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EQUITY FDI AND FEDERALLY COLLECTED TAX REVENUE IMPACTS ON ECONOMIC GROWTH IN NIGERIA

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Abstract

This study examines short-run and long-run impacts of equity foreign direct investment and federally collected tax revenue on economic growth, based on quarterly time series data of 2011q1 to 2021q4. Structural break, and lag order selection criteria was determined before performing unit root test. Pesaran/Smith/Shin bounds test criteria suggested ARDL (1,1,1,1,1,0) lag structure for analyzing study's model. Data exploration tested include autocorrelation, heteroskedasticity, normality, Ramsey regression specification-error test for omitted variables, and CUSUMSQ for parameter constancy, they showed the models are well fitted. The study found that long-run cointegration existed among the study's variables, and there is a speed of adjustment to shock of 109.63%. About 60.75% variation in economic growth was explained by the explanatory and control variables. In the long run, the coefficient of equity foreign direct investment and federally collected tax revenue have significant positive impact on economic growth. In the short-run, first differences of equity foreign direct investment and federally collected tax revenue impacted significantly and negatively on economic growth. There is Granger causality between gross domestic product and federally collected tax revenue

Keywords: Foreign Capital, Equity Foreign Direct Investment, Federally Collected Tax Revenue, Economic Growth, ARDL Bounds Test, Structural Break.

INTRODUCTION

Foreign capital inflows are a substantial contributor to the recipient economy, and so is tax which is a major source of funds needed by every government for economic growth (EcG). For business activities to flow, a good network of transportation and communication, and power supply helps to minimize total transaction cost of goods and services, and hence improve

profitability for investors. Where investors make profit, the government is expected to generate more tax revenue for providing better infrastructural facilities needed for EcG. Poor infrastructural facility and poor tax administration constrain tax revenues in Nigeria.

Theoretically, FDI and other investment inflows is widely believed to have positive impact on EcG by way of spillover effects (Encinas-Ferrer & Villegas-Zermeño 2015), and it is one of the fastest growing economic activities in the world (Emudainohwo, 2015, Helpman, 2006), particularly as a source of capital needed by both private firms and government for infrastructural facilities.

Nigeria's EcG has not kept pace with recent capital inflows though is one of the largest recipients of foreign capital in sub-Saharan Africa (SSA), and it is facing immense challenges in accelerating EcG.

Due to new players in the capital market, new funding policies, macroeconomic policy effects, somewhat inefficiency of FCTR system in Nigeria which is characterized by tax evasion, avoidance, record falsification and other factors; foreign capital inflows and FCTR relationship with EcG remain challenging to policy makers and academicians. Thus, there is the need for a renew look at the association between equity foreign direct investment (EFDI) and FCTR with EcG in Nigeria. This is particularly interesting in spite significant amount of interested studies with no consensus reached on their association. This present study will further contribute to existing literature by examining how EFDI and FCTR support the much-anticipated EcG in Nigeria.

LITERATURE REVIEW

Concept of Economic Growth

Economic growth (EcG) is constant increment in the production capacity of a country, as well as an increment in per capita national output, measured by shifting the country's production possibility frontier outwards (Salami et al. 2015). It can also be described as the increase in the size of an economy between two period. It is predicated upon the availability and growth rate of physical capital, human resources, rise in capital stock, technological advancement, enhancement in literacy level, good governance, and wealth creation, as well as changes in the underlying productivity of these general inputs in the economy national resources (Adefolake & Omodero, 2022; Dwivedi, 2005; Engen & Skinner, 1996).

GDP is widely used to estimate a country's economy size and it is estimated as total value of all finished goods and services produced within a country's borders during a specified period (Aliya & Mustapha, 2020). It is also estimated by adding up private consumption, government expenditure, private capital investment, and net exports at market prices in an open economy (Aliya & Mustapha, 2020). GDP level indicates the size, general health, and an economy's performance. A performing economy is likely to experience a higher investment level, and the reverse is the case for a shrinking economy. As GDP improves, the expectation is that investment will also increase, particularly attracting inflows of foreign capital investments and consequently, increased profit tax revenue.

