International Journal of Development and Economic Sustainability
Vol.6, No.5, pp. 70-78, November 2018
Published by European Centre for Research Training and Development UK (www.eajournals.org)

REAL EFFECTIVE EXCHANGE VOLATILITY AND FDI SUSTAINABILITY: IMPLICATIONS FOR THE NIGERIAN ECONOMY

Victor E. Oriavwote (PhD) and Andrew Ukawe

[1]Department of Economics and Development Studies, Faculty of Humanities and Social Sciences, Federal University Otuoke, P.M. 126 Yenagoa, Bayelsa State, Nigeria.
[2]Department of Economics, College of Education, Warri, Delta State, Nigeria

ABSTRACT: *The paper investigates the empirical evidence of Real Effective Exchange Rate Volatility and FDI inflow into Nigeria. The vital role of FDI in bridging the development gap and the impediment caused by the volatility in the Real Effective Exchange Rate have been attested to by various literature There has been no consensus by studies in this issue as regards whether Real Effective Exchange Rate volatility has a negative or positive effect on the FDI. In addition, the investigation of such relationship has been grossly ignored in the Nigerian literature The main objective is thus to empirically investigate the relationship between the volatility in the Real Effective Exchange Rate and the level of FDI in Nigeria. The study covered the period between 1981 and 2016. The Ordinary Least Squares technique was used in analyzing the data. Specifically, the ECM and the cointegration models were adopted. The results indicate that the one period lagged FDI has a significant and positive impact on the current FDI. The REER has an insignificant and positive impact on the FDI. The REERV has a significant and negative impact on the FDI. The result indicates further that the REERV has a negative and significant impact on the FDI. Openness of the economy o has a positive and significant impact on the REER The paper recommends a production based devaluation of the Nigerian REER.*

KEYWORDS: Real Effective Exchange Rate, Real Effective Exchange Rate volatility, Foreign Direct Investment, Error Correction Mechanism, Openness

INTRODUCTION

Attracting Foreign Direct Investment (FDI) has been a major policy focus in many countries in Africa, Nigeria inclusive. The stability of the Real Effective Exchange Rate (REER) is key towards ensuring inflow of foreign capital into Nigeria. Adegbite and Ayade (2010) noted that by filling the investment gap, FDI can help in increasing the revenue of Nigeria. Other benefits of FDI include those of externalities and transfer of technology (Alobari et al, 2016). FDI can also assist developing countries including those in Africa to finance the savings gap. Also, Feldstein (2000) noted that the international inflow of FDI lowers the risk experienced by the owners of capital because it enables them to diversify their investment and lending. FDI is important since no nation exists in complete isolation. All nations of the World are directly or indirectly connected through assets and goods market facilitated through trade and exchange rate (Mbanefo and Obioma, 2017). Many countries in Sub Saharan Africa, including Nigeria are experiencing the scarcity of foreign capital inflow and this has negatively affected the level of economic progress. The lack or deficiency of competitiveness that resulted from an appreciated or even overvalued Real Effective Exchange Rate (REER) constitutes a major hindrance to the inflow of foreign capital into Nigeria. In a situation of flexible exchange rate, appreciation in the REER is due to appreciation of the nominal exchange rate. In addition,

Print ISSN: 2053-2199 (Print), Online ISSN: 2053-2202(Online)

