank	parms	LL	eigenvalue	statistic	value
0	20	15.109461	.	58.4522	47.21
1	27	31.520202	0.69031	25.6307*	29.68
2	32	41.442385	0.50773	5.7863	15.41
3	35	43.766401	0.15295	1.1383	3.76
4	36	44.335542	0.03984		

### Selection-order criteria

Sample: 1990-2020

Number of obs = 27

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-64.4321			.001869	5.06904	5.12613	5.26102	
1	14.8787	158.62	16	0.000	.000017	.379357	.664779	1.33924
2	42.0525	54.348*	16	0.000	8.3e-06*	-.448334*	.065427*	1.27945*
3	52.3645	20.624	16	0.193	.000016	-.026997	.715101	2.46869

Endogenous: SDC XIC XIN FDI

Exogenous: \_cons



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