

TRADE OPENNESS AND ECONOMIC GROWTH NEXUS: AN IMPACT ANALYSIS OF NIGERIAN ECONOMY

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ABSTRACT

Theoretically, it was established that outward oriented economies grow faster than closed economies and could achieve a respectable level of economic development. This study is set out to examine empirically the impact of trade openness on economic growth in Nigeria between 1980 and 2016. Data were sourced from publications of the central bank of Nigeria (CBN) statistical bulletin 2016. The econometric techniques used in the analysis were: unit root test, Johansen cointegration test, and error correction models (ECM). From the analysis, results revealed that openness was found to have impacted negatively on economic growth in both the long-run and the short-run. Based on this finding it is recommended that since the country's imports are greater than exports; there is the need for the government to sustain its current efforts in diversifying the economy in order to achieve exports led economic growth. Furthermore, the government through collaborative effort with the private sector should encourage Export Substitute Industries in the country in order to promote export and to discourage the importation of primary commodities especially in which the nation has absolute advantages. Finally, the study further recommended that government should retain the current policy of treasury single account (T.SA) in order to block the loopholes in both the public and the private sectors and to ensure equitable utilization of the internally generated revenues for the benefit of the masses.

Keywords: Economic Openness, Import, Export, Economic Growth, ARDL.

JEL: F19, F43, O24

1. INTRODUCTION

At the end of each fiscal year, statistics are gathered for all sectors of the economy within the countries of the world. These figures (economic data) reveal the relative rates of individual country's economic growth. Moreover, the debate on the key drivers of economic growth had been ongoing and is still remained inconclusive. Therefore, does it matters if a country's national output rises or falls overtime? For the many developing economies in West Africa and Nigeria in particular, faced with many challenges particularly in growth problem the answer may be clear. Debate on the key drivers of economic growth had been ongoing and is still far from over since (Lewis, 1954, Solow, 1956, Denison, 1967, Myrdal, 1968, Harris-Todaró, 1970, Schultz, 1980, Fields, 1980, Romer, 1986, Barro, 1991 and Easterly, 2001). These observed scenarios of economic growth were extended to include: economic openness, investment in physical capital, surplus labour and improvement in technological, foreign aid, investment in human capital, foreign direct investment (FDI), stable exchange rate and research and development (R&D) among others.

In this study, trade openness is observed to be one of the key drivers of economic growth; this is simply due to the fact that, according to World Development Report (1987) open economies achieved better than their closed counterparts even under unfavorable environment. Furthermore, the rapid economic growth that were attributed to Asian states comprising Taiwan, South Korea, Singapore and Hong Kong has often been linked to openness to international trade. It was established that openness leads to increase in resource production, large total output, specialization, employment generation, creation of income and relaxation or removal of foreign exchange limitations (Nnadozie, 2013).

However, Nigerian economic performance has not been encouraging; simply because economic data have shown a confusing disparity amid slightly insignificant welfare advancement for majority of the Nigerian populace. Annual economic growth rates that were averagely over 7% during the last periods also; indicated that Nigerian economy is among the fastest growing economies in the world. This growth rates have been concerted mainly in trade and agriculture, which suggested that there is a significant welfare benefits for many Nigerians. Also, trade and agriculture encompass 75% of the non-oil sector contribution, there exist a strong growth rates recorded in these two sectors. Similarly, it was indicated by the World Bank Report 2011 and 2012 that trade alone accounted for 11.3% and 9.6% respectively (Word Bank, 2013). Nevertheless, indicators of social welfare improvements have also been considerably slower than expected in growth perspective. Finally, Employment generation and poverty reduction had not kept pace with population growth indicating a social distress for an increasing number of Nigerians, particularly the youths. Advancement in the direction of the fulfillment of the Millennium Development Goals is relatively slow, and Nigeria is ranked number 153 out 186 countries in the year 2013, United Nations Human Development Index (Word Bank, 2013). Moreover, the structure of Nigerian economy has remained redundant as a result of the discovery of crude oil in the 1970s. Unlike some of the oil producing countries such as Saudi-Arabia, United Arab Emirates and Russia among others, Nigeria has not been able to diversify its export-based potentialities such that, oil sector continued to be a dominant sector in virtually all exports and contribute over 70 percent of its total foreign earnings.

