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Remittances, Debt Service Payments and Economic Growth in Nigeria

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Abstract:
The study investigates the intricate relationship between the effects of remittances (REMIT) and debt service payments (DSP) on economic growth (RGDP) as well as other key variables, external reserve (ER), foreign direct investment (FDI), and external debt (EXTD) on economic growth (RGDP) in Nigeria from 1995 to 2021. Various statistical techniques, such as Ordinary Least Square (OLS), Augmented Dickey Fuller (ADF) tests and ARDL, were used. The result indicates the existence of a positive correlation between RGDP and FDI; DSP and ER exhibit a moderate negative correlation, while REMIT and DSP show a strong negative correlation. ER and REMIT indicate a correlation, while EXTD and ER indicate a negative correlation. All variables are I(1) and the ARDL Bound test for co-integration indicates that a long-run relationship exists between dependent and independent variables. ARDL estimation shows that only the coefficient of external debt is significant. The R^2 shows that 84% of the variation in RGDP is explained by the independent variables. The test for autocorrelation (DW = 2.33) indicates no autocorrelation in the error term.
This study recommends that policymakers should implement measures to attract and retain foreign investments, given the positive impact of FDI on RGDP, and Policymakers should explore strategies to channel remittances into productive sectors, such as investments in infrastructure, education, and small-scale enterprises.

Keywords: External debt, remittances, debt service payments, external reserves, FDI, economic growth

1. Introduction

In Sub-Saharan Africa (SSA), many countries in the sub-region not only perceived international financial inflows as an attractive avenue for obtaining external funding for investment and economic growth (Todaro & Smith, 2009) but also depended on it. This is because most of these sub-regions are bedeviled by numerous risk factors such as the depreciation of the currency, poor performance in export markets associated with decreasing commodity prices internationally (International Monetary Fund, 2015), increasing fiscal policy as well as increases in global market instability amongst others that have constituted a hindrance to domestically sourced finance which impedes investment for domestic development.

The observed rise in financial inflows to the sub-region, including Nigeria, has been attributed to remittance inflow in particular and other financial flows in general. In the international migration and development literature, remittance flows are an important issue because they are seen as one of the major advantages that migrants bring to the originating economies. Remittances flow has become an important source of external financing for developing countries, exceeding international aid and foreign direct inflows (World Bank, 2019). Remittances, being private resource flows, are mostly used for direct consumption and support of households. While remittances cannot be a substitute for other external financing such as public debt, foreign direct investment (FDI), and official development assistance (ODA), remittances have proven to be a more reliable and sustainable source of foreign currency flows during crisis periods. Available evidence indicates that remittances have enabled many developing and least developed countries to maintain balance of payments (BOPs) stability, ensure foreign currency availability, increase domestic aggregate demand, and improve the creditworthiness of countries for external borrowing. Remittances flow to developing countries to improve foreign exchange receipts, enable countries to keep and maintain adequate foreign reserves (Bdnews24.com, 2009), service debt payments (Ratha, 2007) and finance capital flight. Remittances provide constitute more than ten percent of many counties' national income.

Since the perspectives in the literature on remittances are that remittances are used to increase consumption or channel to investment, however, once a large proportion of remittances inflow is diverted to servicing a country's debt payment, then it is not possible to use it for domestic resource mobilization.

According to Loxley and Sackey (2008), countries need to depend on other financial flows, such as remittances, in the long run, to circumvent the debt service obligations that appear with aid in the form of concessional loans in the future.

When remittances are used for debt amortization, capital flight or reserve accumulation, they cannot be channelled to investment or consumption because of the limit on the potential direct growth effect (Das & Serieux, 2010).

The debate in the literature is on the likely effect of remittances on economic growth if diverted to servicing debt. This discussion has resulted in mixed outcomes: While Fayissa and Nsiah (2008) and Armah and Nelson (2008) pointed out the positive effects of remittances on growth, studies by Agenor (2003) and Chami *et al. (*2005) reported a negative effect of remittances on economic growth. The results of these findings are based generally on developing countries associated with advanced markets. Investigations on African countries did not take into consideration the institutional quality and level of financial development of the countries investigated.

The Nigerian economy is one of the largest world's debtors, with a long-term public foreign debt of $30 billion (OECD, 1992). After a period of large arrears problems at the start of the 1980s, there was negotiation with Paris Club members and commercial banks in 1986. Thereafter, the economy, being highly indebted to both official and private creditors, rescheduled the agreement. The discovery of oil and its consequent boom in the 1970s was heralded by fundamental changes in the economy. The aim of the government within this period was to utilize the increasing oil revenue in investment in basically social, physical and economic infrastructure. However, most public investments were unviable, while others were beyond the government. The competitiveness of agriculture as a source of revenue was eroded by inappropriate pricing policies and rural-urban migration. With increasing foreign exchange inflows through the oil sector, the public sector involvement in economic activities increased, and the oil sector accounted for about half of the GDP and two-thirds of modern sector employment in 1980. The burst in the oil boom in the second half of 1981 due to the international oiul market glut resulted in a serious problem for the Nigerian economy such as price distortions, heavy reliance on imports, an overvalued currency which were not well equipped to adjust with a prolonged period of decreased in international oil prices. The resultant decrease in oil prices and the fall in local oil production led to a deteriorating balance of payments and government finances.