Investment is one important factor for ensuring EcG and it entails capital formation. Capital formations result from savings and consequently investing the savings in productive activities. Developing economies suffer from low savings which is insufficient to ensure meaningful investment (Okoro et al. 2019; Sharma, 1986). The low savings and scarcity of foreign exchange

needed to acquire productive resources create "saving gap" and 'exchange gap' (Sharma, 1986). Thus, foreign capital is a necessity to fill savings gap, investment gap, and exchange gaps in developing economies (Adeola, 2017; Sharma, 1986). The inflow of foreign capital is considered to constitute a net addition to resources available for investment, and hence an exogenous factor to stimulate EcG (Sharma, 1986).

Tax and Tax Revenue

The government role in achieving EcG is critical and taxation, an instrument of fiscal policy, is one significant tool government use for stimulating EcG (Edewusi & Ajayi, 2019). Tax is compulsory payment from private individuals, institutions, organizations, or groups to the government based on predetermined criteria for which no direct or specific benefit is received by the taxpayer (Charles et al. 2018). Taxes brings revenue to the government for various uses including providing infrastructure and maintaining law and order, while its ability to affect consumption patterns influences the growth of the economy (Adefolake & Omodero, 2022).

The effectiveness and efficiency in administering tax is what will lead to increment in the generated tax revenue that helps the government in the provision of infrastructure in a society. Good infrastructural facility, law and order, etc., stimulate business activities, the businesses in return, pay taxes as revenue to government (Charles et al. 2018).

The FCTR system in Nigeria is somewhat insufficient as it is characterized by tax evasion, avoidance, and record falsification, and so, consistent low tax revenue (Emudainohwo & Ndu, 2022; Aliya & Mustapha, 2020). Furthermore, challenges are paucity of data, inefficient monitoring and enforcement system, corruption, poor administrative processes, multiplicity of taxes, economic structural problems, and so forth impede tax revenue sufficiency to boost EcG in Nigeria. The mentioned challenges cause leakages that hampered realizing tax revenues and consequently, likely negative impact on EcG.

Several tax reforms have been directed at increasing tax revenue meant to stimulate EcG in Nigeria. The reforms include taxpayers' identification number introduced in February 2008, automated tax system made to facilitate tracking of tax positions; e-payment system in 2015 meant to enhance smooth payment procedures and reduce the incidences of tax touts among others (Emudainohwo & Ndu, 2022). Tax reforms are touted to have strong positive effects on EcG.

However, an adverse tax policy may negatively affect EcG through discouraging new investment rate, or the net growth in capital stock, workers acquisition of skills, it may attenuate labor supply growth, discourage productivity growth by weakening R&D, can influence the marginal productivity of capital by distorting investment from heavily taxed sectors into more lightly taxed sectors with lower overall productivity (Engen & Skinner, 1996): the consequences are poor firm performances and reduce tax revenue.

The correlation between taxation and EcG is a contested subject as taxation has an impact on the economy, business firms, and individual decisions are also affected by tax. In spite the revenue reported by the government over the years, it is insufficient in meeting its social and public spending which is important to enhance EcG

Foreign Capital Investment

Foreign capital has many connotations; however, it is investment originating from other countries intended to produce goods and services. It includes foreign portfolio investment,

foreign public assistance, remittances, etc. EFDI imported capital investment is used as proxy for foreign capital in this study. The argument for foreign capitals is that it aids EcG through its augmenting domestic savings, helping to overcome foreign exchange and import scarcities, smoothing government expenditure, increasing the microeconomic efficiency of production and supplying technology and entrepreneurial skills (Adeola, 2017). Nevertheless, foreign capitals also have its worries which include sharp exchange rate appreciation leading to a rise in the current account deficit of the host economy if spent on imports, they discourage domestic savings and potentially productive investment due to relying on foreign capital which they may never receive (Adeola, 2017). Large external inflows can also reduce their intermediation efficiency in developing countries if their financial markets are underdeveloped and performing poorly (Adeola, 2017). Furthermore, foreign investors may import small amount of money, which is further affected by depreciating exchange rate, and repatriating profits rather than ploughing it back into the economy. There are large untapped opportunity and potentials for foreign capital investment but several factors ranging from insecurity, exchange rate volatility, high transaction cost, poor transportation network and poor energy reliability, among other issues dissuades foreign investors.

