

External financing for economic sustainability in Nigeria: exploring options that thrive

Abubakar SULE^{1*}, Naomi Onyeje DOKI², and David Terfa
AKIGHIR³

To cite this article:

Sule, A., Doki, N.O., Akighir, D.T. (2024).
*External financing for economic sustainability in
Nigeria: Exploring options that thrive. Romanian
Journal of Economics, 58(1), pp. 94 – 108*

Abstract. *This study investigated the effect of components of external financing on economic sustainability in Nigeria with a view to determine the effect and decide which options are most appropriate in the light of the fact that external financing is still relevant to augment a deficient capital base. The Autoregressive Distributed Lag (ARDL) model and Wald Test were employed on the data from 1999 Q1 to 2022 Q4. The bounds test revealed that there is a strong long run significant relationship between external financing and economic sustainability. Foreign direct investment, foreign portfolio investments and official development assistance are the sources that present feasible alternatives for Nigeria. Remittances and external loans have produced negative effects in the period under study. Thus, it is recommended that the impact of external financing on economic sustainability could be enhanced through improvements in the absorptive capacity of the economy and ensuring macroeconomic and socioeconomic stability.*

Keywords: *External financing, foreign direct investment, economic sustainability, industrial production index, savings*

JEL Classification Codes: *F21, E23, E21, F24*

1. Introduction

The achievement of economic sustainability has become a contemporary focus of government policies globally. The focal point of Africa's Agenda 2063, and the United Nations' global 2030 Agenda align with the Sustainable Development Goals (SDGs) which have components of economic development. However, slowing the wheel of developing economies' aspirations for economic sustainability is the clog of domestic resource gaps. Developing countries grapple with the inherent challenge of insufficient domestic capital to finance their requisite development needs. In view of this, policy makers have had to contemplate the search for complementary resources and this gives credence to external financing (Terefe, 2018; Wako, 2017; Girma & Tilahun, 2022). Some reforms already implemented in the developing world depict the adoption of neoliberal policies to allow for opening up of the economies in order to attract foreign capital (United Nations Conference on Trade and Development - UNCTAD, 2006; Kraay & McKenzie, 2014; Terefe, 2018; Banerjee et al. 2020).

¹ Department of Economics, Kogi State University, Anyigba – Nigeria, sule.a@ksu.edu.ng, corresponding author

² Department of Economics, Benue State University, Makurdi – Nigeria

³ Department of Economics, Benue State University, Makurdi – Nigeria

Nigeria, over the years has adopted neoliberal reforms and policies to attract foreign finance to fund her development activities in view of inadequate domestic capital for public and private investment, and to pursue other development projects. Due to this, there have been notable inflows of foreign investment; at first, they were thought to be the solution to every problem facing developing nations like Nigeria (Apostu et al. 2023; Joshi et al. 2021). However, despite the inflow of foreign capital into the economy, it is still grappling with major development challenges, and this has made the role of external finance on development to be a subject of debate (Adedokun, 2017; Moyo, 2009; Adebayo & Kalmaz, 2020; Agbloyor et al., 2016; Zuniga, 2011; Girma & Tilahun, 2022). In 2020, Nigeria's ratios of Gross National Savings (GNS) and Tax Revenue (TR) to Gross Domestic Product (GDP) were respectively 22.4 percent and 8%, which are below the corresponding global benchmarks of 30 percent and 12.75 percent of GDP (International Monetary Fund - IMF, 2020). To fill these funding gaps and support the country's economic sustainability, the options are to grow domestic revenue or supplement domestic financing with external capital. This is expected to support production, the development of infrastructure, human capital, modernization of technology, and create a knowledge-based economy with export capabilities (Phimmavong, 2017).

In Nigeria, two gaps, namely, saving-investment gap and foreign exchange gap have been identified by scholars (Agu and Adeleke, 2021; Agu and Nyatanga, 2020; World Bank, 2018; Agu, 2015). Closing these gaps are paramount to fueling the growth needed to raise living standards and generate sufficient productive employment. The alternative to closing these gaps is to risk remaining at the threshold of under-development. For instance, Nigeria's aggregate infrastructure stock (rail, road, airports, power, telecommunication, seaports, and water) represented only 35 percent of GDP in 2018, it was significantly below that of South Africa which stood at 87 percent of GDP and lower than the average of 70 percent for emerging economies (Games, 2021).

Nigeria has received external financing from several sources over time and stands as one of the chief beneficiaries of external financing in Africa, having received a total of US\$487,039.1 billion (World Bank's Development Indicators, 2020). The sources of external financing that have dominated are Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), Remittance (RMT), Official Development Assistance (ODA), and External Loans (EXL) which provided a whopping sum of \$31,895.44 billion between 2010 and 2019, rising from \$16,808.47 billion between 2000 and 2009 (World Bank, 2020). Despite these inflows, the country was still characterized by a low GDP growth rate between the period of 2000 and 2019 (World Bank, 2020).

Also, two major economic performance indicators worsened between 2000 and 2019. The unemployment rate increased from 3.83 percent to 8.53 percent, while the single-digit inflation rate rose from 6.93 percent to 11.39 percent during the period (World Bank, 2020). The weak performance of the economy implied by these macroeconomic indicators might have contributed to the increasing inequality which still persists at 34.22 percent in 2019 (World Bank, 2020; Adedokun, 2017). The relatively high cases of corruption perpetuated by public office holders have also led to a loss of between \$15 billion to \$18 billion annually according to a report of the Nigeria Extractive Industries Transparency Initiative (Igwe, 2021).