when there is a regime of fixed exchange rate, appreciation of the REER is due to an increase in the inflation rate caused by an increase in the supply of money (Edwards, 1998, Agenor, 1998). Appreciations as well as fluctuations in the REER reduce competitiveness, increase the deficits in the current account and worsen the vulnerability to financial crisis. This has negatively affected the inflow of foreign capital. Significant appreciation of the REER caused sudden decline in foreign capital inflow. This has caused a sudden adjustment in the current account. Apart from the negative impact of significant appreciation of the REER on foreign capital inflow, significant appreciations in the REER constitutes great problem for macroeconomic management (Jean, Patrick and Tidiane, 2011). In addition, an appreciation of the REER makes the exports from Nigeria to be less competitive. Thus, our exports become more expensive than our imports. This constitutes macroeconomic problems in Nigeria. Volatility in the REER has negative impact on domestic exports as a result of uncertainty from returns from investment (Muhammad et al, 2014). The high level of REER volatility in Nigeria has hindered the operating environment for foreign investment. This has affected both domestic and foreign investors. The World Bank stated that while the global share of FDI to developing countries have increased over the years, the share to Nigeria has been fluctuating, recording decline in most of the cases. For example, out of US$25b FDI inflow to all developing nations, in 1990, Nigeria's share was US$0.6B or 2.4 percent. By 1994, with a flow of US$67.6b, Nigeria's share declined to US$1.3b or 1.9 percent. The share was just 0.97 percent in 2016 (World Bank 1998, 2017, Osinubi, 2009). This decline has been attributed to the volatility of the REER. In both the fixed and flexible exchange rate regimes, the REER has fluctuated with Foreign Direct Investment in most of the study period. The percentage of average net capital inflow was approximately -1.15 percent in the early 1980s but increased to a peak of 1.20 percent in 1985. During the last part of the 1990s, the average of the annual net FDI inflow was N262b at the last quarter of 1999. The figure was N269.8b in 2005 (Fredrick, Okeke and Sheriff, 2010). The overreliance on crude oil as a major source of exports has made our REER and FDI to be less competitive. Studies on the impact of REER volatility on FDI inflow has not been conclusive. Some studies are of the opinion that REER volatility has positive impact on FDI inflow. Others are of the view that REER volatility has a negative impact on the FDI inflow. A positive effect of REER on FDI can be justified on the premise that FDI is export substituting. Thus, increase in REER volatility between the headquarters and the host nation will encoruage foreign companies to serve the host country through a local production facility instead of exports, thereby protecting against currency risk (Foad, 2005, Osinubi, 2009). A justification of a negative impact of REER on FDI can be seen in the literature of irreversibility postulated by Dixit and Pindyck (1994). They noted that a direct investment in a country with a high level of REER volatility will have a more risky stream of profits. So long as the investment is partly irreversible, there is a positive value to holding off on this investment to acquire more information. Since there is a given, known or finite number of likely direct investments, nations with a high degree of currency risk will lose out in FDI to nations with more stable experience (Foad, 2005). Nigeria is in the category of countries with a high currency risk. With a population of over 180 million people, Nigeria has the highest market in West Africa. This link between REER movement and lack of competitiveness of our FDI has been given less attention. This makes this study on the importance of REER volatility and FDI to be important. The main objective is thus to empirically investigate the relationship between the volatility in the REER and the level of FDI in Nigeria. Following this introduction, the first section reviews the literature while the materials and methods forms the second section, the result and findings constitutes the third section while the fourth section concludes the paper.

Print ISSN: 2053-2199 (Print), Online ISSN: 2053-2202(Online)