Hypotheses

The following hypotheses will be tested in the long-run and short-run for this study:

H1: no significant association between EFDI and EcG nor direction of causality between them.

H2: no significant impact of FCTR on EcG nor direction of causality between them

Conceptual Framework

Figure 1 present the conceptual model of this study. It provides the pictorial demonstration of the study variables and their relationship.

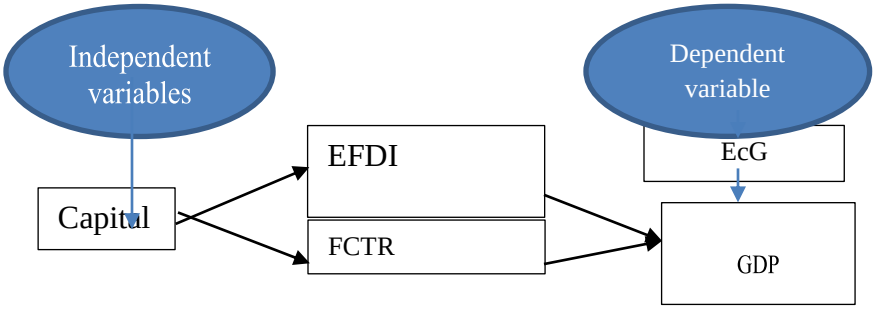

Figure 1: Researcher's Conceptual Model, 2023

Empirical Review

Engen and Skinner (1996) examined the relationship between EcG and taxation both for the US and other countries. They showed that the proposition that high taxes are bad for EcG is not necessarily obvious, either in theory or in the data. However, they found evidence that lower taxes have modest positive effects on EcG. In a study investigating tax structures design for promoting EcG, Christopher (2008) found that corporate taxes are most harmful to growth, followed by personal income taxes, and then consumption taxes. Recurrent taxes on immovable property appear to have the least impact.

Based on annual time series data from the Central Bank of Nigeria Statistical Bulletin over the period 1980-2013, Ihenyen and Mieseigha (2014) examines taxation as an instrument of EcG in

Nigeria. The study revealed that taxation is an instrument of EcG in Nigeria. Phimmavong (2017) analyzed the impact of different categories of foreign capital net inflows and domestic savings on EcG in 6 ASEAN countries, namely Indonesia, Malaysia, Philippines, Singapore, Thailand, and Lao PDR. The study showed foreign capital inflows at aggregate level is negatively correlated with real gross domestic product per capita (GDPPC) growth rate. At disaggregate level, FDI has significantly positive bearing with real GDPPC growth rate in the two periods.

Mcnabb (2018) used the International Center for Tax and Development and United Nations World Institute for Development Economics Research Government Revenue Dataset to examines the relationship between tax structures and EcG, in a panel of 100 countries. The results suggest that, broadly, revenue-neutral increases in income taxes are associated with lower long-run GDP growth and that revenue-neutral reductions in trade taxes have not always had positive effects. Okoro et al. (2019) examined foreign capital inflows impact on EcG of Nigeria and revealed that foreign capital inflows have long-run equilibrium effects on EcG.

Mehdi Behname (2012) investigated FDI influence on EcG in Southern Asia over the period 1977-2009. The study revealed FDI has positive and significant impact on EcG and capital formation have positive effect on GDP. Joutsen and Norling (2014) investigates FDI impact on EcG on sub-Sahara Africa based on World Bank database data for the period 2005-2013. The study shows FDI have significant impact on GDPPC growth.

Based on 21 developing countries data for the period 1990-2013, Rehman and Ahmad (2016) examined foreign capital inflow impact on EcG. The results negative sign of error correction term indicates the convergence of the variables towards equilibrium in the long-run, and that net FDI have positive and significant impact on EcG in the long-run.

Nadar (2021) investigates the causality between FDI and GDPPC in the context of India based on WDI data from 1970-2019. The study applied pairwise Granger causality tests for long-run causality and Wald test approach under Vector Error Correction Model for the short-run causality. The long-run causality test revealed a unidirectional causality running from FDI to GDPPC, implying that FDI causes the GDPPC to change and not vice-versa. The short-run causality test indicates no causality between FDI and GDPPC, suggesting that, in the short-run, FDI and GDPPC does not cause each other.