These facts are signals that the country is facing substantial difficulty in achieving economic sustainability. Generally, international development indicators have placed Nigeria in the lower rung of the sustainable development ladder. For instance, Nigeria is 43rd out of the 52 ranked countries on the attainment of the Sustainable Development Goals and 14th out of 15 countries in West Africa (Akinpelu, 2021). These poor economic performance indicators question a lot of policies including foreign finance as outcomes are not commensurate with the substantial amounts received so far (Adebayo and Kalmaz, 2020). The above issues justify the need for this study in Nigeria, in order to ascertain what become a veritable source of finance to augment the enormous savings and investment gap that has resulted in underdevelopment in the country. This study would help other developing nations with similar features to execute the SDGs, as it would serve as a learning point for them, particularly given that Nigeria is one of the top beneficiaries of external financing among sub-Saharan African countries.

There are also mixed results on the effectiveness of the components of external financing on economic sustainability (Agbloyor et al. 2016; Adedokun, 2017; Wako, 2017; Iheanachor and Ozegbe, 2021; Ogunleye et al. 2020; Ewubare and Okpoi, 2018; Zuniga, 2011; Girma and Tilahun, 2022). In spite of the mixed results, external financing will continue to be sought to complement domestic

resources. This study reviews the effects of these components again in contribution to the discussion and to examine which ones have higher potentials to support economic sustainability. Another outcome of previous research is the measure of economic sustainability as gross domestic product. The use of GDP though conventional, does not preclude considering alternative variables. Therefore, this study uses the industrial production index as proxy for economic sustainability used by several studies (Bernanke et al., 1997; Mackowiak, 2007; Nwaolisa and Ananwude, 2016; Salisu and Isah, 2017) in related ways. It is considered worthwhile to view the impacts from another related variable to economic sustainability. This study therefore seeks to ascertain how external financing can be used to achieve economic sustainability in Nigeria. Therefore, the hypothesis to be tested is that external financing has no significant effect on the economic sustainability of Nigeria.

In addition to this introductory section, the rest of the paper is structured as follows: Section 2 provides a brief literature review on the subject matter; Section 3 presents the materials and method; Section 4 centres on the results and discusses the findings of the study; and Section 5 presents the conclusion and policy remarks.

2. Brief Literature Review

This first paragraph focuses on conceptual clarification. External financing, like any other concept, has been expressed from different perspectives by various scholars. The World Bank (2003) defines it as the influx of capital assets like foreign direct investment, foreign portfolio investment, external loans, official development assistance, and remittances, aimed at promoting productivity, entrepreneurship, and domestic investment. According to the International Monetary Fund (IMF) (2007), external financing involves fund flows, including borrowing, debt relief, technical expertise, and economic programs, with the goal of addressing macroeconomic challenges and difficulties in international monetary transactions. The Central Bank of Nigeria (CBN) (2016) sees it as the resources a country receives from foreign corporations and economies for investment in both tangible and intangible assets. Ouedraogo, Sourouema, and Zahonogo (2018) characterize external financing as a means to diversify exports, transfer technology, contribute to international trade integration, boost trade volume, generate trade tax revenue, intensify domestic competition, and advance the financial sector. This paper conceptualizes external financing as the movement of funds, encompassing capital goods, technical expertise, and managerial capacity, directed into developing or emerging economies. These funds originate from advanced or emerging economies, international institutions, or multinational corporations and are directed toward financing developmental projects with the overarching aim of fostering the overall growth and development of the recipient country.

The idea of economic sustainability has its roots in the economic theory of sustainability (Dasgupta & Heal, 1974; Solow, 1974; Stiglitz, 1974). Economic sustainability is thought to be attainable if the well-being of society is maintained over time (Arrow *et al.*, 2004; Solow 1993; Toman 1998). Basiago (1999) sees economic sustainability as a structure of production that fulfills present consumption levels without conceding future needs. Economic sustainability is inextricably linked to both environmental and social sustainability (Reddy & Thomson, 2015). Economic sustainability involves creating economic value out of whatever project or decision is being undertaken (Wanamaker, 2018). In this study, economic sustainability means maintaining a maximum production process over time without jeopardizing societal social and environmental aspects. It is this conceptualization that influences the use of the Industrial Production Index as the proxy.

This study is anchored on two theories; the Dual Gap theory formulated by Chenery and Strout (1966) and the Endogenous-growth AK model developed by Frankel (1962) and modified by Rebelo (1991) and Pagano (1993) explaining the connection between finance and growth. The standard of living in an economy depends on the country's ability to produce goods and services. Production of goods and services is a function of productivity, which in turn depends on the amounts of physical capital, human capital, natural resources, and technological knowledge available to workers. These inputs are combined to produce output and form the central idea underlying the endogenous growth model. For the production function to be effective, government policies are expected to influence the economy in many ways: by encouraging savings and investment, inducing investment from abroad; promoting research and development of new technologies; and controlling population growth. Productivity is

therefore important because it determines living standards in a country and is useful for cross-country comparisons. An economy, however, cannot increase productivity without savings. Savings precede capital accumulation and are a major driver of economic expansion. In other words, a nation's ability to effectively mobilize savings determines how much it invests.

