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Effects of foreign direct investment on economic growth: evidence from Nigeria and Rwanda

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ABSTRACT

Rwanda economy is considered to be the fastest growing economy in Africa, with 7.8% growth rate in 2019 as reported in the 2019 publication of African Development Bank. In the recent times, there exists a deep comparison between Nigeria and Rwanda economies which makes it imperative to clear the air on the existing issue and employ the necessary empirical tests to substantiate or refute the argument. Hence, this study investigates the relationship between Foreign Direct Investment (FDI) and Economic Growth of both Nigeria and Rwanda. Time series data which were sourced mainly from World Bank, United Nations Conference on Trade and Development (UNCTAD) and National Bureau of Statistics (NBS) covering the period between 1970 and 2018 were used for this study. Growth models were developed for the two countries under study with the inclusion of Gross Domestic Product (GDP), Consumer Price Index (CPI), Net FDI Inflow and Total Export. Augmented Dickey-Fuller, Cointegration and Granger Causality tests for non-stationary time series were employed. The overall result depicts a long run relationship between FDI and GDP of both countries and FDI has a positive effect on Rwanda economy than that of Nigeria in the short-run but converse is the case in the long-run at 5% level of significance. Also, short-run causal relationship exists between the pairs of GDP, FDI, CPI and Total Export of Nigeria at 5% significance level. On the other hand, there exists a short-run causal relationship between GDP, FDI, CPI and Total Export of Rwanda at 5% level of significance. Hence, the study concludes that there is positive effect of FDI on Rwanda economic growth than that of Nigeria.

Keywords: *Economic Growth, Nigeria, Rwanda, FDI, and Cointegration*

Introduction

Palpably, Foreign Direct Investment (FDI) is one of the important economic boosters when it comes to economic growth and development of which its effects have been extensively demonstrated by several researches including Sauwaluck (2012), Muhammad et al. (2012), Sourangsu (2013), McSharry et al. (2016), Adeyemi (2018) and Mwesiigye and Mulyungi (2019) among others. However, performances of countries with respect to FDI are basically divergent owing to varied economic policy employed in different countries which may allow them to maximally benefit from FDI and to suit their respective interests. Although economists believe that the higher the FDI inflow to a country, the better the performance

provided the right policies are adopted and all things being equal, small economy is likely to perform better than large economy if same amount is invested to the economy. For instance, China's growth today was due to their economic reform since 1978 which attracted several high technologically advanced foreign investors from United States and Europe which added together to make China to be the world leading economy after United States today. This is not always the case when it comes to developing economies especially in Africa (see World Bank (2018) and Sourangsu, (2013)).

With little comparison, Nigeria is considered to be the richest country, most populated and as well has the biggest economy in Africa. However, her performance has not been really encouraging in the past few years when compared to some small economy like that of Rwanda (Evidence from International Monetary Fund (IMF), World Bank and African Development Bank (AfDB), 2019). Although, Rwanda is considered to be poor, less populated and has a smaller economy and to an extent, it was ranked 24th poorest country out of 180 countries in the world. Besides, Rwanda in 1994 recorded a genocide tragedy which claimed lives of more than one million individuals, together with mass destruction of assets and properties. Of course, rebuilding of such small and poor country requires the intervention of different countries and aids from international organizations or foreign investors. Thus, no research entities may argue with the fact that Rwanda will by all means find a way of attracting FDI for quick recovery and her growth rate during or after the process maybe relatively high.

In another note, since last 42 years, Nigeria's attention has majorly been from the extraction of oil and to an extent contributes more than 90% to her GDP. Without doubt, oil industry attracts the most of the FDI in the country. And from the literature of investment in Nigeria, Chevron, Texaco and ExxonMobil owned by United States investors have the largest foreign investments in Nigeria, followed by Shell from Netherlands, Total from France and ENI (Agip) from Italy. Meaning that United States and Western Europe are the main source of FDI in Nigeria and since 2004 Chinese oil investors have shown interest in this sector and that brought about the birth of China Petrochemical Corporation known as Sinopec in Nigeria. Yet, as at 2018, oil sector only accounted for 0.01% of the total employment in Nigeria which is against the campaign of United Nations (UN) on decent work and economic growths (G8) of the Sustainable Development Goals (SDGs) (see United Nations Conference on Trade and Development (UNCTAD; 2008) and National Bureau of Statistics (NBS; 2018)). Although, there are evidences of FDI in telecom and other industries from South Africa, India and China, however, their rate of inflow and their shares in the total export of Nigeria are relatively less than 10% UNCTAD (2008).