METHODOLOGY

The study used quarterly time series data extracted from Central Bank of Nigeria and Federal Inland Revenue (FIRS) in Nigeria for the period 2011q1-2021q4. GDP (proxy for EcG) is dependent variable, while the independent variables are FCTR and EFDI. The Clemente and Montane Reyes methods was used to test the existence or not of structural breaks. Should there be a structural break, the data will be differenced to make changes so that a stationary data is obtained before any analysis. The null hypothesis that the series has a unit root with structural break(s) was tested against the alternative that there are stationary with break(s). Philip-Perron (PP) unit root tests was employed to test the data unit root status after structural breaks challenges was surpassed. ARDL bounds test based on the Pesaran et al. (2001) bounds test criteria was employed for the data analysis. Further rigorous data exploration includes collinearity test, spurious regression diagnosis, lag-order specification test, stationarity test, serial

correlation test, homoskedasticity test, normality test, Ramsey regression specification-error test for omitted variables, and CUSUMSQ constancy test.

Model specification

The study's model used value of quarterly GDP as a proxy for dependent variable (EcG), while FCTR and EFDI for independent variables. The study included dummy variables appended with sb compiled as pre-structural break = 0, while post-structural break = 1.

The study's model is specified as follow:

$$GDP = \alpha_{10} + \alpha_{11}EqFDI + \alpha_{12}FCTR + \alpha_{13}GDP.sb + \alpha_{14}EqFDI.sb + \alpha_{15}FCTR.sb + e_{it} \quad - \quad (1)$$

Where: α is intercept, e_{it} is error term.

Table 1

Variables, Measurement and Sources

Variables	Symbols	Measurement	Source
Economic growth	EcG	Actual quarterly GDP	CBN Statistical Bulletin
Federally collected tax revenue	FCTR	Actual quarterly FCTR	FIRS
Equity FDI imported capital investment	EFDI	Actual EFDI-Imported Capital Investment	CBN Statistical Bulletin
Economic growth structural break	EcG.sb	EcG modified with binary variable 0 &1	Researcher's compilation
Federally collected tax revenue structural break	FCTR.sb	FCTR modified with binary variable 0 & 1	Researcher's compilation
Equity FDI imported capital investment structural break	*EFDI*.sb	EFDI Imported Capital Investment modified with binary variable 0 & 1	Researcher's compilation

Source: Compiled by Researcher 2023

Result Presentation and Discussion

The study tested for structural break on GDP, EFDI, and FCTR. Figure 2a to 2c shows Clemente-Montanes-Reyes unit root test for structural break: the structural breaks year is highlighted by the vertical line on the graph. It shows that GDP, EFDI, and FCTR have structural break in 2013q4, 2015q1, and 2020q4, respectively. Subsequently, dummy variable was created by assigning zero (0) to years before the structural breaks, and one (1) from the year when structural break occurs. The created dummy variables are appended with sb (table 1).

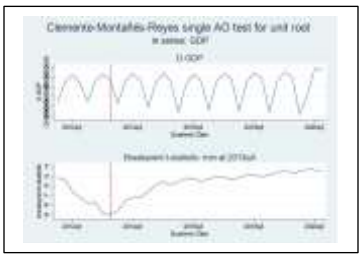

Figure 2a: GDP-sb

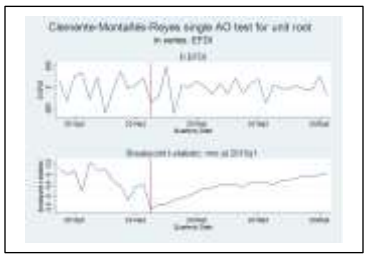

Figure 2b: EFDI-sb

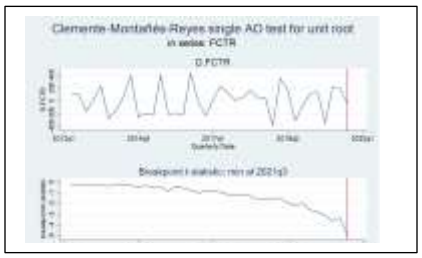

Figure 2c: FCTR-sb

Source: compiled by researcher, 2023.