Today, in an attempt to meet with requirement and also be among those countries that are taking part in moving the trend of globalization and trade openness in the international economic system, Nigeria is a signatory and member of many international and regional trade agreements; that include: International Monetary Fund (IMF), World Trade Organization (WTO), World Bank, Economic Community of West African States (ECOWAS) and others. The overriding objectives of this economic partnership in international trade has been to create a free trade zones by removal of barriers on trade, lessen tariffs and embark on outward-oriented trade policies (Nduka, 2013).

Trade openness and economic growth has been a topic of investigations in the field of literature for a long time in developing countries such as Nigeria. A number of studies have investigated the subject matter across countries using different econometric techniques, sample size and data. Some of these studies include Da'silva (2014), Ugbor (2014), Christopher (2014), and Elenya (2013). Other studies are those Wacziarg (2001) and Sinha (2000). The above mentioned studies found a positive and statistically significant relationship between trade openness and economic growth. While other studies such as Opurk (2013), Jong and Ogege (2012), Kingsely (2004), and Yanikayya (2003) found significant negative relationship between the variables.

In Nigeria many related empirical studies have been conducted on the relationship between trade openness and economic growth (Ezeuchenne and Lawal 2017, Da'silva and Ehinomen 2014, Babatunde et al 2013, Biala et al 2013, Ugbor et al 2013, Alajekwu et al 2013, Adejoke et al 2013, Kingsely 2004 and Ekpo 1995). Accordingly, the findings varied consequently upon different

techniques, period of coverage and sample sizes utilized. Therefore, the need to further investigate empirically the relation between trade openness and economic growth in Nigeria is crucial. It is against this background that this study aims to empirically investigate the influence of trade openness, on Nigeria's economic growth from 1980-2016. The choice of period is informed by the availability of data in published literature.

2. LITERATURE REVIEW

There are varying results on the impact of trade openness on economic growth.

Saaed and Hussain (2015) examined empirically the causal link between trade openness, financial development and economic growth of Kuwait for the period spanning between 1977 and 2012. They adopted Co integration and Granger causality tests as econometric techniques. The variables used in their study were: Gross Domestic Product (GDP), Trade Openness (TO), and Financial Development (FD). The findings of the study revealed that, a positive and statistically significant impact exists between economic growth and the variables. They further, recommended the need to reform the Kuwait financial system. Thus, Kuwait should promote its trade openness policies in order to enhance both the growths of GDP and Financial Sector Development.

Hussain and Asghar (2014) empirically also examined the causal connection among financial sector development, openness and economic growth in developing countries for the period 1978 to 2012. The study employed Panel unit root test, Panel co integration test and Panel causality test and ADF as techniques of analysis. The variables controlled in the analysis were Financial Development (FD), Trade Openness (TO), Foreign Direct Investment (FDI), Human Capital (HC), Gross capital Formation (GCF) and Interest (R). The findings of the study indicated that there were strong evidences of the long-run relationship between FD and economic growth and a bi-directional causality between FD and FDI. However, trade openness has a positive and statistically significant impact in all countries. The study therefore recommended the introduction of effective policies that can promote trade between developing countries.

Cerava, Gjanii and Maco (2014) investigated the relationship between trade openness and economic progress in Albania, for the period 1992 to 2012. The objective of the study was to find out how trade openness and international trade stimulates growth. The authors used Autoregressive Distributive Lagged Model as an econometric technique. The result proved that there is a positive and statistically significant relationship between trade openness and economic growth. That is a 10% increase in trade openness lead to about 1.3% increase in real GDP in Albania. The study suggested that a free trade policy should be encouraged by the Albanian government in order to boost economic progress in Albania.

A study by Altee, Adam, Esmaeel and Saled (2014) on the impact of financial development and trade openness on economic growth in an open economy Sultanate of Oman through the period 1972 to 2012. They employed with reference to Johansen and Juselius (JJ), VAR framework and Granger causality tests as their techniques of analysis. The objective of their work is to establish out how financial development influences economic growth in the Sultanate of Oman during the period under investigation. Result of the findings revealed a positive and statistically significant influence between

economic growth and the controlled variables. On the other hand, the result indicates a unidirectional causality running from trade openness to economic growth.

