IS GOVERNMENT EDUCATION SPENDING BENEFICIAL TO HUMAN CAPITAL DEVELOPMENT? THE NIGERIAN EXPERIENCE

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ABSTRACT
Nigeria's highest human development index rating is 0.539, indicating a low level of human capital development. Because of the need to improve the level of human capital development for better economic growth and development, this study investigates the impact of government education spending on human capital development in Nigeria for the period 2003q1 to 2021q4. Human capital development was proxied with the human development index, while the federal government's recurrent expenditure on education was used as a proxy for government education spending. A linear ARDL-bound test model was employed for the study. The unit root tests results show that all variables are integrated of order one. The cointegration test shows the presence of a long-run relationship between government education spending and human capital development. Government education spending has a positive and significant effect on human capital development in both the short and long run. Based on the findings, the study recommends increased government spending on education to increase human capital development to a level that will adequately enhance the growth and development of the Nigerian economy.

JEL Classification: I28, I22, J24
Keywords: Education Spending, Human Development, Linear ARDL, Nigeria.

1. INTRODUCTION
Human capital is fundamental to sustainable economic performance (Weisbrod, 1962), and education is key to developing human capital (Villela and Paredes, 2022). As a result, investing in human capital development through education expenditure becomes a priority for developing economies.Several studies have highlighted the significance of education spending as an investment in human capital development (Schultz, 1961; Becker, 1962; 1964a; Mincer, 1984; Burgess, 2016; Ojike et al., 2021; Ejim, 2023). However, there is inconsistency in the empirical evidence defining the relationship between education spending and human capital development. Several studies found a positive relationship (Dissou et al., 2016); Adewumi and Enebe (2019); Obi, Obi, and Ejefobihi (2020); Patel and Annapoorna (2019); while others found no evidence of any association (Odubunmi, 2009; Okwu et al., 2022).This suggests inconsistencies in previous findings. Previous findings' inconsistency suggests that more work is needed to empirically explain the educational spending-human capital development relationship. This study explores this in the context of the Nigerian economy, using the human development index (HDI) as a measure of human capital development.

Nigeria has a long history of inadequate investment in education. The highest spending in education as a percentage of gross domestic product (GDP) for Nigeria since the year 2012 was 9.26% in 2015; since then, this has been on a downward trend: 5.86% in 2019 and 5.14% in 2021 (Macrotrend 2022). Budgetary allocation to education as a percent of the federal government's total budget fell from 17.59% in 1970 to 5.68% in 2021 (Ojike, Uwajumogu, and Didigu, 2022) with an average of 7.2% within 1981 – 2019 period (Ihugba et al., 2022). HDI for the economy has remained approximately unchanged at 0.53 for the period 2013–2018 and 0.54 in 2019–2021 (TheGlobalEconomy.com, 2022). Nigeria's rating since 2003 has remained within the low range for human development to date. The accompanying threat of gross neglect for human capital development has further exposed the economy to poor performance in various indices of growth and development over the years. Nigeria's average GDP growth rate from 2015 to 2021 is 1.02%, compared to 2.75% for Sub-Saharan Africa (World Development Indicators, 2021); a Nigerian's life expectancy during this period is 54 years, compared to 61 years for Sub-Saharan Africa (World Development Indicators, 2021). In this connection, increasing spending on education could have served as a stimulating factor for increased growth and development through enhanced human capital development.

Literature evidence shows that Okwu et al. (2020), Obi et al. (2020), and Odubunmi (2009) are the Nigerian-specific studies that dwell on the relationship between government educational spending and human capital development, while few others (Innocent et al., 2017; Ehimare et al., 2014; Muhammad et al., 2018; and Omodero, 2019) work on the relationship between total government expenditure and human capital development. None of the studies utilized the United Nations' composite human development index to measure human capital development. Given the foregoing, this study extends the empirical literature on the effect of government educational spending on human capital development by utilizing the United Nations' human development index to proxy human capital development in its examination of the short- and long-run effects of government education spending on human capital development in Nigeria.

In addition to the introductory section, the study is further divided as follows: the next section dwells on the literature review. Section three contains the methodology. The estimated results are discussed in Section 4, while Section 5 contains the conclusion and recommendation.