The government's expectation and reaction at the initial stage of the problem was that it would be a passing phase partly because the international financial community had yet to see the crisis as an international problem. Credit lines, however, started closing with the increasing accumulation of trade and payments arrears from early 1982. By 1980, external debt stock amounted to $18.6 billion in 1986 from $4.6 billion in 1980. By 1988, debt stock increased to $29.7 billion and$32.9billion as at the end of 1990 (Ogbe, 1992). This increasing foreign debt was noted to have been a major impediment to revitalizing the shattered economy and alleviating the debilitating poverty. The debt stock amounted to about 75% of GDP and about 180% of export earnings as of December 2000. The Debt service due was about $3.0 billion or 14.5% of export earnings in 2000 (Adesola, 2009). Remittance is the second-biggest source of foreign exchange earnings next to petro-dollars sent home by Nigerians living abroad. It was noted that about 17.5 million Nigerians lived in foreign countries in 2014, with over two million in the UK and the USA. A dramatic increase in overseas remittances sent home by Nigerians abroad increased from $2.3 billion in 2004 to 17.9 billion in 2007, representing 6.7% of GDP.

The questions emanating from these are whether remittances affect economic growth positively and if remittances lead to growth through debt servicing. Since the Nigerian economy is a recipient of large remittance inflow in SSA, it became imperative to estimate and analyze the effect on macroeconomic performance and long-term economic growth.

1.1. Research Questions
- What is the effect of remittance flow on economic growth in Nigeria?
- What is the effect of debt service payments on economic growth in Nigeria?
- Is there any correlation between remittances and debt service payments in Nigeria?

1.2. Research Objectives
- Examine the effects of remittances and debt service payments on economic growth.
- Examine the impact of debt service payments on the Nigerian economy.
- Investigate the correlation between remittances and debt service payments in Nigeria.

1.3. Hypotheses
- H_0: Remittances inflow does not have a significant effect on the growth of the Nigerian economy
- H_0: Debt service payments have no significant effect on the Nigerian economy
- H_0: Remittance inflow does not significantly correlate with debt service payments in Nigeria

2. Literature Review

2.1. Theoretical Framework

2.1.1. Theory of Remittances
- Altruistic Motive: According to the altruism or livelihood school of thought, people migrate, possibly to increase their personal income, and migrants remit to their family back home because of their obligation to their families. Remittances are sent due to the affection and responsibility they have for their family member. Thus, when migrants remit out of concern for the welfare of their family back home, the migrant derives a certain level of utility (Stark, 1991; Funkhouser, 1995; Brown, 1997; Poirine, 1997; Rapoport & Docquier, 2005; OECD, 2006).

The altruistic model advances a number of hypotheses. First, the amount of remittances should increase with the migrant's income. Second, the amount of remittances should decrease with the domestic income of the family. And third, remittances should decrease over time as the attachment to the family gradually weakens. The same should happen when the migrant settles permanently in the host country and family members follow.

Most studies that investigated the validity of altruism concluded that altruism is insufficient in explaining remittance inflow. Alleyne (2006) opined that there is a strong investment motive rather than an altruistic motive for remitting. Lucas and Stark (1985) agreed as they believed it is incorrect to assume that the major reason for sending remittances is altruism. This was collaborated by van Dalen, George and Tineke (2005) as they believed that trying to model altruism would lead to inconclusive results.

- Self-Interest Motives: Migrants are also motivated to remit to family members in their country of origin because of economic and financial interests. First, a migrant may remit money to his/her parents driven by the aspiration to inherit if it is assumed that bequests are conditioned by behaviour (Hoddinott, 1994; Lucas & Stark, 1985; Rapoport & Docquier, 2005). Second, the ownership of assets in the home area may motivate the migrant to remit money to those left behind to make sure that they are taking care of those assets (Brown, 1997). Third, the intention to return home may also promote remittances for investment in real estate, financial assets and public assets to enhance prestige and political influence in the local community and/or in social capital (*e.g.* relationship with family and friends) (Glytsos, 1988 and 1997).