On the other hand, Rwanda is known for agricultural production since early 1980s and higher percentage of FDI has been from domestic service sector (ICT and Finance). However, as at 2014, mining sector attracted the largest inflow followed by ICT and tourism, and according to the Rwandan International Growth Centre Publication on FDI in 2016, Mauritius have the largest share of FDI stock which accounted for about 25.7% of the total FDI stocks in Rwanda, followed by South Africa with 14.2%, Luxembourg 10.9%, Kenya with 8.8% and the USA with 7.5% (see McSharry et al., 2016). This implies that, FDI inflow to Rwanda has majorly been from Africa and employments in industrial sector have increased over time (see Figure 1 in the appendix). Due to this, some Nigerians have come to belief that Rwanda is economically better than Nigeria and some considered it to be better place for young graduates in Africa to stay. Hence, it is pertinent that researchers validate or repudiate the claim empirically using appropriate

statistical techniques and procedures. This study will be significant to both Governments and citizens of the two countries under study and provides pragmatic avenue to make comparison between the two nations locally and internationally.

Materials and Methods

The dataset used for this study was extracted from World Bank, UNCTAD and National Bureau of Statistics (NBS) with time ranges between 1970 and 2018. Most relevant empirical studies have employed unit root tests over time (see Ayanwale (2007), Shahjahan et al. (2015), Adeyemi (2018) and Mwesiigye and Mulyungi (2019)). Hence, this study also adopts the unit root tests for the variables under study in each country and the result is interpreted with respect to Ordinary Least Squares (OLS) method. The underlying growth model for the study is given thus:

$$\boldsymbol{RGDP = F(FDI, CPI, EXPT)} \quad \textbf{(1)}$$

where, RGDP is Real Gross Domestic Product, FDI is Foreign Direct Investment, CPI is Consumer Price Index and EXPT is Total Exports of the countries under study.

By taking the natural logarithms of the variables, equation 1 becomes equation 2 as given below;

$$\boldsymbol{ln\, RGDP_t = \beta_0 + \beta_1\, ln\, FDI_t + \beta_2\, ln\, CPI_t + \beta_3\, ln\, EXPT_t + \varepsilon_t} \quad \textbf{(2)}$$

Where β_i for i = 0, 1, 2, and 3 are the coefficients of the model and ε_t is the error term.

Augmented Dickey-Fuller (ADF) Unit Root Tests

Here, it should be noted that before subjecting our data to stationarity test, it is necessary to perform a spurious analysis by plotting of the graph to know the kind of trend in the data and observe the Durbin-Watson (DW) statistic and Coefficient of Determination (R^2). If $R^2 > DW$ then it is a signal of non-stationarity. Theoretically, as stated by Holmes et al. (2020), Augmented Dickey-Fuller (ADF) is the advanced version of ordinary Dickey-Fuller (DF) which allows test for Autoregressive (AR) model of higher order (see Garba et al, 2020). Here, it is assumed that the variables under study are not stationary and we will ascertain this claim using library (urca) in R statistical package at 5% level of significant. Mathematically, the general model for DF-(AR1) is given by:

$$\boldsymbol{Y_t = \alpha + \beta t + \gamma Y_{t-1} + \varepsilon_t} \quad \textbf{(3)}$$

where Y_t is the variable to be tested at year t, $Y_{(t-1)}$ is the variable to be tested at year t-1, α is the constant of the model, β is the coefficient of time trend, γ is the coefficient of lag variable and ε_t is the error term. If α and β = 0 then, the entire equation 3 becomes a random walk model.

The hypotheses for DF model are stated as: Ho: γ=1 vs H1: γ<1

If the variable to be tested is not stationary, the model will not follow the central limit theorem, thus, makes the model very complicated to estimate. Therefore, as stated by Johansen (1991), it is required to find the difference of the variable involved and if higher lag will be required, this will lead to ADF model. Hence, for simplicity, equation 3 can be re-written as equation 4:

$$\boldsymbol{\Delta Y_t = \alpha + \beta t + \gamma Y_{t-1} + \delta_1 \Delta Y_{t-1} + \delta_2 \Delta Y_{t-2} + \delta_3 \Delta Y_{t-3} + \ldots + \delta_{p\text{-}1} \Delta Y_{t-p+1} + \varepsilon_t} \quad \textbf{(4)}$$

where $\Delta Y_t = Y_t - Y_{(t-1)}$ is first-difference of variable Y_t, p is the lag order and δ is coefficient of the lag variables.

Based on the aforementioned associated hypotheses with equation 3, the corresponding hypotheses associated with equation 4 are given by: Ho: $\delta=0$ vs H1: $\delta<0$.
In conclusion, in order to ease the analysis, after plotting the graphs of the data to see their respective behaviour, ***ndiffs()*** command in ***library(forecast)*** in R was used to determine the number of differences (d) required if by peradventure, the variables under study did not pass the ADF stationarity test.