2.LITERATURE REVIEW

2.1 Conceptual and theoretical literature

Human capital is the stock of skills possessed by the human beings in a nation (Anyanwu et al., 1997). It refers to the "totality of the energies, skills, knowledge, and experience available in a country" (Diejomaoh, 1978). Human capital development is the process of strengthening human values in an economy in order to create a normal, educated, and stable workforce capable of consistently solving national and economic challenges (Omodero, 2019).Government education spending constitutes an instrument for direct resource allocation to the education sector. It is made up of capital and recurrent expenditures. Government recurrent expenditure on education involves spending on the day-to-day running of government educational institutions (salaries, maintenance of school physical assets, etc.), while government capital expenditure on education involves government spending on the construction of physical assets such as schools, libraries, etc.

Theoretically, human capital development is regarded as a major driver of countries' economic growth (Barro, 1990; Romar, 1986). Human capital development is enhanced through the acquisition of knowledge, skills, and experience (Becker, 1962; Schultz, 1960). Thus, investment in education can influence economic growth through an increase in human capital

development (Duruh, and Chima, 2022). The theoretical view has prompted many studies on factors that influence human capital acquisition in both developing and emerging economies. While many past studies focused on the education expenditure-economic growth nexus, few studies exist on the link between education expenditure and human capital in developing countries such as Nigeria.

2.2 Empirical Literature

Most prior studies of public spending on education focused more on its influence on economic growth, while only a few studies exist on the link between human capital and public spending on education. For example, Villela and Paredes (2022) examined the connectivity between government spending on education, human capital, and economic growth in Honduras. The study adopted an instrumental variable approach and found evidence of no link between the investigated variables. In a similar study in the context of North Macedonia, Ziberi et al. (2022) found a direct link between public investment in education and economic growth. The study's outcome, although similar approaches were adopted, differs from that of Villela and Paredes (2022). A similar result was also obtained by Okereoti (2022) in Nigeria using regression analysis. The study of Law-Biaduo (2022) investigated the nexus between human capital development and economic growth in Nigeria. Employing the ARDL estimation technique, it found a positive but insignificant link between the investigated series.

Studies that consider the connection between human capital and government spending are Baldacci et al. (2004), Dissou et al. (2016), and more recently Shafuda and De (2020). The study carried out by Baldacci et al. (2004) assessed the indirect and direct connection between public spending and economic growth via human capital in selected developing nations. In a panel data framework, the study utilized a recursive equation system in its estimation techniques. The study's outcomes indicate a direct relationship between government spending and human capital acquisition. In another related study, Dissou et al. (2016), in the context of Benin, examined the influence of public spending patterns in education on human capital and its implication on the country's growth. The study observed a high sensitivity of response in human capital to methods of government spending in education.

In the context of Namibia, Shafuda and De (2020) examined the influence of public spending on human capital and economic growth. The study's focus was on how spending on human capital indexes such as health care outcomes and educational accomplishments influenced the country's growth process. The study found a mixed result using VECM: a long-term negative link between public spending on healthcare and fertility rate and a 5-year mortality rate, but a positive link between public spending on education and primary and secondary school enrollment. Patel and Annapoorna (2019) examined the connection between government spending on education and the human capital index in India using descriptive statistics. The study, motivated by the below-average government expenditure on education in the country for more than a decade, used descriptive statistics, VAR, and Granger causality approaches in its estimation. The study's outcomes demonstrated that public spending on education influences human development indicators in the investigated country.

Ihugba et al. (2019) examined the impact of government education expenditure on primary school enrollment in Nigeria from 1970 to 2017. The study employed the ARDL-bound cointegration test. In their empirical result, they found that government education expenditure has an insignificant impact on primary school enrolment in Nigeria. In another related study, Ojike et al. (2021) utilized the ARDL bound test and found a positive and significant link between government education spending and sustainable development in Nigeria in both the long run and short run. Adewumi and Enebe (2019) employed least squares in a panel

framework to investigate the influence of government education spending on human capital development in West Africa. The study used primary and secondary school enrollment as a proxy for human capital development. Its result indicates, among other things, the existence of a positive relationship between the investigated variables in the West Africa region.

In another related study, the efficiency of public spending on human capital in Africa was examined by Sikayena et al. (2022). The study adopted data envelopment analysis and bootstrapping models in its estimation technique, and its outcome indicates the inefficiency of public spending on health and education in Africa. Edeh, Iloka, and Nnamani (2017) reported a negative significant effect between oil price volatility and human capital development (proxied with school enrolment) in Nigeria.