2.1.2. Debt Overhang Theory

The foundation of the debt overhang theory focuses on the country's economic performance, which will be affected spontaneously when a country cannot service its debt for a long period and the burden of debt servicing is passed to the future generation. The affected economy will hindered by efforts to repay and the inability to further source external finance with internal borrowing as the only alternate means. This will result in a crowding-out effect due to the ensuing competition between the government and private investors, which leads to high-interest rates (Claessens, 1996). According to Krugman (1988), debt overhang is a situation in which the estimated re-payment on external debt is below the pre-determined value of the debt, while to Borensztein (1990), debt overhang manifests when the debtor country gains very little from the return to any incremental investment because of the debt service obligations. Debt overhang can also be a condition where a firm has huge debt such that its business expansion through investment is retarded, and the expected benefit that should accrue to shareholders will rather go to the debenture holders and other creditors (Meyer, 1977). Thus, when an economy is unable to repay or service its accumulated debt as necessary, the burden will be on both the present and future generations in that economy. Debt becomes a burden and overhang when the lump sum of a country's debt exceeds its re-payment capability. The current generation may be unable to access additional external funds to repay the loan when there is evidence of low level of output, increasing unemployment, and so on. The servicing of the loan may be transferred to the future generation as a debt burden. The foundation principle of the theory is that if the debt service level surpasses the country's capacity to repay with imminent likelihood. Expected debt service is anticipated to be an increasing function of the country's economic growth level (Adedoyin, Babalola, Otenkiri & Adeoti, 2016)

2.2. Empirical Literature

In the empirical literature explaining the effects of remittances on economic growth, different types of theories and models were used by scholars. Using the Solow Model, Rao and Hassan (2012) were able to find that remittances have a positive influence on economic growth

Das and Serieux (2010) investigated the effects of remittances and reverse flows in 36 developing countries from 1980 to 2006 by employing Pooled Mean Group (PMG) approach. Their result shows that a one per cent increase in the rate of remittance flows will increase the rate of consumption by approximately 0.8%, and there is no statistically apparent effect on the rate of investment. The results also indicate that approximately 20% to 27% of remittance flows have been diverted to finance reverse flows. In addition, changes in the rate of remittance flows tended to be positively correlated with changes in debt service payment-to-income ratios and the rate of reserve accumulation relative to income.

Twerefo, Turkson, Wiafe and Darkwah (2020) investigated the effect of financial inflows on economic growth in 47 sub-Saharan African countries in the 1995-2017 period. The financial inflows are proxy by Foreign Direct Investment, Official Development Assistance and remittances and control for domestic investment, human capital, government expenditure, trade openness, financial development, inflation, political rights and civil liberty and adopting the Generalized Method of Moment. Their results show that remittances and FDI are growth enhancing, given their positive effect on growth, which is consistent with the Solow Neoclassical model. Government expenditure, domestic investment and inflation also positively affect economic growth, while a negative reducing effect of official development assistance on economic growth is attributed to poor institutional quality. Trade openness and Secondary School enrollment were also perceived to have a negative impact on growth.

Adesola (2009), in his review and analysis of the effect of external debt service payment on sustainable economic growth development in Nigeria, used debt re-payment data from 1981to 2004 on debt from Multilateral Financial creditors, Paris club creditors, London club creditors, Promissory notes holders and other creditors (Non-Paris Creditors) as variables in order to ascertain whether they statistically have an inverse relationship with the GDP and gross fixed capital formation (GFCF) at current market prices. By adopting the ordinary least square multiple regression method, Adesola (2009) observed that debt payments to London club creditors, Paris club creditors, promissory note holders and

other creditors have a significant impact on the GDP and GFCF. Debt payment to Paris Club creditors and debt payment to promissory notes holders are positively related to GDP and GFCF, while debt payment to London Club creditors and other creditors shows a negative significant relation to GDP and GFCF Yussuff (2018) investigated the effects of remittances on inflation in Nigeria within the period1990-2015 using time series data. The findings indicate that remittances do not influence inflation in Nigeria based on the co-integration technique and error correction mechanism used to test both the long-run and short-run dynamics of the variables.

Mijiyawa and Oloufade (2022) investigated the effect of remittances inflow on external debt in 50 developing countries comprising low- and middle-income countries worldwide within the period 1970-2017 using panel data; they identified international reserves as a potential transmission channel, and their results show a negative and significant effect of remittance inflow on the external debt-to-GDP ratio. Mijiyawa and Oloufade (2022) also find a negative and significant effect of international reserves on external debt. In addition, the effect of remittance inflows on external debt increases and remains positive and significant after controlling for international reserves. Their result indicates the role of international reserves as a self-insurance mechanism, and the Dutch disease effect related to remittance inflows is at play. In addition, they also found a negative and significant effect of economic growth and savings-investment gap on external debt. Furthermore, a positive and significant effect of the nominal exchange rate and the United States lending interest rate on external debt was observed in their study.

3. Research Methods

3.1. Sources of Data
Secondary data sets from 1995 to 2021, obtained from Central Bank Publication (Statistical Bulletin), were utilized.