There are two issues: First, savings accumulation is vulnerable to diminishing returns. Economic growth may be temporarily fueled by increasing savings, but when the economy attains a higher level of capital accumulation, productivity and income growth inevitably slow down. This is because an economy generates less additional output per unit of additional capital accumulated. Second, in the absence of savings, a dearth of capital accumulation becomes imminent, which creates a deficiency in investment and births the savings-investment gap. As a result, output and production decline, exports of goods and services are hampered, and a foreign exchange shortfall results. This forms the premise for the dual-gap model. In both scenarios, the need for external financing therefore becomes imperative to augment domestic resources and cover the shortfalls that may have been created by trade deficits. The dual-gap model, therefore, provides a framework for addressing the twin deficits in an economy. Resorting to external financing (the dual-gap theory) to boost productivity (the endogenous growth model) might, however, be confronted with a myriad of challenges. The plausibility of boosting growth is clear. These two theories—the dual-gap theory, and endogenous growth model—formed the theoretical frameworks of this study.

Theoretical Model

Inadequate savings have been noted to be one of the main economic issues in many emerging and poor nations, including Nigeria. Because low capital formation is attributed to the primary problem of developing countries in achieving economic sustainability, external financing is deemed necessary to fill the financial and technological gaps (Phimphanthavong, 2014; Calderón and Nguyen, 2015; Muigai and Willy, 2017). Recall that Nigeria's low savings-to-GDP ratio exerts a negative effect on investment, buttressing the need for external financing to fill the savings deficit as suggested by the dual gap model. This is meant to promote economic sustainability. The dual-gap begins with an open economy's basic macroeconomic identity, in which aggregate output equals aggregate expenditure. Thus, assuming that there is no government sector in equation [1]:

$$[1] \quad Y = C + I + X - M$$

Where, Y stands for national income, C for consumption, I for investment (or Domestic Capital Formation), X for exports, and M for imports.

Now,

Sources of Resources used in the economy = Use of Resources in the economy:

	Expenditure Targets
[2] $Y + M$	$C + I + X$

Subtracting C from both sides we get

[3] $Y - C + M$	$I + X$
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Since $Y - C = S$, Where: S = Savings (domestic)

Then,

[4] $S + M$	= $I + X$
(Withdrawals)	(Injections)

This relationship can be restated as follows in equation [5]

[5] $M - X$	= $I - S$
(Foreign Exchange Gap)	(Savings Gap)

The analysis rests on the premise that domestic investment can be financed by domestic saving as well as through inflows of capital. If we let $(M - X) = F$ (F represents foreign exchange gap), then we can represent the above as follows: $F = I - S$ or as in the text as $I = F + S$.

Recall that the underlying assumption of the dual-gap model is built on the savings-investment gap approach, the export-import (or foreign exchange) gap approach, and the capital absorption approach (Quibria, 1980). The first approach implies savings falling short of what can be effectively and productively invested, while the export-import approach focuses on foreign exchange earnings as

the principal constraint on domestic investment. Lastly, the absorption approach called for by the target rate of growth sees capital requirements as being determined by the ability of a country to employ both domestic and foreign capital. In these three phases, foreign aid and capital inflows can help relax these dominant constraints by augmenting the supply of skills, the supply of investible resources, and the supply of imported commodities and services (Syed, Sabir, and Mehboob, 2011; Nyang'oro, 2017).

Given the savings-investment gap in developing countries and the need for external financing to achieve growth and development as encapsulated in endogenous growth theory, idle resources can be used to produce capital goods and intermediate inputs so that foreign exchange constraints can be eliminated. Based on the three assumptions that guide the dual-gap model, equation [6] explicitly incorporates external financing as a factor of growth and development alongside savings, as postulated by the theories:

$$[6] \quad Y = f(EXF, SAV)$$

Where: Y = National Output, EXF = External Financing, SAV = Savings.

Recall that economic sustainability requires both domestic and foreign resources, thus the need for external financing to address investment in critical infrastructure. Thus, the theoretical model expressed in equation [6] forms the basis for specifying the model. A review of the impacts of savings and external financing measures in its different sub-components as shown in the empirical reviews which follow.

This section centres on the relevant empirical reviews. The influence of external financing and economic sustainability has yielded diverse findings. Some studies have reported positive effects (Sedai, 2019; Gabriel et al., 2019), while others have identified negative or inconsequential effects (Sule, 2019; Monogbe et al., 2020; Adeleye et al., 2021). Foreign aid and official development assistance (ODA) appear to support economic growth by providing capital in developing nations (Jean-Louis et al., 2017; Rahaj, 2018). However, the efficacy of this support is contingent upon the quality of institutions (Kadozi, 2019). Results concerning portfolio investments exhibit a range of outcomes - positive (Nyang'oro, 2017), negative (Ouedraogo et al., 2018), or no significant effect (Adeola, 2017). Remittance flows predominantly demonstrate positive impacts on growth (Hussain et al., 2017; Muigai and Willy, 2017) by stimulating consumption and enhancing production capacity. Calin-Adrian et al. (2018), found that foreign and remittance exhibit positive impact on economic growth. However, the study by Jushi, Hysa, Cela, Panait, and Voica (2021) found an insignificant effect of remittance to sustainable growth. Nevertheless, these outcomes exhibit variability across different countries. External loans and debt flows have generated mixed results - positive (Rahaj, 2018; Sule, 2019), negative (Hussain et al., 2017; Nyang'oro, 2017), or insignificant effects. The observed outcomes are likely contingent on debt sustainability considerations.

