Journal of Economics, Finance and Management Studies

ISSN (print): 2644-0490, ISSN (online): 2644-050

Volume 07 Issue 05 May 2024

Article DOI: 10.47191/jefms/v7-i5-24, Impact Factor: 8.044

Page No: 2502-2514

Secondary School Enrollment in Nigeria: The Role of Remittances from Abroad

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ABSTRACT: Using the autoregressive distributed lag (ARDL) method, the study looked at how remittances affected secondary school enrollment in Nigeria. The research uses annual data from 1981 to 2022. Remittances from overseas, GDP per capita, gross fixed capital formation, inflation, and the ratio of tertiary school enrollment are the five channels that are taken into consideration. The findings show that the remittances coefficient indicates a one-unit increase in remittances leads to a -0.0168-unit decrease in the secondary school enrollment rate, although not statistically significant. This suggests that when remittances are used for basic needs like housing, healthcare, and daily expenses, there is less money available for schooling. Families may feel that the high fees are excessive and that income dynamics cannot support the costs of secondary education. The findings also show that the log of GDP per capita is associated with a 0.0626-unit increase in the log of secondary school enrollment rate. Tertiary school enrollment is associated with an increase in the current log of secondary school enrollment rates because higher secondary school enrollment rates are driven by increased education desires, tertiary opportunities, and better access. The study concludes that while remittances have the potential to impact educational decisions and outcomes in general, they had no effect on secondary school enrollment rates in Nigeria or during the study period, and it suggests that the government look into the challenges faced by families that rely on remittances for education. Pay careful attention to the outcomes of implemented policies and programmes so that you can assess their effectiveness and adjust as needed in response to community input.

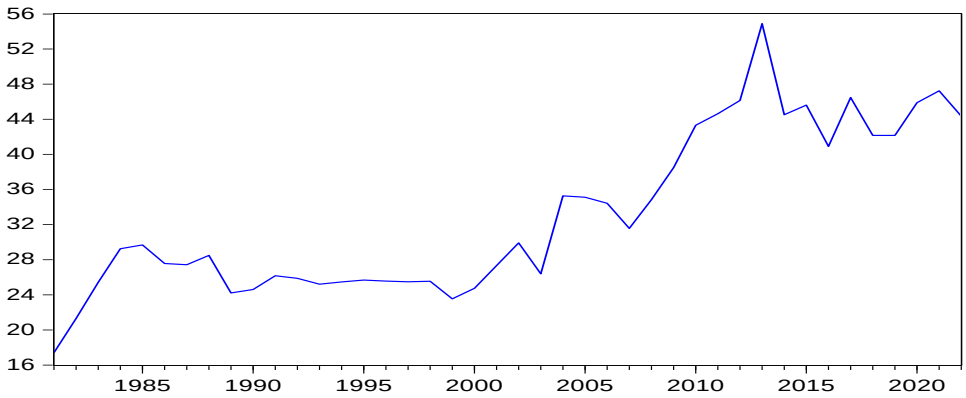
KEYWORDS: Remittances; Enrollment; GDP per capita; ARDL; Families

1 INTRODUCTION

Secondary education serves as a transitional period between primary and postsecondary education. This type of education is given to kids following their primary schooling but before their university education. The goal of government activities is to boost secondary school enrollment; however, constraints like poor socioeconomic conditions and infrastructure make this difficult. Cultural and gender differences also have an impact on enrollment. The standard of the infrastructure, the availability of classrooms, the growing population, and the credentials of the teachers all have an impact on secondary school enrollment. Inadequate funding by the government has caused education to receive less attention. Unsatisfactory attitudes exist among Nigerians towards education, and some teachers are not even interested in becoming teachers. Weak admissions and promotion procedures, along with inconsistent welfare benefits, discourage teachers from working hard (Aduwa, 2021).

Nigeria's secondary school enrollment rate during the period of study was the highest in 2013 at 54.9 percent and the lowest at 17.4 percent in 1981. This indicates that just 54.9% and 17.4% of Nigerian children who are of secondary school age were enrolled in secondary education in 2013 and 1981 (World Bank, 2021). The enrollment rate was 47 percent in 2021 (see Figure 1). Over 5.2 million pupils were enrolled in senior secondary education in Nigeria for the 2018–19 academic year (statista, 2023). In Nigeria, there were over 56,958 secondary schools, comprising both junior and senior, in operation in 2020–21 (NEMIS, 2023).

Nigeria School Enrollment, Secondary (% Gross) 1981-2022

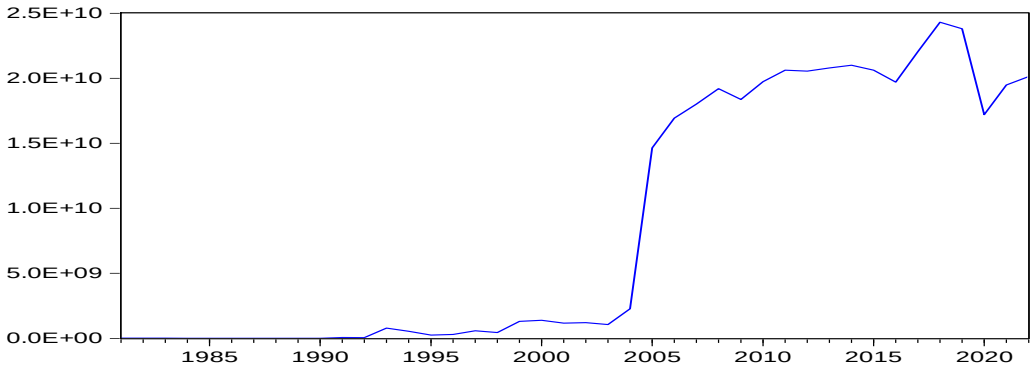


Source: World Bank, 2022

For households, remittances are a lifeline. "All current transfers in cash or in kind made or received by resident households to or from non-resident households [or] current transfers made by employees to residents of another economy" is how the International Monetary Fund defines it in the sixth edition of the Balance of Payments and International Investment Position manual (IMF, 2013).