Co-integration Tests

As stated by Abraham (2018), after the stationarity test has been established, "the question of whether a long-run relationship exists among the variables arises". Theoretically speaking, co-integration test is used to verify the existence of a long-run relationship among the variables. Though, there exist some methods of investigating the existence of co-integration among which includes; Engle-Granger Two-steps (co-integrated Augmented Dickey-Fuller) and Johansen test. However, this study employed Johansen's co-integration techniques to indorse the relationship among the variables at 5% level of significant. Here, it should be noted that the variable to be tested must be non-stationary and all the variables should be integrated at the same order. For instance, Johansen (1991) and Pfaff (2008) made it clear that, after the time series variables under study failed the stationarity tests, then they should be integrated after the first-difference (I(1)).

Vector Error Correction Model (VECM)

From the literature, Error Correction Model (ECM) is an appropriate strategy which accounts for both short-run and long-run fluctuations in a model (Shahjahan et al.; 2015). Considering the original model in equation 1, the error correction model for this study is given by:

$$\Delta \ln RGDP_t = \beta_0 + \beta_1 \Delta \ln FDI_t + \beta_2 \Delta \ln CPI_t + \beta_3 \Delta \ln EXPT_t + \beta_4\, e(-1) + \varepsilon_t \qquad (5)$$

Where Δ denotes the first difference sign, e(-1) is the lagged error term which was gotten from the spurious regression of the OLS in Appendix B and its coefficient β_4 is assumed to be negative and significant in the model while other variable remain the same as defined earlier. The coefficient β_4 can otherwise be called "Speed of Adjustment" to the shocks in the economy.

Granger Causality Tests

Granger causality is an econometric approach used to determine the short-run effects (dynamics) between two or more variables after confirming the existence of a long-run (cointegration) relationship between them. This is in line with definition given by Shahjahan et. al. (2015). Thus, variable X is said to granger cause variable Y if and only if X can be used to predict Y and a change in X will affect Y. Here, it is assumed that there is no causality between the variables, it is therefore important to subject this assumption to test using chi-squared statistic at 5% level of significant and the null hypothesis is rejected if the P-value is less than 5%.

Results and Discussion

Test for Stationarity

After plotting the graphs of the data to see their respective behavior as stated in section 2.1, ***ndiffs()*** command in ***library(forecast)*** in R was used to determine the number of difference's required if by peradventure, the variables under study did not pass the ADF stationarity test. The result shows that the number of differences

required for the variables to be stationary is one and this was supported by ADF results. Hence, the ADF results in Table 1 depicted that all the variables under study both in Nigeria and Rwanda were found to be non-stationary at 5% level of significant and they failed to be integrated at order zero I(0). However, they became stationary after the first difference.

Then, since ADF test statistic of the respective variables are lower than critical value at 5% level of significant, it can therefore be concluded that the variable GDP, EXPT, FDI and CPI both in Nigeria and Rwanda are not stationary and are all integrated at first I(1) order. Hence, it became imperative to further investigate the existence of long-run equilibrium relationship between the variables.

Table 1: Augmented Dickey-Fuller Unit Root Test.

Variables	Nigeria			Rwanda		
	Level I(0)	F-D I(1)	Critical Value	Level I(0)	F-D I(1)	Critical Value
CPI	-1.6749	-4.1176	-2.93	-2.6485	-4.1304	-2.93
FDI	-1.5062	-4.9775	-2.93	-2.1348	-7.1238	-2.93
EXPT	-2.7433	-4.6282	-2.93	-1.2038	-4.7191	-2.93
GDP	-1.3003	-3.176	-2.93	-1.272	-5.1307	-2.93

Reject null hypothesis if ADF test statistic < critical-value at 5% level of significance
It should be noted that the null hypothesis for ADF test is that the series are not stationary, then level I(0) was tested with trend (see Figures 2a & 2b) and I(1) with drift (see Figures 3a & 3b), and that I(0) critical value for respective variables = -3.05.

Johansen's Co-integration Test

The result of the Johansen cointegration test in Table 2 depicts that, all the variables under study both in Nigeria and Rwanda are cointegrated. This is due to the respective values of both maximum eigenvalue and trace test statistic that were greater than the critical value at 5% level of significant. Hence, the null hypothesis was rejected. However, for the fourth hypothesis ($r \leq 3$), as the test statistic of maximum eigenvalue and trace are less than the critical value at 5% level of significant, the null hypothesis cannot be rejected and it can be concluded that there are at most three equations that are co-integrated or there are at most three linear combinations of variables that are co-integrated. (See Tables 8 and 9 in appendix B for the three cointegration equations).