Some of the studies in Nigeria on human capital development indicators focused on total government expenditure and its influence on human capital development (see Ehimare et al., 2014; Innocent et al., 2017; Muhammad et al., 2018; and Omodero, 2019). Utilizing data envelopment analysis, Ehimare et al. (2014) reported a decreasing efficiency of the government expenditure on human capital development in Nigeria. Innocent et al. (2017) used the ARDL estimation technique and observed a positive but insignificant link between total government expenditure and human capital development in the short run and long run. Omodero (2019) found an inverse relationship between total government spending and human capital development in Nigeria using ordinary least squares. Muhammad et al. (2019) examined a regional-level analysis of the influence of government total spending on human capital development in Kaduna State. The study found no significant link between the examined series.

Okwu et al. (2022) explored the ARDL technique to ascertain the influence of government education expenditure on human capital development in Nigeria. The study used the gross secondary school enrollment rate as a measure of human capital development, while government education expenditure was split into recurrent and capital spending. The study's findings showed an insignificant inverse relationship between the recurrent capital education expenditure and the gross secondary school enrollment rate. In a similar study, Obi et al. (2020) measured government expenditure on education with government educational spending as a percentage of gross national income and found a significant positive relationship. Odubunmi (2009) reported no correlation between education expenditure and human capital development.

The reviewed literature showed that Okwu et al. (2020), Obi et al. (2020), and Odubunmi (2009) are the Nigerian-specific studies that examined the effect of government educational spending on human capital development, and some other studies concentrated on the relationship between total government expenditure and human capital development. The human development index was not used in any of the studies to measure human capital development. This study differs from the existing Nigerian-specific studies and advances the economic literature on human capital development by utilizing the United Nations'human development index to proxy human capital development in its examination of the relationship between Nigerian government spending on education and human capital development.

3. METHODOLOGY

3.1 Theoretical Framework

Lucas' (1988) endogenous growth model served as the theoretical underpinning for this study. The approach is based on the notion that investing in education leads to the development of human capital, which is a critical component of economic growth and development (Mishra, 2016). He contends that investing in human capital rather than physical capital has a positive

knock-on impact on technological advancement. The model shows how educating a worker raises his output, which then spreads to capital and other workers. Increased education subsidies and incentives for corporations that invest more in new technology research and development in underdeveloped nations are advocated by the model. Lucas' (1988) production model is as follows:

$Y = AK^{\alpha}(\ell hL)^{1-\alpha} \qquad 0 < \alpha < 1$ …… (1)

Y = output, A = total factor productivity (TFP), K = physical capital, h = human capital, L = labour force, and ℓ = proportion of total labour time spent working (Carroll, 2020).

3.2 Method of analysis and model specification

The linear ARDL bounds test developed by Pesaran, Shin, and Smith (2001) was used as the analytical approach in this work. When the orders of integration of the model's explanatory variables are zero, one, or mixed, the approach is applicable. It is also sufficient when the sample size is small (Pesaran and Shin, 1999). Augmenting the Lucas (1988) model with government education spending and other control variables that affect human capital development, the study model is specified thus:

$$\ln HDI_t = \beta_0 + \beta_1 \ln GFCF_t + \beta_2 \ln LBF_t + \beta_3 \ln GEDS_t + \beta_4 \ln GHS_t + \beta_5 \ln CSCS_t + \beta_6 \ln EXR_t + \mu_t \quad \ldots\ldots (2)$$

Where,

HDI = Human Development Index (a proxy for human capital development)
GFCF = Gross fixed Capital Formation (a proxy for physical capital)
LBF = Total labour force
GEDS = Federal government recurrent expenditure on education (proxy for government education spending)
GHS = Federal government recurrent expenditure on health
CSCS = Federal government capital expenditure on social and community services
EXR = Official exchange rate
t = Time
μ = Error term

ln = Natural log

β_0 = Intercept
β_1 - β_6 = Coefficients

The ARDLbounds test model is:

$$\Delta \ln HDI_t = \beta_0 + \sum_{i=1}^{p} \beta_i \Delta \ln HDI_{t-1} + \sum_{j=0}^{q} \alpha_j \Delta \ln GFCF_{t-j} + \sum_{k=0}^{q} \delta_k \Delta \ln LBF_{t-k} + \sum_{l=0}^{q} \lambda_l \Delta \ln GEDS_{t-l} + \sum_{m=0}^{q} \varphi_m \Delta \ln GHS_{t-m} + \sum_{n=0}^{q} \nu_n \Delta \ln CSCS_{t-n} + \sum_{o=0}^{q} \gamma_o \Delta \ln EXR_{t-o} + \Omega_0 \ln HDI_{t-1} + \Omega_1 \ln GFCF_{t-1} + \Omega_2 \ln LBF_{t-1} + \Omega_3 \ln GEDS_{t-1} + \Omega_4 \ln GHS_{t-1} + \Omega_5 \ln CSCS_{t-1} + \Omega_6 \ln EXR_{t-1} + \varepsilon_t \ldots\ldots (3)$$