With a high rate of informality, Nigeria has the highest remittance inflows in Africa. Over $20.1 billion was remitted to the nation in 2022, representing an over 90% increase from 1981 ($161.9 million), according to the World Bank (2023). Nigerians living abroad made up a sizable portion of this amount, making the nation a net beneficiary of remittances. Figure 2 shows that in 2021, $19.5 billion was remitted to Nigeria, an 11.7% increase from 2020. Remittances have an immediate effect on investments in Nigeria's economy, healthcare, education, poverty alleviation, and household income. However, obstacles, including exchange rate changes and hefty transaction expenses (7.8%), can reduce their efficacy. The goal of policymakers is to maximise the economic impact of remittances. The Nigerian government has put in place programmes to encourage diaspora involvement and financial inclusion to harness remittances for economic development (CBN, 2020).

Figure 2: Remittance Inflows into Nigeria (1981-2022)



Source: World Bank, 2023

Remittances can help families cover costs associated with school enrollment, alleviate financial constraints, and contribute to the construction or improvement of schools. However, the impact is context-specific and may be influenced by broader educational policies and the quality of the education system in the recipient country. If remittances are primarily used for meeting basic needs or if they substitute for income that might otherwise be spent on education, this can lead to a negative correlation. Families might choose to prioritize immediate economic needs over investing in education (Filmer and Pritchett, 2002).

Remittances might also be associated with economic opportunities outside the formal education system, such as vocational training or work opportunities that do not require a secondary education. Families may perceive these alternatives as more immediately beneficial (Adams and Cuecuecha, 2010). If remittances are irregular or unpredictable, families might find it challenging to allocate resources for long-term investments in education. This could result in a negative and statistically insignificant relationship between remittances and secondary school enrollment (Amuedo-Dorantes and Pozo, 2006). Overall, remittances play a crucial role in promoting education and ensuring equal access to education for all.

Gross fixed capital formation includes investments in physical infrastructure such as schools, classrooms, and educational facilities. Increased investments in infrastructure can lead to improvements in the availability and quality of educational institutions, making it more likely for students to enroll in secondary schools (World Bank, 2018). It may also contribute to the provision of educational resources and materials, including textbooks, teaching aids, and technology. Adequate educational resources can enhance the learning environment, making secondary education more attractive and conducive to academic success (Psacharopoulos, 1994). Higher secondary school enrollment rates can indicate improved access to education. When a larger percentage of the population completes secondary education, there is a broader pool of individuals who have the opportunity and qualifications to pursue tertiary education. Higher inflation rates can have adverse effects on economic conditions, household incomes, and the ability of families to invest in education. Inflation can erode the purchasing power of money, leading to increased costs of living and reducing the financial resources available for education (World Bank, 2018).

Remittances to Nigeria are increasing, so it's important to know how they affect the education system. In an effort to shed insight on the factors influencing educational outcomes, this study examines the relationship between remittances and secondary school enrollment in Nigeria by using the Autoregressive Distributed Lag (ARDL) approach to analyze the data and derive meaningful insights because the Bounds Tests (ARDL) framework, offers flexibility in such a way it can be run on the I (1) or I (0) or I (1) / I (0) variables (Gregory and Hansen, 1996). This study adds to the larger discussion of how remittances influence the educational environment in developing nations since education is a major factor in development.

There are five sections to the study. After this introduction, Section 2 has been dedicated to a review of the theoretical and empirical literature. Data and methodology are discussed in Section 3, while study results are discussed in Section 4. Section 5 concludes the paper with some recommendations.

2.0 LITERATURE REVIEW

2.1 Theoretical Literature

Human capital theory suggests that individuals invest in education to enhance their skills and productivity, leading to increased enrollment in secondary education. Remittances can act as an additional income source, positively impacting households' ability to afford secondary education (Becker, 1964). Family Systems Theory emphasises the interconnectedness of family members and their roles within a family system (Boss et. al., 1993). Social capital theory highlights the importance of social relationships and networks in influencing individual and community outcomes. The World Bank's (2001) theory on poverty and the education nexus suggests that remittances can reduce poverty-related barriers to secondary school enrollment. Behavioural Economics Theory suggests that remittances can influence educational decisions by altering perceived costs and benefits (Thaler, 1980).

2.2 Empirical Literature

Matano and Ramos (2013) investigate the impact of remittances from overseas on the education of children in Moldova. The CBSAXA Moldovan Household Survey provided the data. They use methods for instrumental variable (IV) and probit estimation. The study's findings show that remittances raise both boys' and girls' chances of pursuing higher education. Bansak, Chezum, and Giri (2015) discovered the impact of remittances on economic factors, such as education spending in Nepal. The study makes use of survey-based data from 5,988 participants in the Nepal Living Standard Survey. The outcomes of both the instrumental methodology and the ordinary least squares method show that while remittances boost children's school attendance, school quality also influences school enrollment in Nepal. The impact of internal remittances on school enrollment is greater than that of external remittances. The rationale is that households that receive remittances from migrants within their country of origin are more likely to relocate within that country in search of improved amenities, such as access to education. The findings are consistent with those of the studies by Cuadros-Menaca and Gaduh (2020), Malik (2015), Andersen, Christensen, and Tejerina (2007), and Amuedo-Dorantes and Pozo (2010).

Askarov and Doucouliagos (2020) examined how remittances affected a household's expenditure on education. Meta-analysis, which takes into account 73 various studies from 30 different countries, determines the effect of remittances on educational spending. Remittances from overseas have a larger and more noticeable effect on school expenses than remittances from within the country. Remittances from abroad raised educational spending by 35 percent for the majority of the countries, but by 53 percent in Latin America. According to the study, gender discrimination has no such effect.

Arif et al. (2019) looked at how remittances affected the growth of higher education in the top countries that receive remittances. From 1994 to 2013, eight middle-income nations were employed. The panel mean group (PMG) and panel ARDL results show that remittances significantly and favourably influence the growth of higher education in these nations. The study suggests that the government should support migrant workers and their families' investments in capital-building projects that benefit the nation as a whole as well as them. Bucheli et al. (2018) looked at the complicated effects of remittances on children's education using a

bivariate probit model that takes into account endogeneity and non-linearity. Remittances have both beneficial and negative consequences, according to the study.