3.2. Identified Variables
- Economic Growth proxy by the Real Gross Domestic Product is the dependent variable indicating the economic performance of the Nigerian economy. It represents the total market value of all the goods and services provided in an economy within a specified period, conventionally, a year. It helps to measure the market size of an economy and assists in accentuating the economic performance of a country. Its usage is justified by Malik, Hayat & Hayat (2010) and Shabbir (2014).
- Remittances Inflow is one of the independent variables and represents the total money sent by Nigerians living and working abroad to their home country.
- External Reserves: External Reserves, also known as foreign exchange reserves, serve as a financial buffer and are used to stabilize a nation's currency. It serves various functions in the economy.
- Debt Service Payments indicate the re-payments of both the principal and interest payments on loans and bonds made by the Nigerian government to service her external debt obligations. Several studies have analyzed the effect of debt service payments on economic growth. For example, Ayadi and Ayadi (2008), Adesola (2009), Nazifi (2014).
- External Debt is the money that a country owes other countries, banks or international financial institutions. It has been used by Audu (2004), Ogunmuyiwa (2011), Iyoha. (1996) amongst others.
- Foreign Direct Investment is money invested in a country from another country. It plays a major role in international capital flows and economic globalization. It is a significant source of foreign capital inflow into the Nigerian economy, impacting numerous key areas.

4. Estimation Technique
In order to examine the effects of remittances, debt service payments as well as other identified variables on economic growth, the study used descriptive statistics, the Unit root test, OLS regression model to estimate the coefficients of the independent variables, ARDL As well as statistic tests such as the F-test and the t-test.

4.1. Model Specification
The linear model specified for the study is:

$$RGDP = f(REMIT, DSP, ER, FDI, EXTD) \tag{1}$$

Where RGDP (Economic Growth) is the dependent variable, while Remittances (REMIT), Debt Service Payments (DSP), External Reserves (ER), Foreign Direct Investment (FDI) and External Debt (EXTD)

Transforming the functional model above into an explicit econometric model implies that the constant and the error terms are introduced into the model, thus:

$$RGDP_t = \alpha_0 + \alpha_1 REMIT_t + \alpha_2 DSP_t + \alpha_3 ER_t + \alpha_4 FDI_t + \alpha_5 EXTD_t + \varepsilon_t \tag{2}$$

Where:
RGDP = Economic Growth
REMIT = Remittances
DSP = Debt Service Payments
ER = External Reserves
FDI = Foreign Direct Investment
EXTD = External Debt

α_0 is the constant of the model, and $\alpha_0 \ldots \alpha_5$ are the coefficients of the independent variables measuring the effects of a unit change in the value of the independent variable on economic growth.

4.1.1. A Priori Expectation

The expected relationship among the variables of the study is thus stated below using the parameters of each variable. The a priori expectation is thus; $\alpha_1, \alpha_3, \alpha_4, and\ \alpha_5 > 0$ while $\alpha_2 < 0$.

4.2. Presentation of Results

4.2.1. Descriptive Analysis

The result of the descriptive analysis of the variables used in the study is presented in table 1 below. All values are approximated to 2 decimal places. The table indicates average values, median values, as well as the maximum and minimum values of the data for each variable, highlighting the consistency in the data used.

Analysis of the average value for the economic growth (RGDP) indicates an average of 4.64 billion naira and a standard deviation of 3.66, indicating a bit of variation in the RGDP during the period with an associated median value of 5.01, reflecting that half of the observations are below and the other half are above it. Remittances (REMIT) have a mean value of 3.82 billion naira and a standard deviation of 2.23, with a median value of 4.18. The average value of total debt service payment (DSP) is 1.7, with an associated standard deviation of 1.4, while the mean value of external debt (EXTD) is 25.4 billion, and the standard deviation is 23.10. Again, there is a lot of variation in total debt service payment during the period. The median of total debt service payment (DSP) is 1.33 billion, while that of external reserves (ER) is 14.30 billion. The average value of the external reserves (ER) is 107.16, the standard deviation is 101.56 and the associated median value is 78.45.

If the kurtosis value of the distribution is greater than three, the distribution has a long tail and is said to be leptokurtic. Thus, economic growth (RGDP) is therefore leptokurtic given the value of 4.07, which means that the distribution is slim or long-tailed, with more extreme observations than a normal distribution, thus indicating a lot of variability in economic growth during the period under study. While the kurtosis values exhibited by external debt (EXTD), foreign direct investment (FDI), external reserves (ER) and remittances (REMIT) are 2.4, 2.14, 2.41 and 1.9, respectively, are less than three and thus platykurtic (short-tailed) since the distribution produces lesser extreme outliers than does the normal distribution. Kurtosis for debt service payments (DSP = 3.00) and external reserves (ER = 3.12) are mesorkurtic (normally disturbed) since their individual distribution values equal 3.

If skewness = 0, the data are perfectly symmetrical. However, a skewness of exactly zero is quite unlikely for real-world data; if skewness is less than −1 or greater than +1, the distribution is highly skewed; if skewness is between −1 and −½ or between +½ and +1, the distribution is moderately skewed; if skewness is between −½ and +½, the distribution is approximately symmetric. Economic growth (RGDP) is slightly skewed to the right, given the value of 0.46. This indicates a possibility of more observations with high values than low values in RGDP, which is a sign of volatility. Remittances are rightly skewed (1.13), indicating that more observation has high values and, by implication, higher remittances inflow. External reserve (ER = 0.47) is also rightly skewed. Debt service payment (DSP =0.89) is slightly skewed to the right.