Descriptive Statistics

The study's variables quarterly data descriptive statistics is presented in table 2. It revealed minimum GDP is N13,450,717 million, and maximum GDP is N20,329,062 million. And the GDP deviation from means of N1,613,869 million. EFDI minimum is USD77.97 billion and maximum is USD812.33, and its mean is USD338.6691 billion. FCTR has average of N1,185.71 million, minimum of N563.8697 million, and N2,209.86 million.

Table 2
Descriptive Statyistics

Variable	Obs.	Mean	Std. dev.	Min	Max
GDP[1]	44	16746781	1613869	13450717	20329062
EFDI	44	338.6691	193.2311	77.97	812.33
FCTR	44	1185.71	274.5812	563.8697	2209.86
GDP-sb	44	0.75	0.4380188	0	1
EFDI-sb	44	0.6363636	0.4866071	0	1
FCTR-sb	44	0.1136364	0.3210382	0	1

Source: Researcher's Computation, 2023.

Correlation Matrix

The study's variables quarterly data correlation matrix is presented in table 3. It shows that EFDI(-0.2186) have weak negative correlation with GDP while FCTR have weak positive correlation with GDP(0.1316). They both suggest their trend with GDP (EcG) is weak.

Table 3
Spearman's Rank Correlation

Variables		A	B	C	D	E	F
A.	GDP	1.0000					
B.	EFDI	-0.2186	1.0000				
C.	FCTR	0.1316	-0.0732	1.0000			
D.	GDP-sb	0.6841-SB	-0.3327*	-0.0930	1.0000		
E.	EFDI-sb	0.6027*	-0.4539*	-0.0521	0.7638*	1.0000	
F.	FCTR-sb	0.3581*	-0.3130*	0.3243*	0.2067	0.2707	1.0000

Source: Researcher's computation, 2023.

Variable's Data Exploration

Multicollinearity test

Variance inflation factor (VIF) was employed to examine multicollinearity (table 4). The highest VIF of the examined variables is 2.82, and the least is 1.25. The VIF values is far less than the rule of thumb of 7. Thus, there is no multicollinearity challenge among the study's variable.

Table 4
Collinearity Test

Variable	VIF
EFDI-sb	2.82
GDP-sb	2.43
FFCT-sb	1.38
EFDI	1.38
FCTR	1.25
Mean VIF	1.85

Source: Researcher's compilation, 2023.

Spurious Regression Test

The Durbin–Watson d-statistic is (11, 43) = 1.758478, and it lies between 1.5 to 2.5, Thus, it supports the unlikelihood of a spurious regression result.

Lags Specification

Table 5 present lag-order selection criteria. The models select maxlags 4 to be use when examining the unit root (stationarity) test for the study's variables. The selected lag is the least value in the criteria, and they all have p-value < 0.05.

[1] Total GDP at current market prices: https://www.cbn.gov.ng/documents/quarterlyreports.asp (2023Q2_Bulletin Tables_Final (C5)

Table 5

M1 Lag-order Selection Criteria: Sample: 2021q1 thru 2021q4

Lag	LL	LR	df	P	FPE	AIC	HQIC	SBIC
0	-1189.45				3.7e+18	59.7726	59.8642	60.026
1	-1052.02	274.87	36	0.000	2.3e+16	54.7009	55.3421	56.4742
2	-1018.28	67.469	36	0.001	3.0e+16	54.8142	56.0049	58.1075
3	-978.561	79.444	36	0.000	3.5e+16	54.6281	56.3684	59.4414
4	-897.02	163.08*	36	0.000	8.0e+15*	52.351*	54.6409*	58.6843

Endogenous: GDP, EFDI, FCTR, GDP-sb, EFDI-sb, FCTR-sb

Exogenous: _cons

Source: Researcher's compilation, 2023.