Gul et al. (2021) studied how foreign remittances affect children's educational expenses and school enrollment in the Peshawar district. School enrollment and educational costs were investigated using the Heckman selection theory and the logit technique. The results of the study show that per capita remittances (PCRM) have a positive and significant impact on children's attendance at school, with an increase in school enrollment of 10.8% for every 100 rupees in PCM. Shafiq, Yang, and Nawaz's (2022) study investigated the effect of remittances on education in developing countries using data from 90 developing countries between 1991 and 2020. The dynamic panel GMM's results show that remittances have a substantial and favourable influence on education. For every control variable (GDP per capita growth, education spending, urban population, and democracy), comparable findings were obtained. According to the report, appropriate incentives should be created to encourage migrants to send money home, especially those who educate them on the costs and networks involved in doing so.

3.0 DATA AND METHODOLOGY

The study relies on secondary data obtained from the World Development Indicators (World Bank) and the Central Bank of Nigeria. The dataset encompasses 1981–2022 and includes information on remittances, secondary school enrollment, and other pertinent variables for Nigeria. The primary variables of interest are remittances, measured as personal remittances received from abroad (current US$), and secondary school enrollment, quantified as secondary school enrollment ratio (% gross). Control variables such as gross domestic production per capita, gross fixed capital formation, tertiary school enrollment ratio, and inflation rate will be included to account for potential confounding factors. All the variables are displayed as natural logarithms except the inflation rate.

Table 1: Measurement of Variables and Data Sources

S/No	Variables	Measurement	Expected sign	Sources of Data
	Secondary school enrollment ratio (SSER)	The secondary school enrollment ratio is the proportion of total enrollment, regardless of age, to the population of the age group that corresponds to the level of education shown	-	SSER: https://data.worldbank.org/indicator/SE.SEC.ENRR?locations=NG
	Remittances (LREMT)	Refers to the funds or financial transfers that people send from another country, typically the one in which they are employed or live, to their own country. It is a proxy for scholarships and grants.	Positive	https://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT
	Gross domestic production per capita (LGDPPC)	It analyzes Nigeria's GDP per capita and gauges the prosperity of Nigerians by looking at our GDP growth. It is computed by dividing the nation's GDP by its total population. It is a proxy for economic factors.	Positive	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=NG
	Gross fixed capital formation (LGFCF)	Refers to the total amount a country spends on fixed assets (such as buildings, machinery, equipment, and infrastructure) over a specific period, typically a year. It is a proxy for educational infrastructure.	Positive	Central Bank of Nigeria (CBN) statistical bulletin volume 33, December 2023. **C.1.7**
	Tertiary school enrollment ratio (LTSER)	The tertiary enrollment ratio is the proportion of total enrollment, regardless of age, to the population of the age group that corresponds to the level of education shown. It is a proxy for parental education and attitudes	Positive	https://data.worldbank.org/indicator/SE.TER.ENRR.FE
	Inflation rate (INF)	Annual percentages of average consumer prices a year-on-year change. A proxy for government policy	Negative	https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=NG

Source: Source: Authors Compilation, 2024

3.1 Model Specification

The study employs the Autoregressive Distributed Lag (ARDL) approach to examine the long-run and short-run relationships between remittances and secondary school enrollment ratio. The lag structure will be determined through model selection criteria, considering both economic theory and statistical significance. The ARDL model will be estimated using Eview 12, incorporating appropriate diagnostic tests to assess the model's validity. Stationarity checks, cointegration tests, and error correction mechanisms will be applied to ensure robust and reliable results. To validate the model, diagnostic tests will be run. These will include the Breusch-Godfrey test for serial correlation, the Ramsey RESET test for functional form misspecification, and heteroskedasticity tests. Sensitivity analyses will be performed to assess the robustness of the findings.

Secondary school enrollment can be affected by scholarships and grants to students, economic factors, educational infrastructure, parental education and attitudes, and government policy. According to Becker (1964), human capital theory suggests that individuals invest in education to enhance their skills and productivity, leading to increased enrollment in secondary education. Remittances can act as an additional income source, positively impacting households' ability to afford secondary education. Based on this theory, the general model is written as follows:

$$SSER = f(REMT, GFCF, GDPPC, TSER, INF) \quad (1)$$

The following lists the economic expectations for each explanatory variable parameter to the dependent variable:

$$f_1 . > 0,\ f_2 > 0,\ f_3 > f_4 > 0\ f < 0;$$

This means that all the independent variables are expected to have a positive relationship with the dependent variable except the inflation rate. According to the equation, remittances (REMT), gross fixed capital formation (GFCF), Gross domestic product per capita (GDPPC), tertiary school enrollment ratio (TSER), and inflation (INF) all affect secondary school enrollment ratio (SSER). According to Pesaran et al. (2001), Equation (1)'s ARDL framework can be written as:

$$\Delta LSSER_t = \beta_0 + \sum_{i=1}^{p} \beta_i \Delta LSSER_{t-i} + \sum_{j=0}^{q} \gamma_j \Delta LREMT_{t-j} + \sum_{k=0}^{r} \delta_k \Delta LGDPPC_{t-k} + \sum_{i=0}^{o} \phi_l \Delta LGFCF_{t-l}$$

$$+ \sum_{m=0}^{u} \theta_m \Delta LTSER_{t-m} + \sum_{n=0}^{d} \vartheta_n \Delta INF_{t-m} + \varepsilon_t \quad (2)$$

In this equation:

$LSSER_t$ is the log of secondary school enrollment ratio at time t.

$LREMT_t$ is the log of remittances at time t.

$LGDPPC_t$ is the log of gross domestic product per capita at time *t*.

*LGFCF*is the log of gross fixed capital formation at time *t*.

$LTSER_t$ is the log of tertiary school enrollment ratio at time *t*

INF_t is the inflation rate at the time *t*

Δ represents the first difference operator (to achieve stationarity).