The reviews show the ongoing debate and the lack of a consensus on the impact of capital flows in different forms on the economies of different nations at different times. This inquiry is therefore a pursuit to examine comparative impacts of different flows on economic sustainability. Relatedly, in the models adopted by Ridzuan, Ismail, and Hamat (2017) and Iheanachor and Ozegbe (2021), savings, which the theoretical model shows to be important in this relationship, are omitted and considered to be peculiar to Nigeria. This study takes cognizance of this theoretical postulation, and includes savings in the model. Also, industrial production index is used to proxied for economic activity in advanced and emerging economies based their arguments on the fact that industrial activities remain a good representation of the full economy (Bernanke et al., 1997; Mackowiak, 2007; Nwaolisa and Ananwude, 2016; Salisu and Isah, 2017; Stanger, 2020), thus these are among the many reasons why countries around the world, including Nigeria, pursue industrialization policies. The choice of time frame is based on the fact that in 1999, Nigeria commenced its fourth democratic dispensation and this brought about some level of macroeconomic stability and greater international cooperation in the country. The period incorporates the Millennium Development Goals (MDGs) that are the precursors of the SDGs and are also focused on improving economic growth and development.

3. Materials and Method

This study used quarterly data from 1999 Q1 to 2022 Q4. Data from the World Bank (2022), including data on foreign direct investment (FDI), foreign portfolio investment (FPI), official

development assistance (ODA), remittances (RMT), external loans (EXL), savings (SAV), and the real effective exchange rate (REER), were sourced. Contract-intensive money (CIM) was sourced from the Central Bank of Nigeria Statistical Bulletin (2022). The industrial production index was derived from the International Monetary Fund (IMF).

The main estimation method used in the study was the Autoregressive Distributive Lag (ARDL) bounds testing approach to cointegration (Pesaran *et al.* 2001). Other econometric diagnostic techniques include the Heteroskedasticity Test and the Breusch-Godfrey Serial Correlation LM Test: Breusch-Pagan-Godfrey, and Ramsey. RESET Tests. The analysis began with the summary of descriptive statistics and the preliminary Augmented Dickey Fuller and Phillips Perron unit root tests.

The model in use was formulated to analyse the extent to which external financing has affected economic sustainability in Nigeria. The empirical model that guided this study is that of Iheanachor and Ozegebe (2021), which focused on ascertaining the impact of FDI inflows on the sustainable development of the Nigerian and Ghanaian economies from 2000 to 2018 using OLS. As such, the theoretical model in equation [6] was used to construct the functional form of the model expressed below with the modifications in equation [7]:

$$[7] \quad IPI = f(RMT, FDI, FPI, EXL, ODA, SAV, CIM, REER)$$

The stochastic form of the model is presented in equation 8:

$$[8] \quad IPI = \delta_0 + \delta_1 RMT + \delta_2 FDI + \delta_3 FPI + \delta_4 EXL + \delta_5 ODA + \delta_6 SAV + \delta_7 CIM + \delta_8 REER + \varepsilon_t$$

Where: IPI = Industrial Production (Index, ranges between 0 and 100), FDI = Foreign Direct Investment (per cent of GDP in current US\$), FPI = Foreign Portfolio Investment (per cent of GDP in current US\$), EXL = External Loans (Logged), RMT = Remittance (per cent of GDP in current US\$), ODA = Official Development Assistance (per cent of GDP in current US\$), SAV = Savings (per cent of GDP in current US\$), CIM = Contract Intensive Money (Index) and REER = Real Effective Exchange Rate (US\$ to Naira).

The ARDL is a dynamic model suitable for impact studies and is also chosen because it is suitable when the variables in the model are integrated of orders zero [I(0)] and one [I(1)]. It can also be used even with a small sample size, irrespective of whether some of the regressors are endogenous. The ARDL model specification of the above functional form is expressed in equation [9];

$$[9] \quad \Delta IPI_t = \delta_0 + \delta_1 IPI_{t-1} + \delta_2 RMT_{t-1} + \delta_3 FDI_{t-1} + \delta_4 FPI_{t-1} + \delta_5 EXL_{t-1} + \delta_6 ODA_{t-1} + \delta_7 SAV_{t-1} + \delta_8 CIM_{t-1} + \delta_9 REER_{t-1} + \sum_{i=0}^p \varphi_1 \Delta IPI_{t-1} + \sum_{i=0}^q \varphi_2 \Delta RMT_{t-1} + \sum_{i=0}^q \varphi_3 \Delta FDI_{t-1} + \sum_{i=0}^q \varphi_4 \Delta FPI_{t-1} + \sum_{i=0}^q \varphi_5 \Delta EXL_{t-1} + \sum_{i=0}^q \varphi_6 \Delta ODA_{t-1} + \sum_{i=1}^q \varphi_7 \Delta SAV_{t-0} + \sum_{i=1}^q \varphi_8 \Delta CIM_{t-0} + \sum_{i=1}^q \varphi_9 \Delta REER_{t-0} + \lambda ECM_{t-1} + \varepsilon_t$$

where $\delta_1 - \delta_9$ are the long-run parameters; $\varphi_1 - \varphi_9$ are the short-run parameters; δ_0 and ε are the intercept term and the white noise stochastic term respectively; λ is the parameter of the error correction mechanism (ECM); \ln is the natural logarithm of the variables, and; Δ is the difference operator.