Stationarity Test

Augmented Dickey-Fuller and Philip-Perron stationarity test employed for examining unit root results are presented in table 6. The stationarity test was examined based on maxlags 4 (see lag selection). It shows that only GDP and EFDI were stationary at level, while the other variables are stationary at first difference.

Table 6

Philip-Perron Stationarity Test

Variable	Augmented Dickey-Fuller Test[2]		Philip-Perron Test[3]		
	Level test statistic (Zt)	1st difference test statistic (Zt)	Level test statistic (Zt)	1st difference test statistic (Zt)	Decision
GDP	-2.809	-2.285	-5.183*	-8.063*	1(0)
EFDI	-3.587*	-4.959*	-5.915*	-12.694*	1(0)
FCTR	-0.558	-1.722	-2.612	-7.281*	1(1)
GDP-sb	-1.664	-3.120	-1.629	-6.575*	1(1)
EFDI-sb	-1.534	-2.846	-1.780	-6.451*	1(1)
FCTR-sb	-0.658	-3.609*	-1.167	-6.820*	1(1)

MacKinnon approximate p-value for Z(t) are less than 0.05

Source: Researcher's Compilation, 2023.

Autoregressive Distributed Lag (ARDL) Bounds Test and Regression Lag Structure

To examine the ARDL bounds test, firstly the Lags specification for each variable were tested. It shows lag4, lag1, lag3, lag1, lag1, and lag1 for GDP, EFDI, FCTR, GDP-sb, EFDI-sb, and FCTR-sb, respectively. Next, to select ARDL lag structure, maxlag 1 was used since it is the commonest among the lag-order. The elected maxlag structure for the variable analysis is presented in table 7.

Table 7

ARDL bound Test and Regression Lag Structure

	GDP	EFDI	FCTR	GDP-sb	EFDI-sb	FCTR-sb
r1	1	1	1	1	1	0

Source: Researcher's compilation, 2023.

Pesaran, Shin, and Smith (2001) Bounds Test

The models Pesaran/Shin/Smith (2001) ARDL bounds test returned 'estat btest has been superseded by estat ectest as the prime procedure to test for a levels relationship.' Thus, estat ectest was performed for the ARDL bounds test (Kripfganz & Schneider, 2020). The hypothesis decision criteria[4] is that 'do not reject Ho if both F and t are closer to zero than critical values for

[2] ADF 5% critical value at I(0) = -3.544, I(1) = -3.548.

[3] PP 5% critical value at I(0) = -3.528, I(1) = -3.532.

[4] Ho: no level relationship. Ha: there is level relationship.

I(0) variables [if p-values > desired level for I(0) variables], and reject Ho if both F and t are more extreme than critical values for I(1) variables [if p-values < desired level for I(1) variables]. The results (table 8) revealed F = 10.981 is more extreme to zero than l(0) critical value of 4.138, and l(1) critical value of 5.962 at 1%, and t = -7.028 is more extreme to zero than l(0) critical value of -3.593, and l(1) critical value of -5.098 at 1%. Both f and t value are more extreme than critical values for I(0) and l(1) variables, and are statistically significant with a p-value of 0.000), suggesting that Ho is rejected. Thus, there are level relationship among the variables.

Table 8

Pesaran et al. (2001) Bounds Test: Kripfganz and Schneider (2020) Critical Values and Approximate P-Values

	Finite sample (5 variables, 43 obs., 4 short-run coefficients)			
	f =10.981		**t = -7.028**	
	f		**t**	
	l(0)	**l(1)**	**l(0)**	**l(1)**
1%	4.138	5.962	-3.593	-5.098
5%	2.952	4.399	-2.871	-4.246
10%	2.452	3.735	-2.516	-3.824
p-value	0.000	0.000	0.000	0.003

Source: Researcher's computation, 2023.

Auto-correlation (serial correlation) test

Durbin's alternative test for autocorrelation and Durbin-Watson d-statistic were used to examine serial correlation issue (table 9). Their null hypothesis is Ho: no serial correlation. Durbin's alternative test p-value = 0.4671. The p-value is greater than 0.05 suggesting no serial correlation challenges. The Durbin-Watson d-statistic is 1.758478, and it is close to 2 (rule of thumb). It therefore further suggests no serial correlation.