Zaren and Ari (2013) Investigated the connection between trade openness and economic growth for the G7 countries, using annual data for the period 1970 to 2011. They employed Granger non-causality test in heterogeneous panel as a technique of analysis. Results proved a bi-directional causality between trade openness and economic growth. The study recommended an internal trade integration of G7 countries should be employed as a policy of improving their economic growth.

Ulaşan (2012) examined the relationship between trade openness and long-run economic growth over the period 1960-2000. The author also employed various openness measures (such as ratio of export plus imports) instead of dependence on a few proxy variables. The results indicated that, various openness variables are positively and statistically significant with long-run economic growth.

A study by Ezeuchenne and Lawal (2017) on the impact of international trade on Nigeria's economic growth for the period spanning 1985-2015. The controlled variables in the analysis as interest rate, exports, balance of trade and trade openness. A unit root test, Johansen Cointegration test and vector error correction models were employed as techniques of analysis. Results of the analysis proved that there is insignificant long-run relationship between imports and economic openness; while a unidirectional relationship exists between economic growth and trade openness. The authors recommended that government should intensify effort in order to boost exports of finished products and reduce importation of foreign goods.

Da'silva and Ehinomen (2014) in their study examined the nexus between economic openness and productivity growth in Nigeria for the period of 1970 to 2010. The variables selected were real GDP, openness, exchange rate, real interest rate, and unemployment. The authors employed ordinary least square (OLS) in the analysis. Results indicated that a positive and statistically significant relationship exists between trade openness and economic growth. They recommended economic diversification, and accurate utilization of export revenue and further stressed the need to encourage the export promotion policies.

Babatunde, Bukula, Olodo and Ibraheem (2013) empirically analyzed the impact of trade openness on economic growth in Nigeria, during the period 1981 to 2009. The objective of their paper was to formulate a positive policy contribution that could assist the policymakers mapping out appropriate policies that can determine the sources of economic growth in Nigeria. The OLS regression method was engaged to analyze the multiple econometric models with The variables as exchange rate, foreign direct investment, openness, and political stability. The findings of the study indicated that a negative and statistically not significant relationship exist between degree of openness and political stability. On the other hand, economic growth and other variables used in the study are positive and statistically significant with economic growth. Based on the findings, trade policy recommendations the need to review trade policies especially the implementation were suggested. Moreover, economic diversification is also recommended particularly in agriculture, manufacturing and privatization of power sector among others.

Biala, Suboir, and Olaifa (2013) tried to establish whether there is a long-run relationship between trade openness and economic growth in Nigeria, for the period 1970 to 2010. The study adopted ordinary least square (OLS) in testing the influence between the two variables. The result revealed

that trade openness influence economic growth in Nigeria. The researchers concluded that a conducive atmosphere that can enhances further growth such as reforming institutional structures as well as better adherence to international best practices be encourage.

Ugbor, Chukwu and Nduka (2013) conducted a study on the causal relationship between trade openness and economic growth in Nigeria. The study divided the analysis into two: pre and post SAP (1970Q1-1985Q4 and 1986-2011) periods. They employed Augmented Dickey Fuller and Phillips Perron tests for unit root & Engel Granger Causality co integration in the analysis in order to investigate the direction of causality between openness and economic growth for two periods. The variables of the analysis include: Trade Openness (TO), Investment (I) and Government Expenditure (GE). The result of the co integration test displayed a unidirectional causality running from economic growth to trade openness in the pre SAP period. However a bidirectional causality between economic openness and economic growth in the past SAP period, and the result shown that openness causes economic growth more in the post SAP period. The study recommended that, policy makers of the economy should direct policies towards opening the borders more for external trading activities.

A study by Alajekwu, Ezeabasili and Nzotta (2013) was carried out to establish the relationship between trade openness, stock market development and economic growth in Nigeria from 1986 to 2011. The study used Johansen multivariate co integration and granger causality test as the techniques of analysis. The results show that there is negative and statistically not significant relationship between trade openness and economic growth in Nigeria. The study therefore recommended that government should develop policies that could create a friendly business environment where investors will be at home with legal and financial framework plus trading framework respectively.