A shock to any of the regressors may not result in an immediate long-run effect on IPI, which creates disequilibrium in the system and requires that the short-run adjusts to its long-run equilibrium through the error correction mechanism (ECM_{t-1}). The ECM_{t-1} is a one lag error correction term that accounts for the speed of adjustment to the long-run equilibrium.

4. Results and Discussion

Descriptive Statistics

The statistical features of the variables utilized in this investigation are presented in Table 1. The mean, maximum, minimum, and corresponding standard deviations of the variables are presented. The skewness and kurtosis statistics are used to examine the distributional properties of the variables, while the Jarque-Bera test statistics are used to test for normality in the distribution. Essentially, for better results, the raw and not transformed data were used for the descriptive summaries. (Ehigiamusoe and Lean, 2019; Balogun, Okafor, and Ihayere, 2019).

Table 1: Descriptive Statistics of Variables

	IPI (Index)	RMT (\$M)	FDI (\$M)	FPI (\$M)	EXL (\$M)	ODA (\$M)	SAV (\$M)	CIM (Index)	REER (Rate)
Mean	94.17	14815.95	4195.09	-2070.10	31.99	2535.44	6954.41	0.83	97.18
Median	94.22	19137.01	4073.34	-782.99	31.76	2104.58	5865.69	0.87	99.51
Maximum	100.74	24950.56	9049.60	8253.97	66.67	12649.98	22675.83	0.93	124.95
Minimum	79.22	75.67	935.65	-15920.06	10.99	-353.73	236.32	0.68	68.43
Std. Dev.	4.20	8566.28	2471.51	4466.74	13.21	2613.55	6238.11	0.08	17.67
N Std. Dev.	0.04	0.58	0.59	-2.16	0.41	1.03	0.90	0.10	0.18
Skewness	-0.88	-0.82	0.44	-1.46	0.61	2.27	0.61	-0.50	-0.06
Kurtosis	4.59	1.94	2.05	5.20	2.71	8.71	2.21	1.71	1.78
Jarque-Bera	20.75	13.98	6.12	48.93	5.73	194.65	7.69	9.81	5.51
Probability	0.00	0.00	0.05	0.00	0.06	0.00	0.02	0.01	0.06

Source: Extract from E-views 12 Output.

Note: the normalized standard deviation is computed as standard deviation/mean.

Table 1 shows that the average value of IPI in the period was 94.17 percent. Economic sustainability was highest during the study period in December 2005, at 100.74. The standard deviations show that IPI had the least volatile series. In terms of the skewness distribution, the series of IPI with an approximate value of 4.59 can be regarded as mesokurtic. The computed probability value associated with the Jarque-Bera normality test statistic falls below 0.10 and 0.05 for the case of IPI, thus suggesting the rejection of the hypothesis that the series are normally distributed at a 5 percent level of significance. Second, for remittances, an average of 14.815.95 was recorded. The highest value was observed in March 2019, with a value of \$24,950.56 billion. Standard deviation statistics show that remittances were a stable series. Given kurtosis values less than three, the series of remittances with an approximate value of 1.94 exhibit platykurtic distribution in terms of skewness distribution. The probability value of the Jarque-Bera test falls below 0.10 and 0.05 for the case of remittances, thus indicating the rejection of the hypothesis that the series are normally distributed.

Further, the average value of FDI was \$4195.09. Its maximum value stood at \$9049.60 million in September 2011. The standard deviation statistics show foreign direct investment to be among the least volatile in Table 1. In terms of skewness distribution, the series of FDI with an approximate value of 2.05 exhibits a platykurtic distribution given their kurtosis values of less than three. The probability value is less than 0.10 and 0.05 for the case of FDI, thus indicating the rejection of the hypothesis that the series are normally distributed. FPIs average growth stood at -\$2070.10 million. The maximum value of foreign portfolio investment stood at \$8253.97 million in December 2020. The standard deviation statistic shows foreign portfolio investment to be among the most volatile in the series. FPIs skewness with an approximate value of 5.20 is regarded as mesokurtic given that the kurtosis values are greater than three. The probability value is less than 0.10 and 0.05 for the case of foreign portfolio investment, thus indicating the rejection of the hypothesis that the series are normally distributed.

EXLs average value stood at \$31.99. The maximum value was \$66.67 million, recorded in December 2022. The standard deviation shows that external loans are among the least volatile. However, from the skewness distribution's approximate value of 2.71 EXL series is regarded as platykurtic. The probability value is also less than 0.10 and 0.05, thus indicating the rejection of the hypothesis that the series are normally distributed. ODA recorded an average value of \$2535.44. The maximum value stood at \$12,649.98 million in June 2006 while in March 2004, the minimum value of \$353.73 million was recorded. Given the kurtosis values are greater than three, the series of ODA with an approximate value of 8.71 can be classified as mesokurtic in terms of the skewness distribution. According to the probability value, which is less than 0.10 and 0.05 for the case of official development assistance, the hypothesis that the series are normally distributed is rejected.