β_0 is the intercept term

$\beta_i, \gamma_j, \delta_k, \phi_l, \theta_m, \vartheta_n$ are coefficients to be estimated.

$p, q, r, o, u\ and\ d$ are the lag lengths, which can be determined based on statistical criteria.

The null hypothesis of no cointegration is that H0: β1 = ... = β5 = 0, and the alternative hypothesis that cointegration exists is: H1: at least one parameter not equal to zero, it's performed by Wald test using F-test. The null hypothesis can be rejected, when the value of F-statistic is greater than the upper bound critical value. Since there is a long-run relationship is exist, then the conditional autoregressive distributed lag model will be conducted that can be used to estimate the long-run coefficient:

$$LSSER_t = \beta_0 + \sum_{i=1}^{p} \beta_i LSSER_{t-i} + \sum_{j=0}^{q} \gamma_j LREMT_{t-j} + \sum_{k=0}^{r} \delta_k LGDPPC_{t-k} + \sum_{i=0}^{o} \phi_l LGFCF_{t-l}$$

$$+ \sum_{m=0}^{u} \theta_m LTSER_{t-m} + \sum_{n=0}^{d} \vartheta_n INF_{t-m} + \varepsilon_t \quad (3)$$

The second step in the second stage of the bounds testing ARDL approach involves estimating a conditional ECM. "A principle feature of cointegrated variables is that their time paths are influenced by the extent of any deviation from long-run equilibrium. After all, if the system is to return to long-run equilibrium, the movements of at least some of the variables must respond to the magnitude of disequilibrium" (Enders, 2004).

3.2 Descriptive statistics

In Nigeria, secondary education lasts six years on average, and students normally enroll in it after finishing six years of primary education. The Nigerian government has worked to raise secondary education's quality and accessibility. In order to improve

access to high-quality basic education, including secondary education, Nigeria started the Universal Basic Education (UBE) Programme. Even though secondary school enrollment rates have improved, issues including gender and geographical inequities still exist. Enrollment rates are typically greater in urban areas than in rural ones. The West African Senior School Certificate Examination (WASSCE) is one of the measures the government has put in place to solve these problems. Participation from the private sector is also important in secondary education. Notwithstanding advancements, issues including poor infrastructure, uneven educational quality, and security worries continue to exist. International collaborations, community engagement, and government policy are the future directions.

The trend and main descriptive statistics of our data can be shown by the following:

Table 2: Main descriptive statistics

	Mean	Median	Maximum	Minimum	Std. Dev.
LSSER	3.462428	3.383275	4.005203	2.857002	0.274915
LREMT	20.65175	20.94974	23.9142	14.70115	3.191572
LGDPPC	7.148492	7.416388	8.071219	6.162262	0.614731
LGFCF	7.714574	7.922834	11.08563	4.467572	2.021729
LTSER	1.797569	1.669938	2.469012	0.861167	0.523973
INF	18.94762	12.945	72.84	5.39	16.4551

Source: Authors computation using EViews 12, 2024

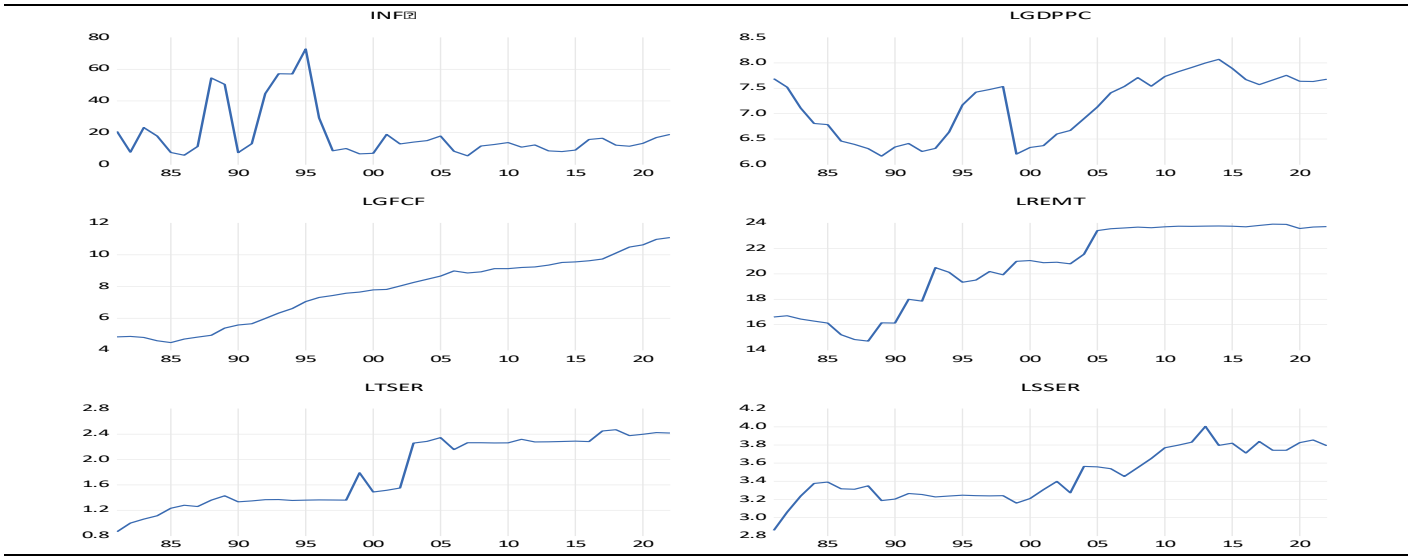


Figure 3. Time series plots of the variables from 1981 to 2022

The study reveals a central tendency for secondary school enrollment, with a median of 3.46, suggesting a potential right-skewed distribution. The log of remittances has a median of 20.65, suggesting a potential right-skewed distribution. The average log of GDP per capita is 7.15, with a median of 7.42, suggesting a potential right-skewed distribution. The log of gross fixed capital formation has a median of 7.71, suggesting a potential right-skewed distribution. The log of tertiary school enrollment has a median of 1.80, suggesting a potential left-skewed distribution. The highest log value for tertiary school enrollment is 2.47, with a minimum of 0.86. The dataset's mean inflation rate is 18.94762, representing the average inflation rate. The median rate is 12.945, indicating 50% of observations have an inflation rate below 12.945. The highest observed rate is 72.84, indicating the most significant price increase. The lowest observed rate is 5.39, indicating the least significant price increase. The standard deviation measures the dispersion of inflation rates around the mean, with higher deviations indicating greater variability.