Table 9

Serioal Correlation (Autocorrelation) Tests

Durbin alternative test for autocorrelation			**Durbin-Watson d-static**
Chi^2	**df**	**prob > chi^2**	
0.529	1	0.4671	(11, 43) = 1.758478

Source: Researcher's compilation, 2023.

Heteroskedasticity

White's test for heteroskedasticity (table omitted) revealed chi^2 (37) = 39.72, prob > chi^2 = 0.3497. The test null hypothesis is Ho: Homoskedasticity, Ha: unrestricted heteroskedasticity. Thus, model is homoscedastic since the p-value > 0.05.

Normality test and Specification Test

Data normality was checked using Jarque-Bera normality test. It returned 0.3472 chi^2 0.8406. The test indicates data is normally distributed. The Skewness and Kurtosis test for normality was also deployed (table 10: Panel A). It revealed joint prob > chi^2 = 0.3234. The result further suggests that normality of data given their p-value > 0.05.

Ramsey (1969) regression specification-error test (RESET) for omitted variables test returned prob > F = 0.8913, indicating the model has no omitted variables issues since p-value > 0.05 (table 10: Panel B).

Table 10
Skewness and Kurtosis Test

Panel A: Skewness and Kurtosis tests for normality			**Panel B:** Ramsey RESET test for omitted variables	
Variable		**resid**		
Obs.		43	**F(3, 35)**	0.21
Pr(skewness)		0.8154	**Prob > F**	0.8913
Pr(kurtosis)		0.1502		
---Joint test---	Adj chi2(2)	2.26		
	Prob > chi2	0.3234		

Source: Researcher's compilation, 2023.

Test for Parameter Constancy

The cumulative sum of recursive residuals of square (CUSUMSQ) was used to examine if the estimated coefficients are unstable. CUSUMSQ null hypothesis is all coefficients are stable. The CUSUMSQ plot stayed within the 5% critical bounds (figure 3). Thus, the coefficient for the model is stable.

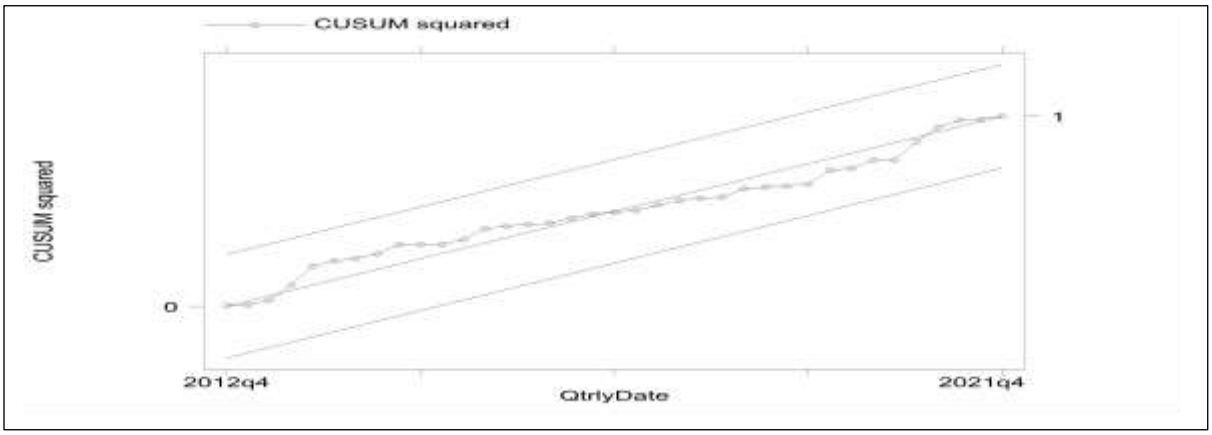

Figure 3: CUSUMSQ

Summarily, the data exploration (pre- and post-estimation diagnoses) satisfied ARDL Bounds test regression for this study. Thus, the ARDL regression, and Granger causality test are employed for the study's objective.

Regression Results

The regression result for the study's hypotheses is presented in table 11. The adjustment coefficient is -1.0963, 0.000 and it has a negative sign, indicating a long-run equilibrium relationship exist in the model at 1% level of significance[5]. The adj. R^2 is 0.6075.