Where Δ = first difference. The lag orders p and q are chosen using the Akaike information criterion (AIC).In order to check the presence of cointegration in the model, the asymptotic non-standard F-test statistic and the upper and lower limit critical values obtained from the lag level

terms in equation (3) are used. Cointegration is present when the F-test result is more than the upper critical bound; it is missing when the F-test result is less than the lower critical constraint. If the F-test statistic falls between the higher and lower critical boundaries, the test is inconclusive.

3.4 Data

Data for the study covered 2003q1–2021q4. Gross fixed capital formation, federal government recurrent expenditure on education and health, federal government capital expenditure on social and community services, and the official exchange rate with US dollars were collected from the CBN Statistical Bulletin 2021. Human development index data were sourced from the United Nations Development Programme (UNDP) 2022, while total labour force data were obtained from World Development Indicators 2021. The data were interpolated from annual to quarterly using Eviews.

4. RESULTS PRESENTATION AND DISCUSSION

4.1 Unit root test

Table 1: Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests result

	Augmented Dickey-Fuller		Phillips-Perron		
Variable	With constant	With constant & trend	With constant	With constant & trend	Order of integration
	t-Statistic	t-Statistic	t-Statistic	t-Statistic	
lnHDI	-1.5615	-1.8869	-1.5982	-1.8438	
ΔlnHDI	-9.0249***	-9.1197***	-9.0470***	-9.1818***	I(1)
lnGFCF	1.1590	-0.7362	2.2055	-1.4723	
ΔlnGFCF	-2.9166**	-3.2211*	-10.0544***	-10.4935***	I(1)
lnLBF	-0.2300	-2.5284	-0.4770	-2.6622	
ΔlnLBF	-2.6734*	-2.6305	-11.9959***	-11.9486***	I(1)
lnGEDS	-1.3254	-2.2334	-1.3362	-2.1391	
ΔlnGEDS	-9.2037***	-9.2253***	-9.2089***	-9.2500***	I(1)
lnGHS	-1.4219	-2.6378	-1.4296	-2.6378	
ΔlnGHS	-9.0085***	-9.0255***	-9.0702***	-9.1691***	I(1)
lnCSCS	-1.5364	-2.3209	-1.5592	-2.4343	
ΔlnCSCS	-8.5806***	-8.5242***	-8.5806***	-8.5242***	I(1)
EXR	0.6660	-1.8289	0.8063	-1.7767	
ΔEXR	-2.8575*	-3.1746*	-9.1558***	-9.4647***	I(1)

Source: Authors' computation

Note: *, **, and *** indicates p-value ≤ 0.10, ≤ 0.05, and ≤ 0.01respectively.

Δ = Firstdifference

The stationarity of the variables was evaluated using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. All the variables are integrated of order one. Since none of the variables is integrated of order two, the cointegration test was conducted using the Pesaran et al. (2001) ARDL bound test.

4.2 Cointegration test

Table 2: Bounds test result

Null Hypothesis: No long-run relationships exist

F-statistic =	4.63

	Critical bound value			
Significance level	1%	2.5%	5%	10%
Upper bound I(1)	4.43	3.99	3.61	3.23
Lower bound I(0)	3.15	2.75	2.45	2.12

Source: Authors' computation

The cointegration test results in Table 2 show that the model's dependent and independent variables have long-run relationships; hence, the F-statistic is greater than the upper critical bound value at the 1% level of significance.

4.3 ARDL model selection

ARDL (1, 4, 4, 4, 0, 1, 4), the model with the lowest Akaike information criterion (AIC), was chosen for the study (see Appendix A). The model has an R-squared of 0.9905, indicating a good fit. It demonstrates that the explanatory variables account for 99.05% of the variability in human capital development. The model is statistically significant, according to the F-statistic (201.6706).

4.4 Diagnostic tests for the models

4.4.1 Stability test

The CUSUM test statistic plot is inside the 5% significance level border lines, and more than 95% of the CUSUM Squares test statistic plot is inside the 5% level of significance border lines too, indicating that the model coefficients are stable (see Appendix B).