Hence, it can be concluded that there is existence of a long-run relationship among the economic variables NGDP, NFDI, NCPI and NEXPT of Nigeria, Likewise among the economic variable RGDP, RFDI, RCPI and REXPT of Rwanda.

Table 2: Co-integration tests

Country	Null Hypothesis	Max-Eigen Statistic	Critical Value	Trace Statistic	Critical Value
Nigeria	$r \leq 3$	7.57	9.24	7.57	9.24
	$r \leq 2$	18.36	15.67	25.93	19.96
	$r \leq 1$	41.37	22.00	67.30	34.91
	$r = 0$	56.77	28.14	124.08	53.12
Rwanda	$r \leq 3$	8.50	9.24	8.50	9.24
	$r \leq 2$	21.44	15.67	29.94	19.96
	$r \leq 1$	35.90	22.00	65.84	34.91
	$r = 0$	44.86	28.14	110.70	53.12

Reject the null hypothesis if the computed statistics are greater than their corresponding critical values at 5% level of significance.

Also, the normalized long-run equations 7 and 9 pertaining to FDI effect on GDP respectively, depict that, FDI inflow to Nigeria has a positive effect on Nigeria's economy and similarly FDI inflow to Rwanda has a positive effect on Rwanda's economy in the long-run. However, since the coefficient of Nigeria FDI (0.3672) is more than that of Rwanda (0.0361) then it can be said that FDI has more positive effect on Nigeria economy than it does on Rwanda economy in the long-run. Hence, it is necessary to check the short-run effects (disequilibrium) using coefficient test ***coeftest()*** function of the error correction model in R.

$$NGDP = -12.2112 - 0.3672NFDI - 0.0067NCPI + 0.2356NEXPT \quad (6)$$

$$NGDP + 12.2112 + 0.3672NFDI + 0.0067NCPI - 0.2356NEXPT > 0 \quad (7)$$

$$RGDP = -4.8452 - 0.0361RFDI - 0.1199RCPI - 0.4698REXPT \quad (8)$$

$$RGDP + 4.8452 + 0.0361RFDI + 0.1199RCPI + 0.4698REXPT > 0 \quad (9)$$

Error Correction Model (ECM)

According to results portrayed in Table 3, despite the long-run relationships that exist among the economic variables of Nigeria, it was discovered that, a short-run disequilibrium also exists between the pairs of NGDP, NFDI, NCPI and NEXPT of Nigeria since the coefficients are not really significant at 5%. This implies that FDI will not have positive effect on Nigeria economy in short-run. On the other hand, since most of the coefficients of the economic variables RGDP, RFDI, RCPI and REXPT of Rwanda are significant at 5%, it shows that there is a short-run relationship between the pairs of economic variables RGDP, RFDI, RCPI and REXPT of Rwanda. Also, considering the speed of adjustment e(-1) in Table 3, since the coefficient of Rwanda (0.0345) is more than that of Nigeria (0.0163), it can be inferred that the time (year) of economic shocks recovery in Rwanda is more than that of Nigeria.

Table 3: Coefficient Test of Error Correction Model.

Nigeria		Rwanda	
Coefficient	Estimate	Coefficient	Estimate
Intercept	-0.0812785 (0.0209012) *	Intercept	-0.2728181 (0.0003771)***
L(d(NFDI)_1	-0.0857602 (0.2101564)	L(d(RFDI)_1	-0.0868397 (7.808e-05) ***
L(d(NFDI)_2	-0.0857602 (0.2101564)	L(d(RFDI)_2	0.0039568 (0.8136495)
L(d(NFDI)_3	0.0556607 (0.0864470).	L(d(RFDI)_3	0.0373777 (0.0462470) *
L(d(NFDI)_4	-0.0222257 (0.0619503) .	L(d(RFDI)_4	0.0052239 (0.7722391)
L(d(NFDI)_5	-0.0222257 (0.0619503) .	L(d(RFDI)_5	-0.0431889 (0.0930398).