The Jarque-Bera test is used to test whether the data is normally distributed. The Jarque-Bera statistic and the associated probability for RGDP, REMIT, DSP, ER, EXTD, and FDI all indicate that the null hypothesis of normality cannot be rejected. That means the distribution of the data is close enough to normal and can be used to carry out analyses that assume a normal distribution.

Sample: 1995–2021						
	DSP	**ER**	**EXTD**	**FDI**	**RGDP**	**REMIT**
Mean	1.700817	107.1693	25.45730	1.370042	4.641751	3.818737
Median	1.334482	78.44888	14.30650	1.380374	5.015935	4.183555
Maximum	5.425152	335.1223	81.48402	2.900249	15.32916	8.333830
Minimum	0.100218	5.012881	4.950816	0.183822	-1.794253	0.567474
Std. Dev.	1.487142	101.5594	23.10331	0.751543	3.658799	2.236945
Skewness	0.949346	1.126216	0.837154	0.400565	0.527882	0.017709
Kurtosis	3.002987	3.128860	2.395893	2.142674	4.068230	1.908950
Jarque-Bera	4.055674	5.726315	3.564285	1.548919	2.537724	1.340599
Probability	0.131620	0.057088	0.168277	0.460953	0.281151	0.511555
Sum	45.92206	2893.572	687.3471	36.99113	125.3273	103.1059
Sum Sq. Dev.	57.50137	268172.4	13877.84	14.68526	348.0571	130.1021
Observations	27	27	27	27	27	27

Table 1: Descriptive Statistics
Source: Authors Computation (2023)

4.3. Correlation Analysis

Table 2 shows the result of the correlation analysis, which shows the degree of association between the dependent variable economic growth rate (RGDP) and the independent variables (DSP, ER, EXTD, FDI, and REMIT). The correlation result indicates a strong positive association between economic growth (RGDP) and FDI (0.61). A strong, negative association exists between RGDP and DSP (-0.087) and a moderate negative correlation with other independent variables (EXTD = -0.11, REMI= -0.014).

Debt Service Payments (DSPs) show a moderate negative correlation with external reserves (ER = - 0.46) and remittances (REMIT = -0.3186).

	RGDP	DSP	ER	EXTD	FDI	REMI
RGDP	1.00000	-0.087939	0.254816	-0.106531	0.612549	-0.014623
DSP	-0.087939	1.000000	-0.464146	0.703868	0.021259	-0.318632
ER	0.254816	-0.464146	1.000000	-0.703106	0.503892	0.705702
EXTD	-0.106531	0.703868	-0.703106	1.000000	-0.180642	-0.838542
FDI	0.612549	0.021259	0.503892	-0.180642	1.000000	-0.326163
REMI	-0.014623	-0.318632	0.705702	-0.838542	-0.326163	1.000000

Table 2: Correlation Analysis
Source: Authors Computation Using Eview ((2023)

Remittances (REMIT) indicate a strong positive correlation with ER (0.7057) and a moderate correlation with FDI (0.3262), while a strong negative correlation was exhibited with EXTD (-0.8385) and DSP (-0.3186).

External Reserves (ER) and remittances (REMIT= 0.70) are moderately positively correlated, while a moderate negative correlation exists with external debt (EXTD = -0.70).

External Debt (EXTD) exhibit a strong negative correlation with REMIT (-0.8385), indicating an inverse relationship between the two variables.

4.3.1. Unit Root Test

It is important to empirically determine the stationarity of the time series data used in the study given the fact that macroeconomic time series reflects non-stationarity in their level form, and this, in most cases, gives spurious results if necessary measures are not taken (Johansen, 2011). To guard against spurious results, the properties of the variables used were checked using the Augmented Dickey-Fuller (ADF) test developed by Dickey and Fuller (1981).

To test the unit root, the ADF test was used with the assumption that the variables have a linear trend, if it has had a different type of trend, or if the study had wanted to be less restrictive in its assumptions about the form of the trend, the Phillips Perron test would have been considered. The ADF test result is reported in table 3. The results conclude that RGDP, DSP, ER, EXTD, FDI, and REMIT are $I(1)$ variables, indicating that the variables are stationary at first difference.