LITERATURE REVIEW

The channels through which the REER affects foreign capital inflows have received several theoretical and empirical attentions. The common view is however that devaluation of currency in the recipient country increases the capital inflow while an appreciation results in a decline in foreign capital inflow. Devaluation in the receiving county's currency leads to a decline in domestic cost of production when compared to foreign currency, thus improving the profits from exports for foreign investors (Froot and Stein, 1991). This higher return on investment naturally attracts even more capital inflow from the rest of the World. The wealth effect also rises with devaluation since the inputs in the production process are now cheaper (Ogun, Egwaikhide and Ogunleye, 2010). Silvia and Nguyen (2017) investigated FDI inflow as well as exchange rate volatility in 10 Latin American countries between the period of 1990 to 2012. The panel least squares was used. The fixed effect result indicated a confirmation of the theory of hysteresis and option value. Exchange rate volatility was statistically significant in explaining the changes in the FDI. Osunubi and Amaghiongeodiwe, (2009) studied FDI and exchange rate volatility in Nigeria between the 1970 and 2004 period. The OLS technique was used. The results suggests that real inward FDI has a negative and positive impact on FDI. Murtala (2017) assessed exchange rate fluctuations and FDI in Nigeria. The study span the period between 1990 and 2015. The study concludes that exchange rate, FDI and GDP are positively correlated. Olusuyi, Samuel and Akinbobola, 2006) assessed exchange rate volatility and capital inflows with special focus on their interactive effect. The General Method of Moments (GMM) was used. The result revealed that exchange rate volatility has significant and interactive impact on FDI. Dollar exchange rate volatility and FDI was the focus of the study by Okenyis and Stella, 2010. The study focused on the Nigerian economy and used the Autoregressive Conditional Heteroskedasticity (GARCH). The study covered a 39 year period and revealed that exchange rate volatility affected FDI. Jose (2015) assessed Real Exchange Rate volatility and FDI inflow in Brazil between 1976 and 2013. The research used the Autoregresive Distributed Lag (ARDL) model. It found that Real Exchange Rate volatility has a statistically significant impact on FDI inflow into Brazil both in the long run and short run. The research by Jean-Louis, Patrick and Tidiane (2011) focused on the impact of capital flows on the REER for 42 developing countries. The panel least technique was adopted in analyzing the data. The result revealed that both public and private inflows caused an appreciation of the REER. Alobari, et al examined the implications of exchange rate and FDI for economic growth. Using the OLS, the study found positive and significant relationship between FDI, exchange rate and economic growth. The study by Mbaneso and Obioma (2017) focused on the relationship between exchange rate fluctuation and Foreign Private Investment (FPI). Using the two stage least squares (2SLS), the study found a negative relationship between FPI and exchange rate fluctuation. The relationship between RER and FDI in Sub-Saharan Africa forms the basis of the study by Ogun, Egwaikhide and Ogunleye, 2010). Using the granger causality and the simultaneous estimation technique, the result revealed statistical dependence between RER and FDI for few of the countries. The regression result shows a significant relationship between these two variables. Chineze (2017) investigated the association between foreign exchange volatility and FDI in Nigeria between the period of 1999 to 2016. The result revealed that fluctuation in exchange rate has a positive and significant impact on FPI in Nigeria. Fredrick , Okeke and Sheriff (2015) investigated exchange rate dynamics and capital inflows between the period of 1970 and 2010. Using the GARCH model and the OLS technique, the study found that trade openness has more impact on FDI than the exchange rate Muhammad et al (201) studied the relationship between exchange rate and FDI in Pakistan between the period of 1982 and 2015? The OLS technique was used. The result revealed positive and significant

Print ISSN: 2053-2199 (Print), Online ISSN: 2053-2202(Online)

relationship between exchange rate and FDI. The literature thus far shows lack of consensus of the relationship between exchange rate volatility and FDI inflow. Another notable aspect of the literature is the paucity of research on the REER volatility and FDI. The situation is not different in Nigeria, hence the need for this study.

Statistical Procedure

The model used in analyzing REER volatility and FDI in Nigeria is stated below:

$FDI = b_o + b_1REER = b_2REERV + b_3INTR + b_4OPEN + U_t$

Where:

FDI = Foreign Direct Investment

REER = Real Effective Exchange Rate

REERV = Real Effective Exchange Rate Volatility

INTR = Interest rate (Prime lending rate)

OPEN = Openness of the Nigerian economy to the outside world proxied by the ratio of exports plus imports to GDP

Ut = Error term

The above model will be estimated by developing an Error Correction Mechanism (ECM). This will commence by an analysis of the time series property of the model. The Phillip Peron (PP) unit root test and the Augmented Dickey Fuller (ADF) unit root test will be used to assess whether the data are stationary. They will thus enable us to identify the order of integration. The long run equilibrium relationship will be assessed using the Johansen methodology of cointegration. The relevant coefficients and statistical significance will be assessed with the use of the preferred Error Correction Mechanism or the parsimonious ECM. Various diagnostic checks will also be carried out.