Nigeria		Rwanda	
L(d(NFDI)_6	-0.0881764 (0.0858853).	L(d(RFDI)_6	-0.0798973 (0.0087538) **
L(d(NFDI)_7	-0.0269551 (0.5047376)	L(d(RFDI)_7	-0.0731919 (0.0034636) **
L(d(NFDI)_8	0.0283546 (0.0018803) **	L(d(RFDI)_8	-0.0106332 (0.0554450) .
L(d(NCPI)_1	0.2126671 (0.2890727)	L(d(RCPI)_1	0.2570539 (0.1271416)
L(d(NCPI)_2	-0.2928645 (0.0826369) .	L(d(RCPI)_2	0.2487005 (0.0739728) .
L(d(NCPI)_3	0.1820712 (0.2388213)	L(d(RCPI)_3	-1.1197213 (1.735e-05) ***
L(d(NCPI)_4	-0.4093661 (0.2774364)	L(d(RCPI)_4	1.5651595 (0.0001272) ***
L(d(NCPI)_5	0.6314887 (0.1101495)	L(d(RCPI)_5	-0.4154196 (0.1401742)
L(d(NCPI)_6	-0.1836241 (0.1631598)	L(d(RCPI)_6	1.3700452 (0.0007117)***
L(d(NCPI)_7	0.1189484 (0.4142544)	L(d(RCPI)_7	0.5655481 (0.0707828) .
L(d(NCPI)_8	-0.2140596 (0.2128788)	L(d(RCPI)_8	0.5629643 (0.0111642) *
L(d(NEXPT)_1	-0.0238753 (0.2115912)	L(d(REXPT)_1	0.2654235 (0.0071217) **
L(d(NEXPT)_2	-0.0293347 (0.0033018) **	L(d(REXPT)_2	0.2440642 (0.0040236) **
L(d(NEXPT)_3	0.0324644 (0.0297392) *	L(d(REXPT)_3	0.4175586 (0.0001513) ***
L(d(NEXPT)_4	-0.0131400 (0.5476646)	L(d(REXPT)_4	0.4545807 (0.0015523) **
L(d(NEXPT)_5	-0.0189594 (0.4332319)	L(d(REXPT)_5	0.3280831 (0.0012925) **
L(d(NEXPT)_6	0.1236965 (0.0006862) ***	L(d(REXPT)_6	0.6483928 (7.619e-05) ***
L(d(NEXPT)_7	0.1281735 (0.0165535) *	L(d(REXPT)_7	0.5896223 (0.0046077) **
L(d(NEXPT)_8	-0.0041207 (0.7975093)	L(d(REXPT)_8	0.3718847 (0.0317670) *
L(d(NGDP)_1	0.5498871 (0.0277841) *	L(d(RGDP)_1	-0.1163622 (0.2535963)
L(d(NGDP)_2	0.4251954 (0.3336748)	L(d(RGDP)_2	-1.5187536 (0.0019325) **
L(d(NGDP)_3	-0.1266043 (0.2189776)	L(d(RGDP)_3	-1.9705150 (2.743e-05) ***
L(d(NGDP)_4	-1.1484609 (0.0865716) .	L(d(RGDP)_4	-0.6924845 (0.0361000) *
L(d(NGDP)_5	0.2722407 (0.0167871) *	L(d(RGDP)_5	-0.4699971 (0.0552559) .
L(d(NGDP)_6	-0.4555032 (2.783e-05) ***	L(d(RGDP)_6	-0.3313885 (0.1326548)
L(d(NGDP)_7	-0.5508177 (0.0427430) *	L(d(RGDP)_7	-0.3704514 (0.1537019)
L(d(NGDP)_8	-0.2981230 (0.3392623)	L(d(RGDP)_8	-0.6152982 (0.0009149) ***
e(-1)	-0.0163172 (0.0105539) *	e(-1)	-0.0344530 (0.0002050) ***
R-squared = 0.8552		R-squared = 0.8862	
Adjusted R-squared = 0.05868		Adjusted R-squared = 0.2601	
Durbin-Watson = 1.9438		Durbin-Watson = 1.6031	

*Note: ***, ** and * represent < 1%, 1% and 5% level of significance respectively.*

OLS Regression of the Impact of FDI on the Economy of Nigeria and Rwanda.

As shown in Table 4, both FDI and Export variables have a positive effect on Rwanda economy at 5% level of significance which implies that a unit increase in FDI will increase the Rwanda economy by 0.040579, a unit increase in CPI will decrease the economy by 0.284760 and an increase in export will increase the economy by 0.175264.

Table 4: OLS Regression of the differenced data (short-run)

Nigeria Dependent variable = D(NGDP)			Rwanda Dependent variable = D(RGDP)		
Variable	Coefficient	P-value	Variable	Coefficient	P-value
Constant	0.046042	0.000904 ***	Constant	0.049241	0.0011**
D(NFDI)	-0.005399	0.726414	D(RFDI)	0.040579	0.0000***
D(NCPI)	-0.103698	0.111564	D(RCPI)	-0.284760	0.0179*
D(NEXPT)	0.050394	0.010228 *	D(REXPT)	0.175264	0.0002***
R-squared = 0.1976 Adjusted R-squared = 0.1429 Durbin-Watson = 1.4271 F-statistic = 3.612 P-value= 0.0204			R-squared = 0.8000 Adjusted R-squared = 0.7864 Durbin-Watson = 1.871 F-statistic = 58.68 P-value < 0.0001		

*Note: ***, ** and * represent < 1%, 1% and 5% level of significance respectively.*

On the other hand, only the Export in Nigeria has a positive impact on the economy while both FDI and CPI have a negative impact on Nigeria economy in short-run at 5% level of significance. Meaning that a unit increase in FDI will decrease Nigeria economy by 0.005399, a unit increase in CPI will decrease the economy by 0.103698 and an increase in export will increase the economy by 0.050394.