3.3 The Empirical Results

The descriptive statistics for the five time series (as in Table 2) show that the average log of secondary school enrollment rate is approximately 3.46 indicating moderate enrollment, the median (50th percentile) is around 3.38, indicating that half of the observations fall below this value, the highest log enrollment rate is about 4.01, the lowest log enrollment rate is around 2.86 and the standard deviation is 0.27, suggesting a relatively low level of dispersion around the mean. The average log of remittances is approximately 20.65 suggesting a right-skewed distribution, the median is around 20.95, indicating the middle value, the highest

log remittances value is about 23.91 indicating high remittances, the lowest log remittances value is around 14.70 and the standard deviation is 3.19, suggesting a moderate level of variability. The average GDP per capita is 7.15, with a median of 7.42. The highest GDP per capita is 8.07, with a minimum of 6.16. The highest fixed capital formation is 7.71, with a median of 7.92. The lowest fixed capital formation is 4.47. The tertiary school enrollment are 1.80, with a median of 1.67. The highest and lowest values are 2.47 and 0.86 respectively.

Table 3: Independent Variable Correlation Matrix

	LREMT	LGDPPC	LGFCF	LTSER	INF
LREMT	1.0	0.7	1.0	0.9	-0.3
LGDPPC	0.7	1.0	0.7	0.6	-0.4
LGFCF	1.0	0.7	1.0	0.9	-0.3
LTSER	0.9	0.6	0.9	1.0	-0.3
INF	-0.3	-0.4	-0.3	-0.3	1.0

Source: Authors' computation using EViews 12, 2024

Table 3 shows that there is a moderately positive correlation (0.6511) between LGDPPC and LGFCF. This suggests that as the log of GDP per capita increases, the log of gross fixed capital formation tends to increase as well. There is a moderately positive correlation (0.6670) between LGDPPC and LREMT. This indicates that as the log of GDP per capita increases, the log of remittances tends to increase as well. There is a moderately positive correlation (0.5863) between LGDPPC and LTSER. This suggests that as the log of GDP per capita increases, the log of tertiary school enrollment tends to increase as well. There is a very strong positive correlation (0.9558) between LGFCF and LREMT. This indicates a close relationship between the log of gross fixed capital formation and the log of remittances. There is a very strong positive correlation (0.9213) between LGFCF and LTSER. This suggests a close relationship between the log of gross fixed capital formation and the log of tertiary school enrollment. There is a very strong positive correlation (0.8961) between LREMT and LTSER. This indicates a close relationship between the log of remittances and the log of tertiary school enrollment. A negative correlation between GDP per capita (LGDPPC) and inflation (INF), suggesting higher GDP per capita leads to lower inflation. A strong positive correlation exists between gross fixed capital formation (LGFCF) and tertiary school enrollment rate (LTSER), indicating a high positive association. Conversely, a negative correlation exists between LTSER and inflation, suggesting higher tertiary school enrollment rates lead to lower inflation.

3.4 Stationarity

Cointegration analysis fails when variables are integrated into different orders, i.e., some series are I(1) and others are I(0), as demonstrated by Engle and Granger (1987). Johansen and Juselius (1990), however, demonstrated that the ARDL cointegration approach is effective in these circumstances. Searching for unit roots beforehand is not necessary when using the ARDL cointegration approach. So that the ARDL model doesn't fail when there is an integrated stochastic trend of I(2), the stationary condition for each series needs to be looked at first when estimating the model.

If the mean, variance, and structure of a series remain constant over time, it is referred to as stationary. A non-stationary time series is a stochastic process having unit roots, or structural breaks, according to the theory of unit roots. Nonetheless, one of the main causes of non-stationarity is unit roots. When a unit root is present, a time series under study is considered non-stationary; when it is not, a time series is considered stationary (Abonazel, and Elnabawy, 2020).

Dickey and Fuller (1979) developed the use of the unit root in time series for stationarity testing. A non-stationary series (X) has d unit roots at its level and needs integration of order d if it needs to be differentiated d times to become stationary. This is what the unit root test is based on. One way to write this is (X) ^ I (d).

"The series has a unit root" is the null hypothesis (H0) of the Dickey-Fuller (DF) test, whereas "the series is stationary" is the alternative hypothesis (H1). Since the DF test assumes that the disturbance term is white noise, autocorrelation in the dependent variable will always result in autocorrelation in the error term, rendering the test invalid. Dickey and Fuller developed the DF test in 1981 to add p-lag values to the Dickey-Fuller test (ADF). The DF test makes use of the same critical value table and null hypothesis.

Table 4: Results of the Augmented Dickey-Fuller Test

Series	Order of Integration
LSSER	I (1)
LREMT	I (1)

LGDPPC	I (1)
LGFCF	I (1)
LTSER	I (1)
INF	I (0)

Source: Authors computation using EViews 12, 2024

According to Table 4, the ADF test verified that the variables included are stationary at I (0) (stationary at their level) and I (1) (integrated of order 1).

3.5 Lag Selection

In time series modeling, lag selection is an essential phase, especially for autoregressive models such as ARDL (AutoRegressive Distributed Lag) models. Finding the right amount of lag terms for the dependent variable and any pertinent independent variables to include in the model is the aim of lag selection. Making the proper lag order selection guarantees that the model accurately represents the underlying dynamics and aids in capturing the temporal dependencies in the data (Enders, 2014).