RESULTS AND FINDINGS

The results of the ADF and PP unit root tests are shown in the table below:

Table 1: Results of ADF and Unit Root test

Variables	ADF 1st difference	Order of Integration	PP 1st difference	Order of integration
REER	5.23	I(1)	4.22	I(1)
FDI	3.98	I(1)	4.11	I(1)
REERV	3.86	I(1)	4.34	I(1)
OPEN	4.44	I(1)	4.01	I(1)
INTR	6.43	I(1)	5.87	I(1)

NB: 1 percent critical value is 3.86

Print ISSN: 2053-2199 (Print), Online ISSN: 2053-2202(Online)

The result of the ADF and PP unit root test results indicate that the variables were I(1). The variables are non-stationary but became stationary after the first difference was taken. The variables were all stationary at the 1 percent level.

The result of the Johansen cointegration test is shown in the table below:

Table 2: Summary of Johansen Cointegration Test Result

Trace Statistic	5 % Critical Value	Max-Eigen Statistic	5 % Critical Value
89.23	67.02	78.23	68.23
76.32	73.43	64.24	60.23
62.34	60.23	58.34	56.32
50.86	53.54	38.43	41.20
44.34	49.53	28.48	21.09

The result of the trace statistic indicates two cointegrating equations. The result of the max-eigen-statistic also indicates two cointegrating equations. This result suggests the existence of a long run equilibrium relationship among the REER, REERV, INTR, OPEN and FDI.

The parsimonious ECM result is shown in the table below:

Table 1: Summary of Parsimonious ECM Result. Modeling FDI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFDI)-1)	1.119739	0.233789	4.789520	0.0001
LREER	0.069864	0.053542	1.304832	0.2013
LREERV	-0.649648	0.221572	-2.932000	0.0089
LINTR(-1)	-0.001639	0.001014	-1.615386	0.1449
OPEN	0.076825	0.101318	0.758258	0.4576
ECM(-1)	-0.585661	0.202681	-2.889568	0.0107
C	-31.40268	8.334877	-3.767624	0.0007

R2= 0.76, AIC = -9.76, SC = -3.33, DW = 2.11

The coefficient of determination indicates that 76 percent of the total changes in the FDI has been explained by the REER, REERV, INTR and OPEN. The changes explained outside the model is just 24 percent. The result indicates further that the immediate past FDI has a positive impact on the current FDI. An increase in the immediate past FDI by 1 unit increased the current FDI by 1.12 units. Also, the REER has a positive relationship with the FDI. A depreciation of the REER by 1unit increased the FDI by 0.7 units. The REERV has a negative relationship with the FDI. An increase in the REERV by 1 unit reduced the FDI by 0.65 units. This is an indication that the inflow of foreign investors into Nigeria is hindered by fluctuations and uncertainty. The result indicates further that the immediate past value of interest rate has a negative relationship with the FDI. An increase in the immediate past value of interest rate by 1 unit reduced the inflow of FDI by 0.001 units. The openness of the economy through international trade has a positive impact on FDI. An improvement in the openness of the Nigerian economy to the outside World through trade by 1 unit increased the inflow of FDI by

Print ISSN: 2053-2199 (Print), Online ISSN: 2053-2202(Online)

0,08 units. The result indicates that the intercept has a negative sign. This suggests that at the point where all the explanatory variables are zero, the FDI will decrease. The result shows further that the immediate past FDI with a t value of 4.79 and probability of 0.0001 is statistically significant in explaining the changes in the current FDI. The result shows further that the REER with a t value of 1.30 and 0.20 is statistically significant in explaining the changes in the FDI. The REERV with t value of -2.93 and probability of 0.0089 is statistically significant in explaining the changes in the FDI. The result indicates that the one period lagged interest rate with a t value of -1.62 and probability of 0.1449 is statistically insignificant in explaining the changes in the FDI. The openness of the Nigerian economy is to the outside World with a t value of 0.76 and probability of 0.4576 is not statistically significant in explaining the changes in the FDI. The ECM lagged by one period is statistically significant in explaining the changes in the FDI. This result indicates a satisfactory speed of adjustment. It shows that about 59 percent of the errors are corrected in each period.