Granger Causality Tests

Apart from NGDP which doesn't granger cause NCPI and NCPI does not granger cause NEXPT from the results in Table 5, it was discovered that a short-run causal relationship exists between the pairs of NGDP, NFDI, NCPI and NEXPT of Nigeria. On the other hand, there exists a short-run causal relationship between RGDP, RFDI, RCPI and REXPT of Rwanda. However, the export variable has no causal effect on GDP and FDI of Rwanda in the short-run.

Table 5: Granger causality Wald tests

Equation	**Nigeria Excluded**	**Chi-Sq**	**df**	**Prob**	**Equation**	**Rwanda Excluded**	**Chi-Sq**	**df**	**Prof**
d_NGDP	d_NFDI	26.445	8	0.001	d_RGDP	d_RFDI	41.432	8	<0.0001
d_NGDP	d_NCPI	12.021	8	0.150	d_RGDP	d_RCPI	35.881	8	<0.0001
d_NGDP	d_NEXPT	36.607	8	<0.0001	d_RGDP	d_REXPT	37.719	8	<0.0001
d_NGDP	ALL	87.097	24	<0.0001	d_RGDP	ALL	149.28	24	<0.0001
d_NFDI	d_NGDP	114.68	8	<0.0001	d_RFDI	d_RGDP	64.053	8	<0.0001
d_NFDI	d_NCPI	100.63	8	<0.0001	d_RFDI	d_RCPI	69.319	8	<0.0001
d_NFDI	d_NEXPT	137.18	8	<0.0001	d_RFDI	D_REXPT	60.261	8	<0.0001
d_NFDI	ALL	295.21	24	<0.0001	D_RFDI	ALL	226.7	24	<0.0001
d_NCPI	d_NGDP	33.238	8	<0.0001	D_RCPI	D_RGDP	30.165	8	<0.0001
d_NCPI	d_NFDI	20.059	8	0.010	d_RCPI	D_RFDI	38.018	8	<0.0001
d_NCPI	d_NEXPT	14.236	8	0.076	d_RCPI	d_REXPT	14.394	8	0.072
d_NCPI	ALL	68.72	24	<0.0001	d_RCPI	ALL	69.816	24	<0.0001
d_NEXPT	d_NGDP	46.294	8	<0.0001	d_REXPT	d_RGDP	9.7138	8	0.286
d_NEXPT	d_NFDI	34.439	8	<0.0001	d_REXPT	D_RFDI	11.219	8	0.190
d_NEXPT	d_NCPI	20.532	8	0.009	d_REXPT	d_RCPI	16.004	8	0.042
d_NEXPT	ALL	85.791	24	<0.0001	d_REXPT	ALL	49.07	24	0.002

Conclusion and Policy Implications

Based on the results obtained from the analyses, it was discovered that FDI inflow to Rwanda has a positive impact on her economic growth both in the long-run and short-run while FDI inflow to Nigeria only has a positive effect on the economic growth in the long-run and a negative effect on Nigeria economy in the short-run. Hence, there is statistical evidence to deduce that Rwanda is performing better than Nigeria in terms of FDI impact on economic growth. This is in agreement with popular notion that Rwanda is economically better than Nigeria. The employment rate Nigerian industries is deteriorating and that of Rwanda has significantly improved overtime, even though the employment remunerations in Rwanda may be less than that of Nigeria due to exchange rate effect and richness of the country, Rwanda may still be considered a better place for young graduates in Africa to stay and pursue their careers.

Having established the economic implications of setting the right policy on FDI in order to assess its impact on the economy, it is highly recommended for the Nigerian government to review their policy on foreign investments as its inflow to the country in order to enhance improved economy. Instead of paying huge subsidies by the Government on the products of foreign investors for the citizens to afford the products, the government should continue to find a way of attracting the foreign investments which can be producing the affordable products for the benefits of the masses and improvement of local market. It is also recommended for the Rwanda government to continue their relentless efforts on FDI policy employed which is currently impacting positively on their economy for the purpose of their international recognition in future.