4.4.2 Serial autocorrelation, Normality, Heteroskedasticity, and Specification tests

Table 3: Breusch-Godfrey Serial Correlation LM test, Jarque-Bera Normality test, Breusch-Pagan-Godfrey Heteroskedasticity test, and Ramsey RESET Specification test

	Statistic	Value	Prob.
Breusch-Gogfrey Serial LM	F-statistic	0.2175	0.8053
Jarque-Bera Normality	Jarque-Bera	1.6367	0.3503
Breusch-Pagan-Godfrey Heteroskedasticity	Obs*R-squared	31.1085	0.1507
Ramsey RESET Specification	F-statistic	2.7587	0.1035

Source: Authors' calculation

Based on the statistically non-significant results of the diagnostic tests, the model has no serial autocorrelation problem, is normally distributed, has constant error term variance (homoskedasticity), and is well specified.

4.5 Short-and long-run results

The estimated results in Table 4 show that gross fixed capital formation has a significant positive impact on human capital development in the short run and a significant negative effect in the long run. A percentage increase in gross fixed capital formation will increase human capital development by 0.0462% in the short run, while in the long run it will reduce human capital development by 0.0474%. It shows that increased gross fixed capital formation in the short run encourages human capital development through staff training but discourages it in the long run as the staff training is neglected. The implication is that long-term investments in Nigeria are not using new advancements that require continuous worker training through education.

Table 4: Estimated short-and long-run results

Short-run result Dependent variable: D(lnHDI)			Long-run result Dependent variable: lnHDI		
Variable	Coeffecient	t-Statistic	Variable	Coeffecient	t-Statistic
D(lnGFCF)	0.0462	3.5664***	lnGFCF	-0.0474	-2.4050**
D(lnLBF)	-0.2935	-2.2749**	lnLBF	-0.7688	-3.4069***
D(lnGEDS)	0.0717	5.5566***	lnGEDS	0.2036	6.4963***
D(lnGHS)	-0.0090	-1.0943	lnGHS	-0.0280	-1.0709
D(lnCSCS)	0.0158	3.7810***	lnCSCS	0.0291	2.7916***
D(lnEXR)	0.0776	3.5600***	lnEXR	0.0524	1.8321*
ECM(-1)	-0.3203	-4.8499***	C	12.0278	3.1672***

Source: Authors' calculation

Note: *, **, and *** indicates p-value ≤ 0.10, ≤ 0.05, and ≤ 0.01respectively.

In both the short and long run, the labour force has a significant negative impact on human capital development. A percentage increase in the total labour force will reduce human capital development in the short and long run by 0.29% and 0.77%, respectively. The implication is that government support for human capital development reduces in relation to the rate of increase in the total labour force in Nigeria. It is an indication that government spending on education, health, and other programmes that support human capital development is inadequate compared to the size of the labour force. The consequences of the situation are a high level of unemployment, a large number of unskilled workers, an increase in poverty, and low labour productivity.

The results show that government spending on education has a positive and significant impact on human capital development in both the short and long term. A percentage increase in government education spending will increase human capital development by 0.072% in the short run and 0.204% in the long run. The result shows the urgent need for increased government spending on education to enhance the growth of human capital development in Nigeria. The result is inconsistent with the Nigerian-specific studies (Omodera, 2019; Okwu et al., 2022) that examined the effect of total government spending on human capital development, while it is consistent with the study by Obi et al. (2020) that utilized educational spending as a percentage of gross national income to proxy government education spending. It is also consistent with Adewumi and Enebe's (2019) panel study in West Africa.

Government recurrent health expenditure had a negligible impact on human capital development in both the short and long run. The government's capital expenditure on social and community services has a positive and significant short- and long-term impact on human capital development. A one percent increase in capital expenditure on social and community services will increase the level of human capital development by 0.016% and 0.029% in the short run and long run, respectively. The result calls for more capital investments in education, health, and other social and community services to boost the development of human capital in Nigeria.

The exchange rate exhibited a positive and significant impact on human capital development at the 1% level in the short run and at the 10% level in the long run. It shows that the exchange rates support human capital development more in the short run. An increase in the exchange rate enhances the growth of human capital development by discouraging the mass exodus of Nigerians to foreign schools by making education cheaper at home. ECM(-1) is negative and statistically significant at a 1% level, with an adjustment speed of 32.03%. It demonstrates that

in a quarter, 32% of the difference between long-run and short-run human capital development is addressed.