The Breusch Godfrey Serial Correlation LM test with a probability of 0.71 indicates that the residuals are not serially correlated. The result of the white heteroskedasticity test indicates that the residuals are homeskadastic. The Jarque-bera normality test indicates that the residuals are normally distributed

CONCLUSION

The paper investigates the REER volatility and FDI inflow into Nigeria. The study concludes that REER volatility has hindered the inflow of FDI into Nigeria. This has reduced the level of economic activities and even denied the country of valuable foreign exchange that ordinarily would have come from FDI. This is quite unfortunate since the job creation ability of FDI and the transfer of technology has not manifested in the case of Nigeria. The study concludes further that increment in REER uncertainty reduced the inflow of FDI into Nigeria. This has reduced the competitiveness of the Nigerian economy. The study concludes that the depreciation of the REER has not significantly improved the inflow of FDI into Nigeria. This casts some doubts in devaluation policy of the Nigerian government within the study period. The result indicates further that the high interest rates charged by banks have been detrimental to the inflow of FDI into Nigeria. The study concludes further that investors are also conscious of the past records of FDI in Nigeria. The paper recommends a production-based devaluation of the Nigerian REER. The devaluation of the REER should be accompanied with an increase in the level of productivity in the economy. This will guarantee the needed benefit from such devaluation. This will also reduce the volatility in the REER. This will need some level of certainty of the REER by a reduction in the level of fluctuation. The study also recommends the granting of loans to would be foreign investors at concessionary interest rate. This will provide the needed domestic capital base for foreign investors. The result recommends more openness of the Nigerian economy to the outside World through international trade.

REFERENCES

Adegbite, E. and Ayadi, F. (2010). “The role of FDI on economic development. The case of Nigeria”.*World Journal of Entrepreneurship and Sustainable Development*, 6(1)

Print ISSN: 2053-2199 (Print), Online ISSN: 2053-2202(Online)

Agenor, P.R. (1998). Capital inflows, external shocks and the RER". *Journal of International Money and Finance, 17.*

Alobari, C., Paago, J.K., Igbara, F.N. and Emmah, D.(2016). "Exchange rate and FDI: Implications for economic growth in Nigeria". *Equatorial Journal of Finance and Management Science.*

Chineze, D. (2017). "The impact of foreign exchange volatility on FDI in Nigeria, 1999 to 2016". *Global Journal of Management and Business Research.*

Dexit, A. and Pindyck A.(1994). *Investment under uncertainty.* Princeton: Princeton University Press.

Edwards, S.I. (1998). ""Capital inflows, RER and capital controls: Some Latin American experience". National Bureau of Economic Research. NBER Working paper, 6800

Feldstein, M. (2000). "Aspects of global economic integration: Future outlook". *Working Paper, NBER, 7899.*

Foad, H. (2015). "Exchange rate volatility and export oriented FDI". Emmy University, Atlanta G.A.

Fredrick, O.A., Okeke, I.M. and Sheriff, M.U. (2013). "The impact of exchange rate dynamics on capital inflows in Nigeria (1970 to 2010)". *Information and Knowledge Management,* 3(8).

Froot, K. and Stein, K. (1999). "Exchange rate and FDI:An imperfect capital market approach". *Quarterly Journal of Economics,* 106 (4)

Jean, C.C., Patrick, P. and Tidiane, K. (2011). "capital flows and the impact on the REER. H" Hal Archives-Ouvertes

Jose, F.M. (2015). "Impact of RER volatility on FDI inflows in Brazil". *A Project Submitted as Partial Requirements for the Award of M.Sc. in Finance.* Iscte Business School, Instituto Universitario de Lisbon.

Mbaneso, C.O. and Obioma, J. (2007). "Exchange rate fluctuations and FPI IN Nigeria". *International Journal of Economies and Business Management,* 3(8).