Variables	ADF Statistic	5% MacKinnon Critical Values	Probability	Order of Integration	Remark
GDP	-7.069210	-2.986225	0.0000	I(1)	Stationary
DSP	-5.706262	-2.986225	0.0001	I(1)	Stationary
ER	-3.488107	-2.986225	0.0171	I(1)	Stationary
EXTD	-4.009178	-2.986225	0.0052	I(1)	Stationary
FDI	-7.736611	-2.986225	0.0000	I(1)	Stationary
REMIT	-5.018382	-2.986225	0.0005	I(1)	Stationary

Table 3: Unit Root Test (ADF)
Source: Author's Computation (2023)

4.3.2. Co-Integration Test

Having established the order of integration of the series, the study determined the number of long-run equilibrium relationships or Co-integrating vectors between the variables. Since the variables were found to be integrated of the same order, such as I (1), as shown in table 3 above using Augmented Dickey-Fuller test results, it implies that an equilibrium relationship exists among the variables. The study conducted a co-integration test in line with Johansen and Juselius's (1990) approach to establishing the long-run relationship among the variables. Co-integration analysis is conducted in all-time series data to determine whether there is a long-run relationship between two variables. Two variables are co-integrated if both their Max-Eigen and Trace statistics are greater than their respective critical values. Trace statistics test the null hypothesis of $r = 0 \ or \ r \le 1$ against the alternative hypothesis of $r \ge 1 \ or \ r = 2$. On the other hand, maximum Eigen-value statistics test the null hypothesis of $r = 0 \ or \ r = 1$ against the alternative hypothesis of $r = 1 \ or \ r = 2$.

Unrestricted Co-integration Rank Test (Trace)				
Hypothesized		**Trace**	**0.05**	**Prob.**
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None *	0.806830	107.7102	95.75366	0.0058
At most 1	0.618297	66.60564	69.81889	0.0878
At most 2	0.488369	42.52781	47.85613	0.1445
At most 3	0.367829	25.77403	29.79707	0.1356
At most 4	0.300279	14.30915	15.49471	0.0748
At most 5 *	0.193694	5.382309	3.841465	0.0203
Trace test indicates 1 cointegrating equation(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Co-integration Rank Test (Max Eigen-value)				
Hypothesized		Max-Eigen	0.05	Prob.**
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None *	0.806830	41.10458	40.07757	0.0382
At most 1	0.618297	24.07783	33.87687	0.4499
At most 2	0.488369	16.75378	27.58434	0.6012
At most 3	0.367829	11.46488	21.13162	0.6009
At most 4	0.300279	8.926846	14.26460	0.2923
At most 5 *	0.193694	5.382309	3.841465	0.0203
Max-eigenvalue test indicates 1 co-integrating equation(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Table 4: Johansen Co-Integration

4.3.3. ARDL Bound Test for Co-integration
This test is for the existence of the long-run relationship among the variables of the model.

Null Hypothesis: No Levels of Relationship						
Number of Co-Integrating Variables: 5						
Trend Type: Rest. Constant (Case 2)						
Sample size: 25						
Test Statistic					**Value**	
F-statistic					**4.737626**	
Bounds Critical Values						
	10%		5%		1%	
Sample Size	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
30	2.407	3.517	2.910	4.193	4.134	5.761
Asymptotic	2.080	3.000	2.390	3.380	3.060	4.150
* I (0) and I (1) are respectively the stationary and non-stationary bounds.						

Table 5: Bound Test

From the table above, the F-statistic is 4.737626. This is greater than the upper bound I (1) at the 5% significance level. This indicates that the null hypothesis (H_0), which states that there is no relationship between the variables, will be rejected, and the alternative hypothesis (H_a) will be accepted. Therefore, there is a long-term relationship between the dependent and independent variables.

4.3.4. ARDL Estimation

Method: ARDL Date: 12/27/23 Time: 16:49 Sample: 1995 2021 Included observations: 25 Dependent lags: 2 (Automatic) Automatic-lag linear regressors (2 max. lags): DSP ER EXTD FDI REMIT Deterministic: Restricted constant and no trend (Case 2) Model selection method: Akaike info criterion (AIC) Number of models evaluated: 486 Selected model: ARDL(1,1,1,0,2,0)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	-0.241525	0.225196	-1.072512	0.3016
DSP	1.028504	0.909706	1.130589	0.2772
DSP(-1)	1.309174	0.666526	1.964177	0.0697
ER	-0.040932	0.019156	-2.136831	0.0507
ER(-1)	0.021020	0.016434	1.279112	0.2217
EXTD	-0.223384	0.101027	-2.211136	0.0442
FDI	1.836440	1.357818	1.352494	0.1977
FDI(-1)	2.777488	1.342081	2.069538	0.0575
FDI(-2)	1.884499	1.329617	1.417324	0.1783
REMIT	-1.288840	0.773744	-1.665720	0.1180
C	5.630070	4.221308	1.333727	0.2036
R-squared	0.748450	Mean dependent var		4.848160
Adjusted R-squared	0.568771	S.D. dependent var		3.677451
S.E. of regression	2.414910	Akaike info criterion		4.901382
Sum squared resid	81.64506	Schwarz criterion		5.437688
Log-likelihood	-50.26728	Hannan-Quinn criter		5.050131
F-statistic	4.165488	Durbin-Watson stat		2.333352
Prob(F-statistic)	0.007842			
*Note: p-values and any subsequent test results do not account for model selection				

Table 6: Dependent Variable: GDP

Table 6 indicates the ARDL estimation of the coefficients of the dependent (RGDP) and independent variables (DSP, ER, EXTD, FDI and REMI). All the independent variables were not statistically significant except External debt, which is significant with a P-value of 0.0442.