In the **Long-run,** EFDI(2863.63; 0.034) had significant positive impact on EcG. However, FCTR(2861.327; 0.001) had strong positive influence on EcG. In the **Short run,** first difference of EFDI have insignificant negative (-1760.25, 0.070) influence on EcG while, first difference of FCTR have strong indirect impact on EcG(-2954.16, 0.001).

[5] The negative sign of error correction term shows the convergence of the variables towards equilibrium in the long run

Table 11
Regression Results

	ARDL (1,1,1,1,1,0) regression		
	R^2 = 0.7009		
	Adj R^2 = 0.6075		
	Root MSE = 9.182e+05		
	Log likelihood = -645.05778		
D.GDP	Coef.	Std. err.	P-Value
ADJ			
GDP			
L1.	-1.0963	0.1556	0.000
LR			
EFDI	2863.63	1293.01	0.034
FCTR	2861.327	777.9473	0.001
SR			
EFDI			
D1.	-1760.25	940.1246	0.070
FCTR			
D1.	-2954.16	830.6726	0.001
__cons	1.11e+07	2445104	0.001

Source: Researcher's Computation, 2023

Granger Causality

Granger causality Wald test is presented in table 12. It revealed no directional flows between GDP (EcG) and EFDI, and between EFDI and FCTR. There is bidirectional Granger causality between GDP and FCTR.

Table 12
Granger Causality Results

Equation	**Excluded**	**Direction**	**Chi^2**	**Prob>Chi^2**
GDP	EFDI		0.615	0.433
EFDI	GDP		0.47828	0.489
GDP	FCTR	←	22.448	0.000
FCTR	GDP	←	10.494	0.001
EFDI	FCTR		2.2734	0.132
FCTR	EFDI		0.15278	0.696

Source: Researcher's Computation, 2023

Discussion

The long-run equilibrium relationship among the variables, and at 1% level of significance suggests that shocks or errors affecting EcG from previous period are speedily corrected in the current period in this study. The study's variables[6] explained over 60% of variation of EcG.

The result has mixed support for H1 which says, 'no significant association between EFDI and EcG.' It revealed strong direct association between EFDI and EcG in the long run, which failed to support H1. On the other hand, EFDI have insignificant inverse relationship with EcG in the short run, supporting H1. The long run association however, corroborated earlier studies that show FDI has positive and significant impact on EcG (Phimmavong, 2017; Mehdi Behname, 2012; Joutsen & Norling, 2014). The result suggests that increase (decrease) in EFDI will probably increase (decrease) EcG where other variables are held fixed in the long run but

[6] This includes the structural break control variables omitted from the tables.

increase (decrease) in EFDI will cause decrease (increase) in EcG in the short run where other variables are held constant.

The no-directional flows between EFDI and EcG supports H1 which says no direction of causality between EFDI and EcG. Thus, they will not cause themselves with changes in the other. The flow between GDP and FCTR are mutually related. It is such that changes in GDP will affect FCTR and conversely. Unidirectional causality running from EFDI to GDP corroborated Nadar (2021) that show unidirectional causality running from FDI to GDP per capita.

Policy Implication

Nigerian Government should encourage EFDI that have long-run positive impact on EcG. The weak negative influence of EFDI on EcG in the short run is probably due to insufficient EFDI expected to drive EcG upward. In this light, the study recommends enabling environment to attract foreign equity investors. The non-directional flows between EFDI and EcG is probably due to a third variable that is not factored into the model, that would have caused their causality: e.g., infrastructural facility, inflation, and exchange rate. Thus, interfering in EFDI is necessary to better EcG, and their causal relationship.

With FCTR strong positive bearing on EcG in the long run, expanding the tax base, encouraging value adding goods and services is recommended to increasing FCTR and probably EcG in the future. On the other hand, government should identify the variable factors that has caused strong inverse relation between FCTR and EcG in the short run and put them right.

From the long run result, just as a bad policy on GDP and EDFI may cause EcG decline, a good policy will enhance EcG. Since the desired is a positive EcG, government should carefully select the right GDP and EFDI policy that should enhance EcG.

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