Muhammad, B., Muhammad, I., Amjad, A., Muhammad, S., Mansour, A., IItaf, H. and Tehreen, F. (2014). "Impact of exchange rate on FDI in Pakistan:. *Advances in Economics and Business,* 2(6).

Murtala, Z.(2017). He impact of exchange rate fluctuations on FDI in Nigeria" *Journal of Finance and Accounting,* 5(4).

Ogun, O., Egwaikhide, F.O. and Ogunleye, E.R. (2012). "RER and FDI in Sub-Saharan Africa: Some empirical results". *Economia Mexicana,* XXI (1).

Okenyi, S.A. and Stella, I.M. (2012). "The impact of dollar exchange rate volatility on FDI in Nigeria". *International Journal of Research in Arts and Social Sciences.*

Olusuyi, E.F., Samuel, O. and Aibbola, I.O. (2016). "Interactive effects of exchange rate volatility and foreign capital inflows on economic growth in Nigeria". *Proceedings of the Third International Conference on Africa Development Issues.*

Osinuo, T.S. and Awoghonyeodiwe, I. (2009). "FDI and exchange rate volatility in Nigeria" *International Journal of Applied Econometrics and Quantitative Studies, 6(2)*

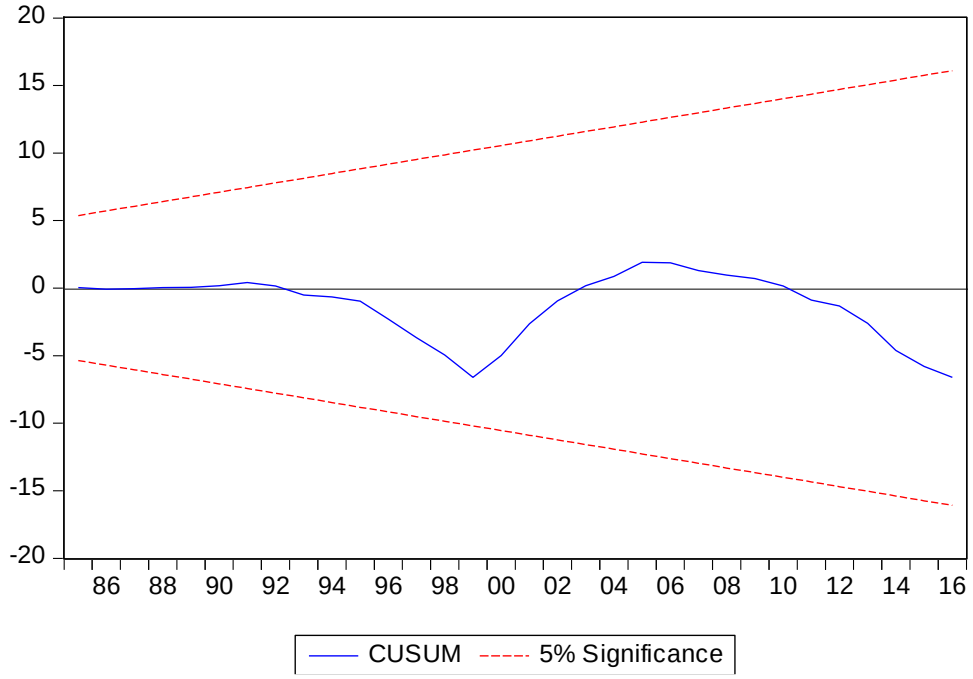
Silvia, O.B. and Nguyen, C.T. (2017). "FDI inflows, price and exchange rate volatility: New empirical evidence from Latin America". *International Journal of Financial Studies,* 5(6).