In the case of savings, the average value in the period was \$6954.41. The maximum value of \$22675.83 million was recorded in December 2022. The standard deviation statistics show savings to be among the least volatile. With an approximate value of 2.21, savings exhibits a platykurtic distribution given the kurtosis values being less than three. The probability value is less than 0.02, thus indicating the rejection of the hypothesis that the series are normally distributed. The average value of

EXR was \$97.18. Its maximum value was \$124.95 in September 2014. The standard deviation shows savings to be among the least volatile. In terms of skewness distribution, the series of exchange rates with an approximate value of 1.78 exhibited a platykurtic distribution given kurtosis values of less than three. The probability value lies below 0.01, thus indicating the rejection of the hypothesis that the series are normally distributed. Also, the average index of contract intensive money was 0.83, The maximum value of 0.93 was recorded in quarters June, September and December 2022 respectively. The deviations show that its series was among the least volatile. In terms of skewness distribution, the series of contract intensive money with an approximate value of 1.78 exhibited a platykurtic distribution given that kurtosis was less than three. The probability value is less than 0.06, thus indicating the rejection of the hypothesis that the series are normally distributed.

Table 2: Unit Root Test

Augmented Dickey-Fuller Unit Root Test								
<i>Variables</i>	<i>ADF @ Level</i>	<i>Prob.</i>	<i>ADF @ 1st Diff.</i>	<i>1% Critical Value</i>	<i>5% Critical Value</i>	<i>10% Critical Value</i>	<i>Prob.</i>	<i>Order of Integration</i>
IPI	-2.65	0.2606	-3.90***	-4.07	-3.46	-3.16	0.0159	I(1)
RMT	-2.44	0.3561	-3.33*	-4.07	-3.46	-3.16	0.0682	I(1)
FDI	-1.96	0.6157	-5.65***	-4.08	-3.46	-3.16	0.0001	I(1)
FPI	-3.63	0.0327	-	-4.07	-3.46	-3.16	-	I(0)
EXL	-1.19	0.9057	-3.84**	-4.07	-3.46	-3.16	0.0189	I(1)
ODA	-2.83	0.1924	-5.64***	-4.07	-3.46	-3.16	0.0001	I(1)
SAV	-3.47**	0.0499	-	-4.07	-3.46	-3.16	-	I(0)
CIM	-1.71	0.7372	-7.57***	-4.07	-3.46	-3.16	0.0000	I(1)
REER	-3.80**	0.0213	-	-4.07	-3.46	-3.16	-	I(0)
Phillips Perron Unit Root Test								
IPI	-4.60***	0.0019	-	-4.07	-3.46	-3.16	-	I(0)
RMT	-2.09	0.5396	-4.99***	-4.07	-3.46	-3.16	0.0005	I(1)
FDI	-2.44	0.3546	-6.22***	-4.07	-3.46	-3.16	0.0000	I(1)
FPI	-3.02	0.1320	-6.16***	-4.07	-3.46	-3.16	0.0000	I(1)
EXL	-0.59	0.9769	-3.86**	-4.07	-3.46	-3.16	0.0179	I(1)
ODA	-2.66	0.2566	-4.91***	-4.07	-3.46	-3.16	0.0007	I(1)
SAV	-2.79	0.2045	-5.64***	-4.07	-3.46	-3.16	0.0000	I(1)
CIM	-1.75	0.7191	-7.59***	-4.07	-3.46	-3.16	0.0000	I(1)
REER	-3.31	0.0705	-5.03***	-4.07	-3.46	-3.16	0.0004	I(1)

Source: Extract from EViews 12 Output

Note: The lag lengths were selected based on Schwarz info criteria. The intercept and trend are included in the levels and the first difference equations.

In this subsection, the results of the unit root test estimate of external financing and economic sustainability are presented in Table 2. The unit root test results obtained from the Augmented Dickey Fuller unit root test and Phillips Perron test both revealed the integration properties of the series to lie between level [I(0)] and first difference [I(1)]. This reinforces the suitability of the ARDL technique as the most appropriate for accommodating the series' mixed order of integration. The data used for this unit root tests were the growth rates of the variables. The empirical estimates in Table 3 present the dynamics of external financing and economic sustainability over the long and short terms. However, the first approach to the ARDL bound test is to establish the existence of long-run co-integration, which is presented on Panel A, Table 3.

Table 3: ARDL estimates

Panel A: Bounds Test Cointegration Result

Level of Significance	F-Statistics		Lower Bound	Upper Bound
			I(0)	I(1)
10%			1.85	2.85
5%	56.75184		2.11	3.15
1%			2.62	3.77
<i>Panel B: Short run estimates</i>				
	Coefficient	Std. Error	T-Stat.	Prob.
Constant	17.24760	2.321452	7.429661	0.0000
ΔIPI_{t-1}	-0.167489	0.020384	-8.216550	0.0000
ΔRMT_{t-1}	-0.030806	0.045772	-0.673045	0.5041
ΔFDI_{t-1}	0.302030	0.089119	3.389069	0.0014
ΔFPI_{t-1}	0.066503	0.019546	3.402375	0.0013
ΔEXL_{t-1}	-0.700094	0.124336	-5.630663	0.0000
ΔODA_{t-1}	0.909279	0.097744	9.302690	0.0000
ΔSAV_{t-1}	0.010897	0.005037	2.163355	0.0354
ΔCI_{t-1}	2.674354	1.131619	2.363299	0.0221
$\Delta REER_{t-1}$	16.78486	2.300584	7.295911	0.0000
ECT_{t-1}	-0.167489	0.006462	-25.91827	0.0000
<i>Panel C: Long run estimates</i>				
RMT	-0.810895	0.225008	-3.603855	0.0007
FDI	1.803280	0.466078	3.869050	0.0003
FPI	0.397061	0.126726	3.133213	0.0029
EXL	-4.179926	0.562730	-7.427937	0.0000
ODA	5.428871	0.615647	8.818149	0.0000
SAV	0.065060	0.035454	1.835051	0.0726
CIM	15.96730	7.763209	2.056791	0.0451
REER	-2.762847	2.463249	-1.121627	0.2675