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APPENDIX A

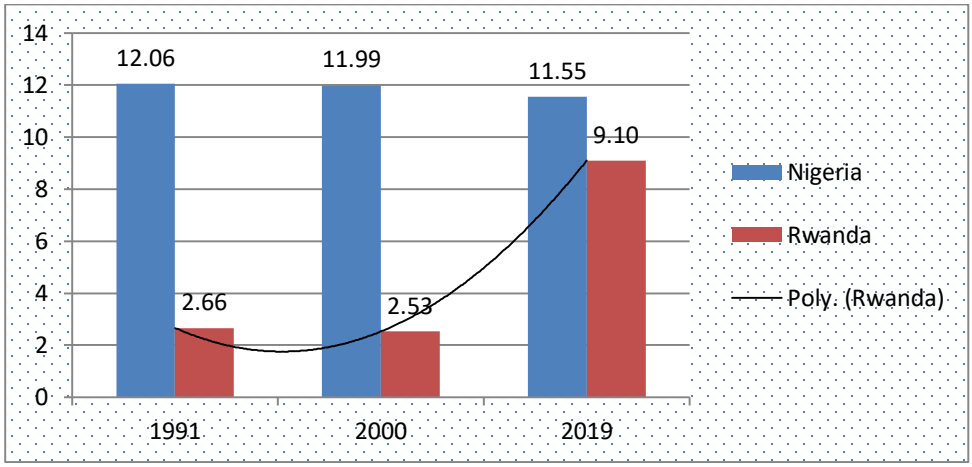

Figure 1. Percentage of Employment in industry (modeled ILO estimate)
Source: World Bank.