5. CONCLUSION AND RECOMMENDATION

The broad objective of the study is to examine the impact of government education spending on human capital development in Nigeria. Human capital development was measured with the United Nations' human development index, while the federal government's recurrent expenditure on education was used as a proxy for government education spending. Utilizing linear ARDL for the analysis, the study found a positive and significant relationship between government education spending and human capital development in both the long run and the short run. Conclusively, government spending on education enhances human capital development in Nigeria. Following the findings, the study recommends increased budgetary allocation to the education sector in Nigeria to increase human capital development to a level that will adequately support the growth of the economy.

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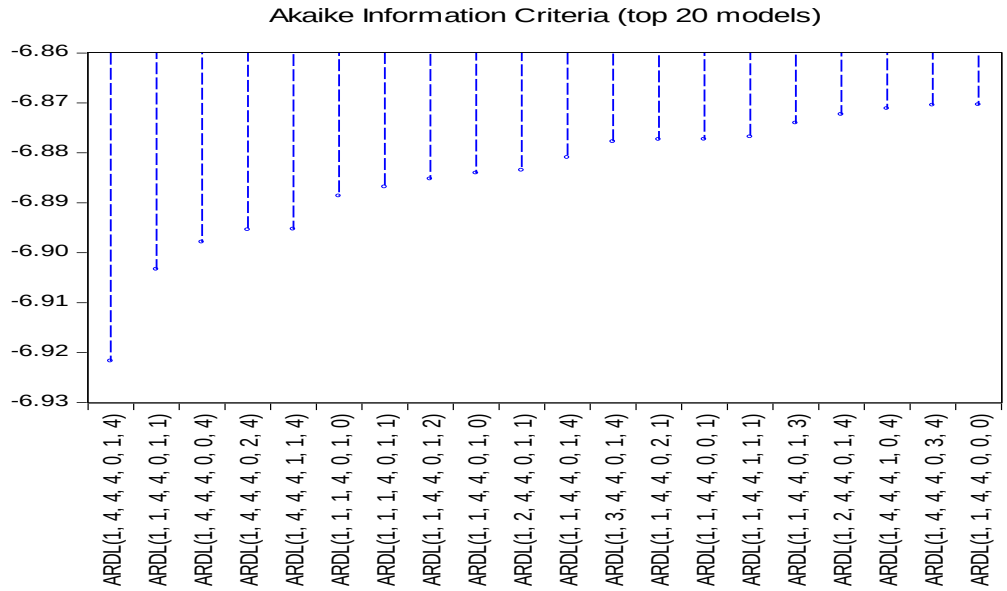
Appendix A : Akaike Information Criteria(AIC) model selection graph



R-squared = 0.9904 F-statistic = 201.6706 Prob(F-statistic) = 0.0000

Figure 1: Model Selection Graph
Source: Authors' plot

Appendix B: CUSUM and CUSUM of squares stability test graph

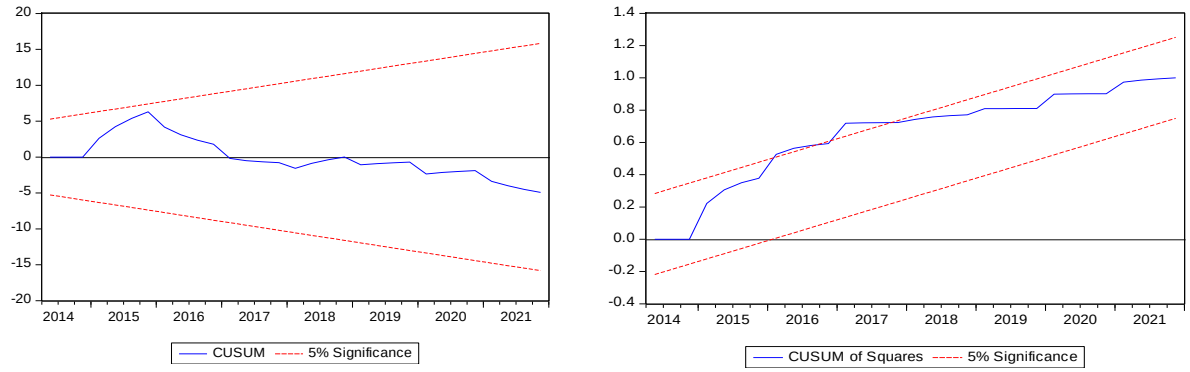


Figure 2: Cumulative Sum (CUSUM) and CUSUM of Squares Tests
Source: Authors' plot