Source: Extract from EViews 12 Output

Panel A of Table 3 holds the result of the ARDL bound test. The F-statistic of 56.75 for the model on economic sustainability, is greater than the critical values at 1 percent, 5 percent, and 10 percent. This implies that a long-run relationship is established among the variables under consideration. Therefore, the null hypothesis of no long-run relationship is rejected.

The lag selection criterion used is determined by whether the study is for forecasting or impact analysis. If the study is for forecasting, the Akaike Information Criterion is appropriate, whereas the Schwarz Information Criterion is appropriate for impact analysis. Further, when the data is quarterly, and a dynamic model like the ARDL used in this study, lag lengths ranging from 1 to 4 are preferred. For this study therefore, the Schwarz Information Criterion (SIC) lag length selection criteria was used to select the ARDL order of model maximum lags for the variables. Panels B and C of Table 3 report the short-run and long-run result of ARDL with the significance of estimates in the short run given different lags. The Wald test was performed (results shown in Panel B) on the short-run estimate using the representations of the estimation equation and they are significant. However, aside from industrial production index and remittances, the optimal lag length associated with the parsimonious model estimated hovered between 2 and 4. Specifically, it was ARDL (1, 1, 4, 2, 4, 4, 4, 2), hence industrial production index and remittances are the only variables whose lag lengths were not subjected to coefficient combination since their values were one.

The results on Table 3 show that variables of foreign direct investment, foreign portfolio investment and official development assistance have conformed to a priori expectations and are significant at 5 percent. The estimated elasticities indicated that an increase in foreign direct investment would increase the economic sustainability in the short run and long run, which conform to previous studies (Calin-Adrian *et al.*, 2018; Sedai, 2019) but contrary to the findings of Monogbe *et al.* (2020) and Adeleye *et al.* (2021). The result also supports the assertion made by Jush *et al.* (2021) that foreign direct investment has long been viewed as an enticing solution that can address any issue pertaining to the host country's economic development. For FPI, the estimated elasticities indicated that an increase

in foreign portfolio investment would increase the economic sustainability in the short run and long run, which agrees with the findings by Nyang'oro, (2017) but contrary to the study by Ouedraogo et al., (2018). The result also shows that an increase in official development assistance will lead to an increase in the economic sustainability in the short run and long run, respectively, which corroborates with earlier findings (Jean-Louis et al., 2017; Rahaj, 2018). These numbers indicate that foreign direct investment and official development assistance are important components of external financing that can influence economic activity growth in Nigeria. As a result, the government can implement necessary reforms for improved collaboration with international corporations and donor agencies towards reinvigorating economic activities.

The variables of remittances and external loan have not conformed to a priori in both short run and long run as reported in Table 3. The significant positive effect of remittance to economic sustainability in the long-run agrees with empirical findings in literature (Hussain et al., 2017; Muigai & Willy, 2017), however, the insignificant effect in the short run corroborates with the study by Jushi *et al.* (2021). However, external loan achieves significance in both the short run and the long run. The estimated elasticities indicated that an increase in remittances would reduce the economic sustainability in the short run and long run, respectively. The coefficient of the external loan shows that an increase in external loans leads to decrease in the economic sustainability in Nigeria at a 5 percent level of significance in the short run and long run, this agrees with the findings of Hussain *et al.* (2017), Nyang'oro, (2017) but contrary to that of Rahaj, (2018). This finding implies that, during the study period, the inflow of external loans did not spur economic performance. This kind of outcome is likely when loan is not channeled into productive sectors with a higher multiplier effect. This is also a red flag that Nigeria must consider with her rising debt profiles.

The series of savings and contract intensive money (CIM) on Table 3 have conformed to a priori. CIM exerts a significant effect in both short run and long run while savings is only significant in the short run. Also, real effective exchange rate aligns with a priori but is significant only in the short run. The estimated elasticities of savings in the short and long runs demonstrate that its contribution to economic activities is small, especially over the long run. This relationship for Nigeria is in direct disagreement to the theoretical positions taken by McKinnon (1973) and Shaw (1973), who believed that savings were crucial to a nation's economic progress. The short run result of the quality institution indicator (confirmed by Wald test) and long run are positive, elastic, and significant. This demonstrates that increasing quality institutions improves economic activity in the short and long runs, respectively. Also, the result indicates that a rise in REER would result in an increase in economic sustainability in the short run, but it is negatively signed in the long run.