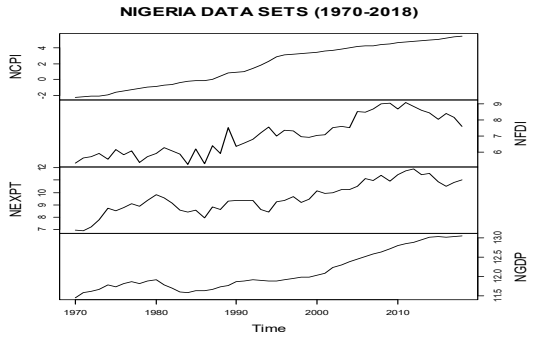

Figure 2a: Nigeria Raw Data

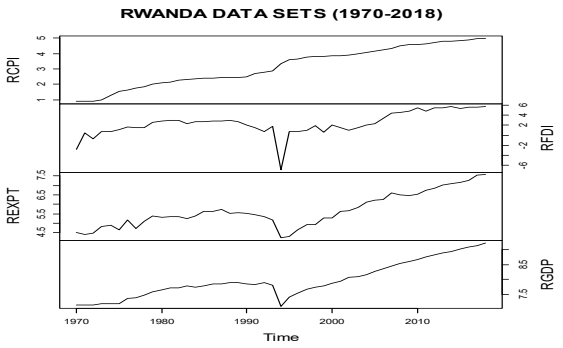

Figure 2b: Rwanda Raw Data

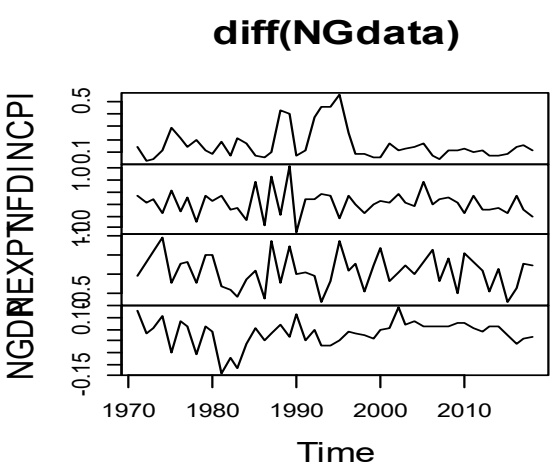

Figure 3a: Nigeria Differenced Data

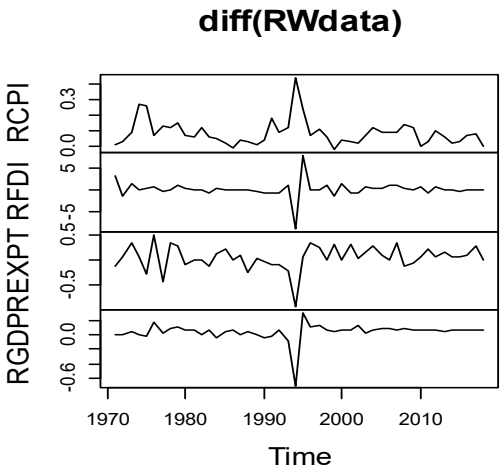

Figure 3b: Rwanda Differenced Data

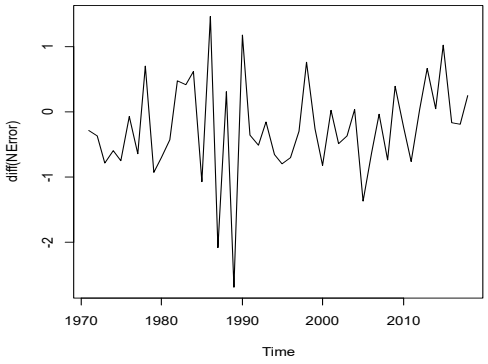

Figure.4a

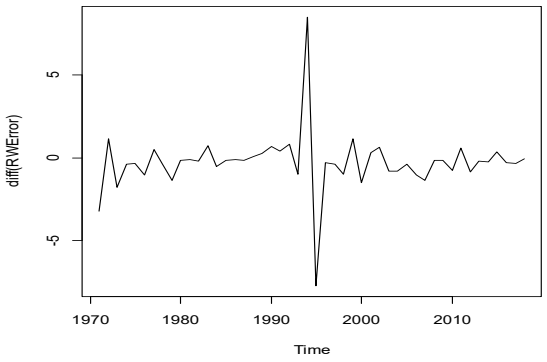

Figure.4b

APPENDIX B (Results Output)

Nigeria Spurious Regression

Spur1=dynlm(NGDP~NFDI+NCPI+NEXPT)
Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	9.57292	0.44295	21.612	< 2e-16	***
NFDI	0.07488	0.06286	1.191	0.239779	
NCPI	0.05106	0.02745	1.860	0.069387	.
NEXPT	0.20201	0.04866	4.151	0.000145	***

Residual standard error: 0.1978 on 45 degrees of freedom
Multiple R-squared: 0.8493, Adjusted R-squared: 0.8393
F-statistic: 84.54 on 3 and 45 DF, p-value: < 2.2e-16
Durbin watson= 0.2726

Rwanda Spurious Regression

spur2=dynlm(formula = RGDP ~ RFDI + RCPI + REXPT)
Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	4.976149	0.135242	36.795	< 2e-16	***
RFDI	0.025784	0.009311	2.769	0.00813	**
RCPI	0.139191	0.014545	9.570	2.03e-12	***
REXPT	0.439922	0.031778	13.844	< 2e-16	***

Residual standard error: 0.07854 on 45 degrees of freedom
Multiple R-squared: 0.9836, Adjusted R-squared: 0.9825
F-statistic: 900.4 on 3 and 45 DF, p-value: < 2.2e-16,
Durbin watson = 1.0239

Table 6: Johanson's Cointegration Relations for Nigeria

Equation	NGDP.l8	NFDI.l8	NCPI.l8	NEXPT.l8	constant
NGDP.l8	1	1	1	1	1
NFDI.l8	-0.36723	0.26361	0.186368	-0.18749	-0.60155
NCPI.l8	-0.00671	-0.02611	-0.42296	0.02013	0.182485
NEXPT.l8	0.235623	-0.43344	-0.39976	-0.01049	-0.13407
constant	-12.2112	-9.61914	-9.29225	-10.4962	-6.90695

Eigenvectors, Normalized to First Column

Table 7: Johanson's Cointegration Relations for Rwanda

	RGDP.l8	RFDI.l8	RCPI.l8	REXPT.l8	Constant
RGDP.l8	1	1	1	1	1
RFDI.l8	-0.03615	0.102934	-0.15108	-0.02547	-0.18246
RCPI.l8	-0.11988	-0.10556	-0.23002	-0.15459	-0.24745
REXPT.l8	-0.46983	-0.75455	-0.11487	-0.47049	0.045953
constant	-4.8452	-3.63581	-6.1921	-4.8821	-7.06962

Eigenvectors, Normalized to First Column

Table 8: VECM Cointegration Equations for Nigeria

Equation	ect1	ect2	ect3
NGDP.l8	1.00E+00	-2.78E-17	0.00E+00
NFDI.l8	-4.08E-17	1.00E+00	7.61E-17
NCPI.l8	-1.50E-18	2.29E-18	1.00E+00
NEXPT.l8	-1.52E-01	-1.06E+00	1.21E-01
constant	-1.07E+01	4.06E+00	-1.61E+00

Table 9: VECM Cointegration Equations for Rwanda

Equation	ect1	ect2	ect3
RGDP.l8	1.00E+00	-2.22E-16	0.00E+00
RFDI.l8	1.05E-17	1.00E+00	6.05E-17
RCPI.l8	6.41E-17	6.94E-17	1.00E+00
REXPT.l8	-6.85E-01	-1.92E+00	-1.22E+00