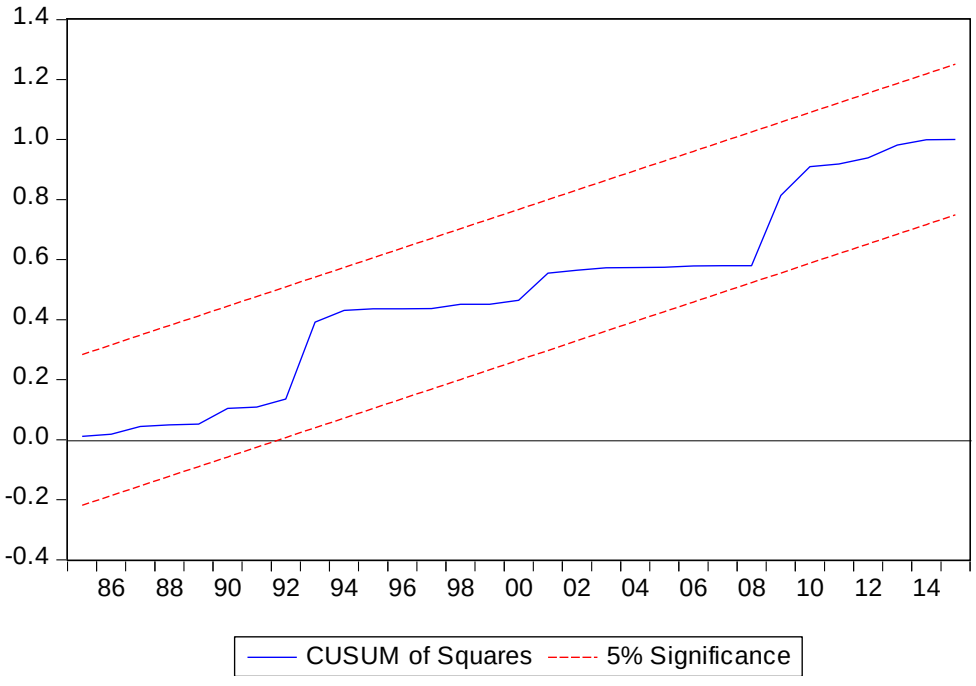
World Bank, (2002). *World Bank Development Indicator, W*ashington D.C.

World Bank, (2017). *World Bank Development Indicator, W*ashington D.C.

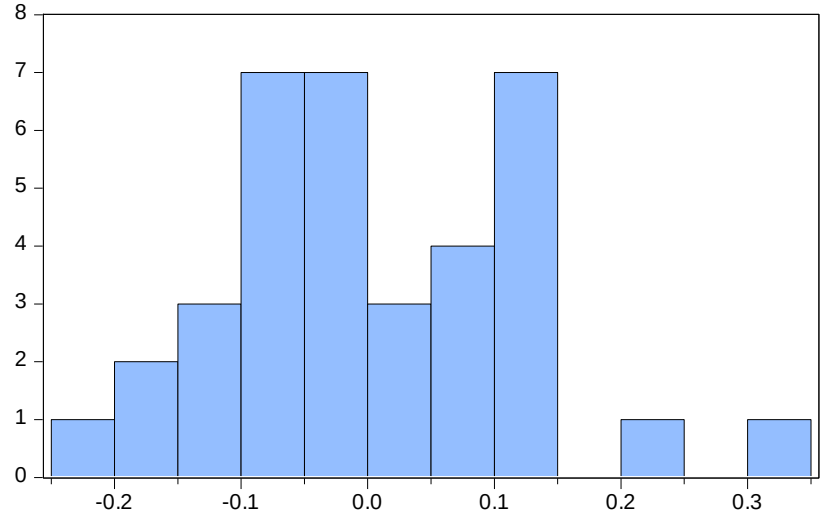
Print ISSN: 2053-2199 (Print), Online ISSN: 2053-2202(Online)

APPENDIX





Print ISSN: 2053-2199 (Print), Online ISSN: 2053-2202(Online)



Series: Residuals	
Sample 1981 2016	
Observations 36	
Mean	-2.27e-15
Median	-0.014132
Maximum	0.326181
Minimum	-0.240548
Std. Dev.	0.119439
Skewness	0.320306
Kurtosis	3.140936
Jarque-Bera	0.645371
Probability	0.724202

Print ISSN: 2053-2199 (Print), Online ISSN: 2053-2202(Online)