Table 4: Diagnostic and Post-Estimation Tests

Adj. R ²	F-statistics	Linearity Test	Autocorrelation test	Heteroscedasticity test
		Ramsey RESET	LM Test	Breusch-Pagan-Godfrey
0.947405	56.75184	0.039168 (0.9689)	0.65006 (0.5266)	1.004357 (0.4869)

Source: Extract from EViews 12 Output

Note that probability values for the post-estimation test are in parentheses

The F-statistic of 56.75184 with a standard error of 0.0000 and the error correction term (ECT) value of -0.167489 show that the rate of adjustment to the long-run horizon is significant. However, while the choice and appropriateness of ARDL as the preferred estimation technique was motivated by the outcome of the unit root testing where the order of integration was both I(0) and I(1), this study considered the accuracy of the estimated models via several post estimation and/or diagnostic tests. Thus, this study presents post-estimation results to ascertain the accuracy or viability of the estimated models.

Table 4 presents the diagnostic and post-estimation results for model two. F-statistics indicates whether the independent variable(s) are jointly significant in explaining the dependent variable. R² measures how well the estimates have explained the actual dependent variable – it is a measure of the strength of the model. Adjusted R² is particularly used to assess if the addition of an independent variable has contributed to increased strength of the model. The null hypothesis of linearity is maintained and the model is appropriately stated as the Linearity RESET test verifies that the model is

stable. The presence of autocorrelation and the rejection of the serial correction null hypothesis, which appears to be consistent with the economic sustainability model, were further investigated in this work. Also, this study discovered that the economic sustainability model's null hypothesis of heteroscedasticity was repeatedly rejected. These indicators obtained confirm the estimated model is efficient and robust for policy inference.

5. Conclusion and Policy Remarks

This study concludes that external financing has impacted positively on economic sustainability within the period of the study, given the favorable results of FDI, FPI, and ODA. One of the arguments for the increasing foreign direct investment and foreign portfolio investment flows in recent years is attributable to enactment of reforms and policies aimed at improving the business climate in Nigeria. At the same time, Nigeria remains one of the largest recipients of official development assistance in Africa. In order to increase the amount of external financing available for the stock of productive capital and stimulate economic activity, the government can build on these results by enacting new policies and strengthening the ones that are already in place. This will prevent an excessive reliance on unstable sources of funding. Achieving this balance will be essential to utilizing external financing for inclusive, sustainable, long-term growth that advances human development.

However, remittances and external loans have shown an effect that is detrimental to economic sustainability. This implies that remittances and external loans did not enhance economic sustainability within the period of the study. These outcomes could be linked to Nigeria's governance challenges that continued to undermine efforts to translate these capital inflows into sustainable inclusive growth. Hence, the need for reforms that can guarantee property rights, contract enforcement, and the broader judicial system to incentivize more long-term loan facilities in the direction of economic sectors like manufacturing. It is worthy to note that reduction in trade barriers and improving infrastructure could make Nigeria more attractive for market-seeking foreign investment. The government can put in place incentives that can encourage foreign investors to channel more external financing into health, education, and infrastructure to alleviate poverty and enhance economic sustainability.

Since FDI, FPI, and ODA have exhibited increasing effects on economic sustainability, pursuing them on the path to economic sustainability is valid. However, this impact can be improved by government agencies such as Federal Ministry of Finance (FMF), Federal Ministry of Trade and Investment, Federal Ministry of Science and Technology Central Bank of Nigeria, Nigerian National Petroleum Corporation (NNPC), reviewing the modalities and processes that have been in use to achieve even more benefits of this external financing. This is achievable when the government through its relevant agencies provides incentives for available investment, increasing the ease of doing business particularly in the real sector. This is in addition to the stable macroeconomic environment, such as stability in exchange rate behavior, that can spur investment activities that encourage foreign investors into the domestic economy. With the current foreign exchange crisis in Nigeria, the risk of losing the benefits foreign direct investments looms largely. The growing threat of insecurity and other forms of social unrest also threaten the flow of foreign investment and must be curtailed to sustain the benefits.

The negative and significant response of remittances to economic sustainability requires Nigerians in diaspora to double their efforts in remittance inflows. The Diplomatic missions need to deliberately sensitize nationals on the benefits of channeling remittance inflows to productive economic activities in addition to immediate household consumption/altruistic motives alone. Also, the declining effect of external loans prompts the need for the government, through the Debt Management Office, Federal Ministry of Finance to strengthen their quantity and quality control unit for judicious utilization of loanable funds on sustainability and productive projects. The rising debt profiles largely spells doom for the economy. Savings must be encouraged across all segments of society, particularly in the rural areas, with the collaboration of the Central Bank of Nigeria and commercial banks on advocacy for financial inclusion to facilitate adequate savings mobilization, thereby making loanable funds available for investment purposes. While these efforts have begun in several ways, they need to be stepped up and sustained.

This study is limited to a country-specific using data from 1999Q1 to 2022Q4. Future study can consider more countries and extend the timeframe. Therefore, the authors suggest further research

on external financing and economic sustainability in Nigeria by investigating non-linear relationship. Other studies may also consider extending the analysis to other countries beyond Nigeria using nonlinear models. Given the crucial role of quality institutions in economic performance, it is imperative to examine the moderating effect of quality institutions on the nexus between external financing and economic sustainability.

Authors Contribution

Introduction, Sule, A., & Doki, N.O.; Literature review, Sule, A.; Methodology and data, Sule, A., & Akighir, D.T.; Research results and comments, Doki, N.O., & Akighir, D.T.; Conclusion, Doki, N.O. & Sule, A.

Acknowledgement

We acknowledge the support of anonymous reviewers, and Department of Economics, Benue State University Makurdi, Dr Shitile, T.S. for the critical review of the draft version of this paper.

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