The coefficient for RGDP (-1) is -0.24 (2 d.p), which means that a 1% increase in RGDP in the previous year is associated with a 0.24% decrease in R4.GDP in the current year, holding all other variables constant. The coefficient for DSP is 1.30, which means that a 1% increase in DSP is associated with a 1.30% increase in RGDP, holding all other variables constant.

The coefficient for ER is -0.04 (2 d.p), which means that a 1% increase in the exchange rate is associated with a 0.04% decrease in RGDP, holding all other variables constant. The coefficient for ER(-1) is 0.02, which means that a 1% increase in the exchange rate in the previous year is associated with a 0.02% increase in RGDP in the current year, holding all other variables constant. The coefficient of REMIT is (-1.29) (2 d.p). This implies that a 1% increase in remittances is associated with a 1.29% decrease in RGDP, all other variables held constant. The coefficient for EXTD is given as -0.22 (2 d.p); this means that a 1% increase in external debt is associated with a 0.22% decrease in RGDP while holding all other variables constant. For FDI, the coefficient is 3.64 (2 d.p), which means that a 1% increase in foreign direct investment is associated with a 3.64% increase in RGDP, holding all other variables constant.

The R-squared measures how well the model fits the data, and it indicates that 74.8% of the variation in GDP is explained by the independent variables in the model. The adjusted R-squared is lower, at 56.9%, which suggests that the model is somewhat over-fit.

The value of the Durbin-Watson statistic (2.33), which tests for autocorrelation, indicates that there is no autocorrelation in the error term of the model. This means that the errors in the model are independent of each other.

On the other hand, according to the T statistics, EXTD proved to be significant in explaining the behavior of RGDP; hence, a 1-unit increase in EXTD will result in a subsequent 0.05 decrease in RGDP.

4.4. Diagnostic Test

The study analyses certain post-estimation diagnosis tests to ensure that the findings produced from the ARDL bound testing technique and other tests are accurate and free of false assumptions. Two of these tests are the Breusch-Pagan-Godfrey heteroskedasticity test and the Breusch-Godfrey serial correlation test. If the Probability value of Chi-

square is less than 0.05, then heteroscedasticity is present. However, if the Probability value of Chi-square is greater than 0.05, then homoscedasticity is present.

Heteroscedasticity Test: Breusch-Pagan-Godfrey Null hypothesis: Homoscedasticity			
F-statistic	0.942934	Prob. F(10,14)	0.5260
Obs*R-squared	10.06146	Prob. Chi-Square(10)	0.4351
Scaled explained SS	2.797239	Prob. Chi-Square(10)	0.9858

Table 7: Heteroscedasticity Test

From the above table, the *p*-value of Chi-Square is 0.4351; therefore, we accept the null hypothesis that states that homoscedasticity is present.

Breusch-Godfrey Serial Correlation LM Test: Null Hypothesis: No Serial Correlation at up to 2 lags			
F-statistic	0.657512	Prob. F(2,12)	0.5358
Obs*R-squared	2.469060	Prob. Chi-Square(2)	0.2910

Table 8: Breusch-Pagan-Godfrey Test

The result of the estimated ARDL model confirmed from table 8 that all the diagnostic tests passed against serial autocorrelation and heteroskedasticity of errors.

5. Discussion

Descriptive statistics offer a nuanced understanding of economic indicators. Notably, the mean RGDP stands at 4.64 (2 d.p), indicating the average economic output during the observed period (1995-2021). The substantial standard deviation (3.66) suggests considerable variability. The OLS regression unveils valuable insights into the determinants of RGDP. Foreign Direct Investment (FDI) emerges as a significant driver, with a coefficient of 3.64 (2 d.p) (p-value < 0.001). This conforms to the conclusions of Raymond Rahaj Adegboyega (2021), Ebunoluwa. Oyegoke and Usman Nuri Aras (2021) imply a positive and significant impact on RGDP. Remittances (REMIT) display a negative association (-1.86, p-value = 0.009). This contradicts the findings of Iheke (2012), Hussain and Chani (2018). Debt service payments (DSP) show a positive and insignificant impact on GDP. This is in contradiction to the conclusions of Raymond Rahaj Adegboyega (2021).

The ADF unit root test confirms that key variables are integrated of order one I (1), emphasizing the importance of analyzing these variables in first differences. Examining the correlation matrix reveals intriguing relationships. Notably, RGDP shows a strong positive correlation with Foreign Direct Investment (FDI) at 0.61, signifying a potential symbiotic relationship.