Table 5: Output of Different ARDL (Autoregressive Distributed Lag) Models

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
26	51.075030	-2.052440	-1.676291	-1.915467	0.908777	ARDL(1, 0, 0, 1, 1, 0)
25	51.561103	-2.027371	-1.609426	-1.875179	0.908041	ARDL(1, 0, 0, 1, 1, 1)
10	51.100911	-2.004922	-1.586978	-1.852730	0.905953	ARDL(1, 1, 0, 1, 1, 0)
18	51.093142	-2.004544	-1.586599	-1.852351	0.905917	ARDL(1, 0, 1, 1, 1, 0)
9	51.564028	-1.978733	-1.518994	-1.811322	0.904989	ARDL(1, 1, 0, 1, 1, 1)
17	51.561860	-1.978627	-1.518888	-1.811216	0.904979	ARDL(1, 0, 1, 1, 1, 1)
2	51.125818	-1.957357	-1.497618	-1.789945	0.902936	ARDL(1, 1, 1, 1, 1, 0)
29	48.824308	-1.942649	-1.566499	-1.805676	0.898191	ARDL(1, 0, 0, 0, 1, 1)
1	51.564358	-1.929969	-1.428435	-1.747338	0.901714	ARDL(1, 1, 1, 1, 1, 1)
30	47.129403	-1.908751	-1.574396	-1.786998	0.892767	ARDL(1, 0, 0, 0, 1, 0)
13	48.887422	-1.896947	-1.479003	-1.744755	0.895230	ARDL(1, 1, 0, 0, 1, 1)
21	48.839508	-1.894610	-1.476666	-1.742418	0.894985	ARDL(1, 0, 1, 0, 1, 1)
28	46.419113	-1.874103	-1.539748	-1.752349	0.888986	ARDL(1, 0, 0, 1, 0, 0)
14	47.386978	-1.872536	-1.496386	-1.735562	0.890797	ARDL(1, 1, 0, 0, 1, 0)
22	47.352048	-1.870832	-1.494682	-1.733859	0.890610	ARDL(1, 0, 1, 0, 1, 0)
20	46.982960	-1.852827	-1.476677	-1.715854	0.888623	ARDL(1, 0, 1, 1, 0, 0)
27	46.979811	-1.852674	-1.476524	-1.715701	0.888606	ARDL(1, 0, 0, 1, 0, 1)
5	48.915326	-1.849528	-1.389789	-1.682117	0.891885	ARDL(1, 1, 1, 0, 1, 1)
19	47.826780	-1.845209	-1.427264	-1.693016	0.889667	ARDL(1, 0, 1, 1, 0, 1)
31	45.744957	-1.841217	-1.506862	-1.719464	0.885275	ARDL(1, 0, 0, 0, 0, 1)
6	47.663479	-1.837243	-1.419298	-1.685051	0.888784	ARDL(1, 1, 1, 0, 1, 0)
12	46.456995	-1.827170	-1.451021	-1.690197	0.885728	ARDL(1, 1, 0, 1, 0, 0)
32	44.340657	-1.821495	-1.528934	-1.714961	0.880754	ARDL(1, 0, 0, 0, 0, 0)
23	46.206133	-1.814933	-1.438783	-1.677960	0.884322	ARDL(1, 0, 1, 0, 0, 1)
4	46.992500	-1.804512	-1.386568	-1.652320	0.885084	ARDL(1, 1, 1, 1, 0, 0)
11	46.986178	-1.804204	-1.386259	-1.652012	0.885048	ARDL(1, 1, 0, 1, 0, 1)
3	47.832352	-1.796700	-1.336961	-1.629289	0.886020	ARDL(1, 1, 1, 1, 0, 1)
15	45.790671	-1.794667	-1.418517	-1.657694	0.881953	ARDL(1, 1, 0, 0, 0, 1)
16	44.543374	-1.782604	-1.448248	-1.660850	0.878349	ARDL(1, 1, 0, 0, 0, 0)
24	44.450183	-1.778058	-1.443702	-1.656304	0.877795	ARDL(1, 0, 1, 0, 0, 0)
7	46.220852	-1.766871	-1.348926	-1.614679	0.880676	ARDL(1, 1, 1, 0, 0, 1)
8	44.632260	-1.738159	-1.362009	-1.601186	0.875091	ARDL(1, 1, 1, 0, 0, 0)

Source: Author's computation using EViews 12, 2024

Model 26 (ARDL (1, 0, 0, 1, 1, 0)) has the highest Adjusted R-squared (0.908777) and relatively low AIC, BIC, and HQ values using E-views version twelve. This model is a strong contender for selection based on the goodness of fit and model simplicity.

3.6 The ARDL (1, 0, 0, 1, 1, 0**) Model's Outcomes**

The coefficient of LSSER (-1) is 0.514621 in Table 6 indicating that a one-unit increase in the lagged log of secondary school enrollment rate is associated with a 0.514621-unit increase in the current log of secondary school enrollment rate, holding other variables constant. The coefficient of LREMT is -0.020751. It suggests that a one-unit increase in the log of remittances is associated with a -0.020751-unit decrease in the log of secondary school enrollment rate, holding other variables constant. However, this coefficient is not statistically significant at the conventional significance level (p-value = 0.1769). The coefficient of LGDPPC is 0.066030. It indicates that a one-unit increase in the log of GDP per capita is associated with a 0.066030-unit increase in the log of secondary school enrollment rate, holding other variables constant. However, this coefficient is not statistically significant at the conventional significance level (p-value = 0.0600). The coefficient of LGFCF is -0.284046. It suggests that a one-unit increase in the log of gross fixed capital formation is associated with a -0.2133-unit decrease in the log of secondary school enrollment rate, holding other variables constant. This coefficient is statistically significant (p-value = 0.0238). The coefficient of LGFCF (-1) is 0.295809. If all other factors stay the same, it shows that a one-unit rise in the lagged log of gross fixed capital formation is linked to a 0.295809-unit rise in the current log of secondary school enrollment rate. This coefficient is statistically significant (p-value = 0.0138). The coefficient LTSER is -0.030637, which is a proxy for parental education and attitudes. This suggests that a one-unit increase in the log of tertiary school enrollment is associated with a -0.030637-unit decrease in the log of secondary school enrollment rate, holding other variables constant. However, this coefficient is not statistically significant at the conventional significance level (p-value = 0.7550). LTSER (-1): The coefficient is 0.279973. It indicates that a one-unit increase in the lagged log of tertiary school enrollment is associated with a 0.279973-unit increase in the current log of secondary school enrollment rate, holding other variables constant. This coefficient is statistically significant (p-value = 0.0075). The coefficient of INF is 0.001221. It indicates that a one-unit increase in the inflation rate is associated with a 0.001221-unit increase in the log of secondary school enrollment rate, holding other variables constant. However, this coefficient is not statistically significant at the conventional significance level (p-value = 0.2261).

Table 6: The ARDL Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LSSER(-1)	0.514621	0.104640	4.918001	0.0000
LREMT	-0.020751	0.015028	-1.380794	0.1769
LGDPPC	0.066030	0.033867	1.949688	0.0600
LGFCF	-0.284046	0.106105	-2.677037	0.0116
LGFCF(-1)	0.295809	0.113507	2.606083	0.0138
LTSER	-0.030637	0.097356	-0.314687	0.7550
LTSER(-1)	0.279973	0.098014	2.856447	0.0075
INF	0.001221	0.000989	1.234261	0.2261
C	1.146194	0.329495	3.478634	0.0015
R2 = 0.927022				
Note: *** significant at 0.01, ** significant at 0.05, * significant at 0.1				

Source: Author's computation using EViews 12, 2024

3.7 Bound Test

The bound test examines the existence of a long-run relationship among variables in a cointegration framework. This test is used to look at autoregressive distributed lag (ARDL) models, which show how variables with different order lags relate to each other over the long term (Pesaran and Shin, 1999). F-statistic values show that in the first case, we reject the null hypothesis and conclude that there is no long-run relationship if the value is less than I(0); in the second case, we reject the null hypothesis and show that a long-run relationship exists if the value is greater than I(1); and in the last case, we are unable to determine if the value falls between two bounds. Given that the F-statistic is higher than the upper bound and that a long-term link exists at all significance levels (1%, 5%, and 10%), we are in the second case in this instance.

Table 7: Bounds Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.049051	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Authors computation using EViews 12, 2024

3.8 Error Correction Model

The error correction model is specified as follows due to cointegration:

Table 8: Estimation of Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.401837	0.466559	5.147976	0.0000
D(LREMT)	-0.03615	0.030349	-1.19105	0.2421
D(LGDPPC)	0.135056	0.068959	1.958495	0.0587
D(LGFCF)	-0.284046	0.066251	-4.287455	0.0002
D(LTSER)	-0.030637	0.075101	-0.407938	0.6860
ECT	-0.485379	0.074922	-6.478444	0.0000
R2 = 0.508092				

Source: Authors computation using EViews 12, 2024

The ECT indicates the degree to which any disequilibrium from the prior period is being adjusted at the current point, or how much of the disequilibrium is being corrected. A positive coefficient indicates divergence and a negative coefficient indicates convergence. 60% of the adjustment occurs each period or year if the estimate of ECT is 0.6; if the estimate of ECT is 1, then 100% of the adjustment occurs within the period, or the adjustment is instantaneous and entire. It is illogical to assert that there is a long-term link when ECT = 0 indicates that there is no adjustment. Since the ECT in our instance is extremely significant and shows a negative sign, indicating convergence, we can conclude that 49% of the annual adjustment from the short run to the long run occurs after a year.

3.9 Diagnostics tests

3.9.1 Stability

To make sure that your model generates reliable and consistent results, stability checks are essential.

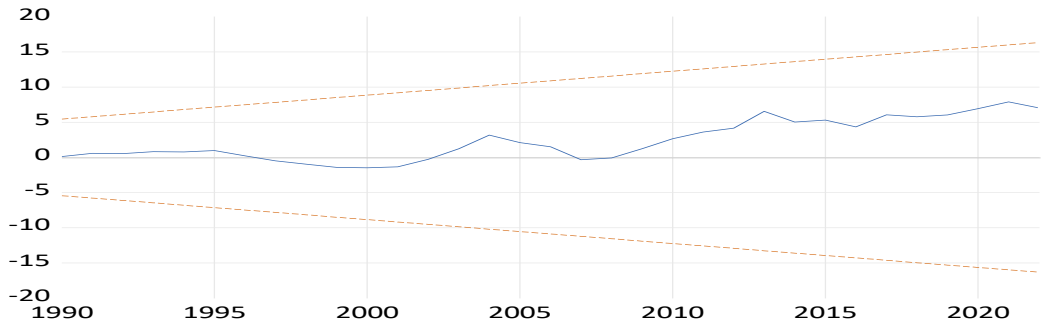


Figure 4: CUSUM at 5% Significance

CUSUM is used to verify the accuracy and stability of the calculated model. The fact that no root is located outside of the significance level in Figure 4 indicates that the estimated model satisfies the stability criteria.

Checking Normality

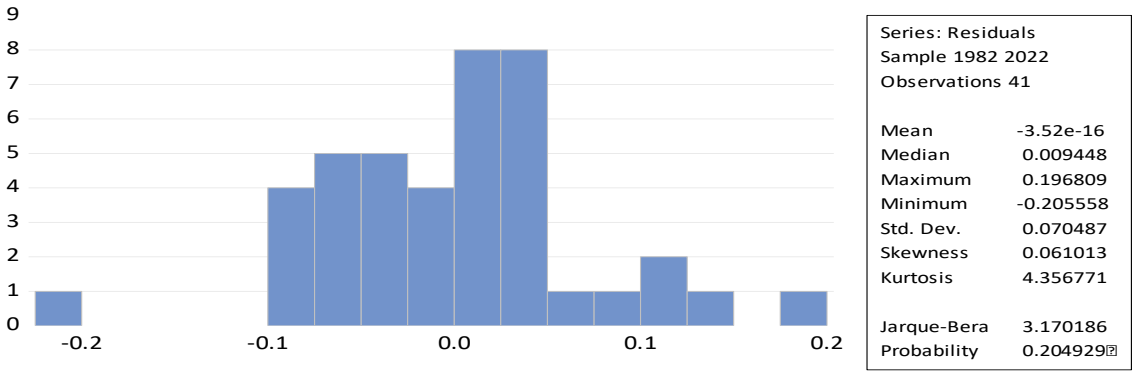


Figure 5:Normality and Jarque-Bera test

The Jarque-Bera (JB) test is used to determine whether the residuals are normal. The test's null hypothesis is that the residuals are normally distributed. The probability (p-value) strongly suggests that the residuals are normal because, at very high levels of significance, we are unable to reject the null hypothesis event.