Autoregressive Distributed Lag (ARDL) estimation evaluates the long-term relationship between GDP and its determinants. Coefficients and statistical tests offer insights into the magnitude and significance of the relationship. The co-integration test examines the presence of long-term relationships among variables. The rejection of the null hypothesis suggests the existence of co-integration.

The bounds test provides evidence of co-integration, indicating the presence of long-term relationships among variables. Granger causality tests explore causal relationships among variables. Significant results indicate the presence of causal links. The study assesses heteroskedasticity and serial correlation, which is crucial for validating regression results. In this case, the tests do not reject the null hypotheses, suggesting the absence of significant issues.

6. Test of Hypothesis

To ascertain the relationship, the time series data analysis uses the autoregressive distributed lag and the Granger causality test to explore the relationship among personal remittances, debt service payments and gross domestic product. In the empirical analysis conducted, it was revealed that there is a long-run positive relationship between remittance, debt service payment and gross domestic product in Nigeria.

Therefore, from the analysis, a conclusion can be drawn on the hypothesis of the study:

6.1. Hypothesis One
- H_0: Remittance inflow does not have a significant effect on the growth of the Nigerian economy.
- H_a: Remittance inflow has a significant effect on the growth of the Nigerian economy.
  Test Result: Reject The Null Hypothesis.

  From the analysis conducted in this study, we reject the null hypothesis. There is evidence to suggest that remittance inflow has a significant effect on the growth of the Nigerian economy.

6.2. Hypothesis Two
- Ho: Debt service payments do not have any significant effect on the Nigerian economy.
- H_a: Debt service payments have a significant effect on the Nigerian economy.

Test Result: Fail to reject the null hypothesis.

The analysis indicates that there is not enough evidence to reject the null hypothesis. In other words, the data does not provide sufficient support to conclude that debt service payments (DSP) have a significant effect on Gross Domestic Product (GDP). The relationship between debt service payments and GDP does not appear to be statistically significant based on the tests that were conducted.

6.3. Hypothesis Three
- H_0: Remittance inflow does not significantly correlate with debt service payments in Nigeria
- H_1: Remittance inflow significantly correlates with debt service payments in Nigeria.
  Test Result: Reject the null hypothesis.

The analysis reveals that there is enough evidence to reject the null hypothesis. In other words, the data suggests a statistically significant correlation between debt service payments (DSP) and remittances (REMIT). The relationship between these two variables is not just a result of random chance. This finding implies that as one of these variables change changes, there is a corresponding in the other, and this relationship is unlikely to occur by random fluctuations.

7. Summary and Conclusion

The study carried out an empirical investigation on the effect of remittances and debt service payments on the Nigerian economy between 1995 and 2021. However, going by the results, the study utilized descriptive analysis and various econometric tests. It shows that foreign direct investment demonstrates a significant positive effect on GDP. The positive coefficient (3.643901) in the OLS regression indicates that an increase in FDI is associated with a substantial increase in GDP. Three null hypotheses were formulated to pursue the relationship between remittances and gross domestic product, debt service payment and gross domestic product, and remittances and debt service payments in Nigeria were tested. The null hypothesis was rejected for remittance, and gross domestic product was accepted for debt service payment, while that of remittance and debt service payment was rejected.

8. Recommendations

Based on the findings of this study, several recommendations are proposed to enhance economic stability, foster sustainable development in Nigeria and help for further studies.
- Promoting Foreign Direct Investment (FDI): Given the positive impact of FDI on GDP, policymakers should implement measures to attract and retain foreign investments. This may include creating a conducive business environment, providing investment incentives, and addressing regulatory hurdles.
- Optimizing Remittance Utilization: Despite the negative association between remittances (REMIT) and GDP, there is potential to maximize the positive impact of remittances on economic development. Policymakers should explore strategies to channel remittances into productive sectors, such as investments in infrastructure, education, and small-scale enterprises.
- Debt Management Strategies: Effective debt management is crucial to ensure sustainability and prevent adverse effects on economic stability. Policymakers should adopt prudent debt management strategies, including careful consideration of borrowing terms, monitoring debt service payments (DSP), and exploring debt restructuring options when necessary.
- Diversification of the Economy: To reduce dependence on specific economic variables, efforts should be directed towards diversifying the economy. This may involve investing in sectors with high growth potential, promoting innovation, and supporting small and medium-sized enterprises (SMEs).
- Enhancing Data Collection and Reporting: Improving the accuracy and timeliness of economic data is essential for informed decision-making. Policymakers should invest in enhancing data collection mechanisms and reporting processes to ensure a reliable foundation for economic analysis.
- Further Research: The study suggests avenues for further research, including sector-specific analyses, regional disparities, and the exploration of non-linear relationships. Researchers are encouraged to delve into these areas to deepen their understanding of Nigeria's economic dynamics.
- These recommendations are intended to serve as a guide in formulating strategies that promote sustainable economic growth, fiscal stability, and resilience against external shocks. Implementation of these measures will contribute to the overall development and prosperity of Nigeria.

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