3.9.2 Checking heteroscedasticity and serial correlation

To make sure your econometric model is reliable, it's crucial to do diagnostic tests such as heteroscedasticity and serial correlation (autocorrelation). There is no evidence for serial correlation in the residuals term of the estimated model, as indicated by Table 9, which also indicates that the null hypothesis that there is no serial correlation is not rejected at level 0.05. A low p-value (typically below 0.05) suggests the presence of the issue (serial correlation or heteroscedasticity). The Ramsey RESET (Regression Specification Error Test) is a diagnostic test used to check for omitted variable bias or misspecification in a regression model. The test assesses whether the inclusion of additional polynomial terms of the fitted values significantly improves the model's explanatory power (Zeileis and Hothorn, 2002). A small p-value (usually less than 0.05) indicates that the null hypothesis should be rejected, meaning that the model is improved by including polynomial terms. A higher p-value indicates that the original model might be sufficient because there isn't much evidence to refute the null hypothesis. Furthermore, since we do not reject the null hypothesis that there is no heteroscedasticity at level 0.05, Table 9 demonstrates that there is neither heteroscedasticity nor constant variance in the residuals and also indicates that the model passed the Ramsey Regression Specification Error Test as the p-values exceed the level of significance. Thus, the assumptions of the ordinary least squares are not violated.

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Table 9: Heteroscedasticity and Serial Correlation

Test	F - Statistic	P-value
Lagrange Multiplier (LM) for Serial Correlation	0.009694	0.9222
Breusch-Pagan-Godfrey for Heteroscedasticity	0.010963	0.9172
Ramsey Regression Specification Error Test	0.048852	0.8265

Source: Author's computation using EViews 12, 2024

4.0 DISCUSSION OF FINDINGS

The remittances coefficient indicates a one-unit increase in remittances leads to a -0.0168-unit decrease in the secondary school enrollment rate, although not statistically significant. This result is not expected; however, remittances can ease financial strains and lower secondary school enrolment, encouraging families to place a higher priority on other necessities than schooling (Filmer and Pritchett, 2002). Remittances can be allocated for immediate needs like living, healthcare, and housing, leaving little financial capacity for education. Income dynamics may be insufficient to cover costs associated with secondary school enrollment, and families may perceive the high costs as too high. Access to education, particularly in rural areas, can be a barrier to enrollment. Cultural norms and societal expectations may influence decision-making, and perceived issues with educational quality may discourage enrollment. Government policies and governance effectiveness can also shape enrollment patterns. The finding is not in line with the studies of Arif et al. (2019), Matano and Ramos (2013), Bansak et al. (2015), Cuadros-Menaca and Gaduh (2020), Malik (2015), Andersen et al. (2007), and Amuedo-Dorantes and Pozo (2010).As expected, a one-unit increase in the log of GDP per capita is associated with a 0.0626-unit increase in the log of secondary school enrollment rate. This is because higher average earnings and economic prosperity are correlated with higher GDP per capita, which in turn leads to higher levels of education. Higher GDP countries make greater investments in human capital, including educational materials, teacher pay, and infrastructure for education. Enrollment rates are rising as the economy moves from agricultural to knowledge-intensive sectors, creating a

greater need for skilled labour. Governments make investments to increase access to education and lower the cost of education for households. Social and cultural values also shift; in wealthy nations, the value of education for individual and collective growth is emphasised. Enrollment rates rise as a result of better diet and healthcare, which also have a good effect on cognitive development and preparedness for school. Governments place a high priority on education as a vital element of plans for economic growth, increasing funds, and supporting enrollment-boosting activities. The result is in line with the findings of Gul et al. (2021) that per capita remittances (PCRM) have a positive and significant impact on children's attendance at school.The result show that gross fixed capital formation is linked to a rise in secondary school enrollment rate showing that investments in education made by the government can raise enrollment rates, improve the quality of instruction, and supply necessary funding. These expenditures have the potential to increase secondary school enrollment rates, accommodate expanding student populations, and broaden educational possibilities. Lagged tertiary school enrollment is associated with an increase in the current log of secondary school enrollment rate because higher secondary school enrollment rates are driven by increased education desires, tertiary opportunities, and better access. Factors such as economic and technological developments, government initiatives, financial support, globalization, competition, positive attitudes, and social and cultural variables contribute to this positive relationship.

5.0 CONCLUSION AND RECOMMENDATIONS

The objective of this study was to apply the auto-regressive distributed lag, a modern and highly successful dynamic model, to the secondary school enrollment rate in Nigeria. The model can deal with integrated series of different orders, which means it can fix both the problem of mixed stationary and non-stationary series and the serial correlation that happened when the least squares regression method was used. The best ARDL model is the secondary school enrollment rate, which has a long-run equilibrium connection with its determinants (remittances from overseas, GDP per capita, gross fixed capital formation, tertiary school enrollment ratio, and inflation). It is an ARDL relation (1, 0, 0, 1, 1, 0). While remittances have the potential to impact educational decisions and outcomes in general, they had no effect on secondary school enrollment rates in Nigeria or during the study period. Our findings indicate that there is a weak and negative correlation between remittances and secondary school enrollment in Nigeria. We also find that every year, 49% of the short-run to long-run adjustment occurs. The study recommends the following:

- The government should reduce the cost of secondary education and implement targeted education subsidies.
- The government should reduce direct educational expenses, expand accessibility, and raise secondary education standards.
- The three tiers of government should embark on campaigns that will enable community involvement and raise awareness about the long-term advantages of education.
- The government should investigate the difficulties that families who use remittances for schooling encounter. Keep a close eye on the results of adopted policies and programmes to evaluate their efficacy and make necessary revisions in response to community feedback.

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