Ademola, Ibiyemi, Olusuyi and Babatunde (2013) examined the effect of trade openness and financial investment on economic growth in Nigeria between 1960 and 2011. It was observed that long- run positive and stastically significant relationship exists among trade openness, FDI and economic growth in Nigeria. Emanating from the findings, the study it was recommended that structural trade oriented policies should be adopted to enhance economic growth in Nigeria via high exports flows in order to accumulate more foreign proceed to boost output growth in Nigeria.

3. Methodology

To establish the link between the variables, this study applied Autoregressive Distributed Lag (ARDL) Model for estimation. Also, before the model estimation, the properties of the variables under study were tested in order to know the stationarity levels. The econometrics technique used in the process were Augmented Dickey-Fuller (ADF). This study as well used annual data spanning from 1980 to 2016 for the estimation. The data is obtained from Statistical Bulletin of the Central Bank of Nigeria (CBN). Furthermore, this study adopt model from the work of Onoh, Okore & Ugochukwu 2013) with little modification in order to estimate the relationship among the series. The variables incorporated in the model are economic openness (OPEN), real gross domestic product (RGDP), import (IMP) and export (EXP). Additionally, after conducting ARDL test, this study conducted Granger causality test in order to identify the nature and direction of causality among the series.

However, this study used ARDL approach developed by Pesaran et al (2001) to estimate the connection among the variables under investigation. The logics behind the choice of this approach are: first ARDL can be applied irrespective of whether the variables are stationary at level value I(0) or at first difference I(1) or combination of both. Second, it can generate robust and reliable results even if the number of observations is small or large. Finally, it produces unbiased result of the long-run as well as valid f- statistics even if when some of the regressors are endogenous (Abubakar and Ya’aba, 2014). Aligned with Pesaran et al (2001) the ARDL model is given as:

$$\Delta RGDP_t = \beta_0 + \sum_{i=1}^m \beta_1 \Delta RGDP_{t-i} + \sum_{i=1}^m \beta_2 \Delta OPN_{t-i} + \sum_{i=1}^m \beta_3 \Delta IMP_{t-i} + \sum_{i=1}^m \beta_4 \Delta EXP_{t-i} +$$

$$\Delta OPN_t = \beta_0 + \sum_{i=1}^m \beta_1 \Delta OPN_{t-i} + \sum_{i=1}^m \beta_2 \Delta IMP_{t-i} + \sum_{i=1}^m \beta_3 \Delta EXP_{t-i} + \alpha_1 OPN_{t-1} + \alpha_2 IMP_{t-1} + \alpha_3 EXP_{t-1} + \mu_t$$

(1)

Note that β_0 , to β_3 and α_1 to α_3 are the parameters of the explanatory variables. Additionally, the error correction model of the ARDL approach is specified as:

$$\Delta RGDP_t = \beta_0 + \sum_{i=1}^m \beta_1 \Delta RGDP_{t-i} + \sum_{i=1}^m \beta_2 \Delta OPN_{t-i} + \sum_{i=1}^m \beta_3 \Delta IMP_{t-i} + \sum_{i=1}^m \beta_4 \Delta EXP_{t-i} + \beta_5 ECM_{t-1} + \mu_t$$

(2)

The ARDL model was organized into two parts; the first part of the equation with β_0 to β_3 represents the short-run dynamics of the model, while the coefficients α_1 to α_3 represents the long-run relationship. The null hypothesis of the above model is defined as $H_0: \alpha_1 = \alpha_2 = \alpha_3 = 0$ which tell us that there is no cointegration among the variables under measurement (Pesaran et al. 2001). Furthermore, the study commenced the analysis by conducting cointegration test of the ARDL in order to find out the evidence of long-run relationship. The calculated F-statistics is compared with the Critical Value as tabulated by Pesaran et al (2001). If F-statistics is greater than the upper critical value, then the decision rule will be to reject the null hypothesis of no long-run relationship, whereas if it falls below a lower critical value, then the null hypothesis cannot be rejected and if it falls within these two critical bounds, then the result is inconclusive (Pesaran et al, 2001).

4.1 Data Presentation, Results and Discussion of Findings

In using time series data, it is important to test the nature of the series behavior so as to establish or know the order of integrations. To this end, the result of the descriptive statics is presented in Table 4.1 and the result of the test conducted using Unit Root testing approaches is presented in Table 4.2 while ARDL Bound testing approach result is presented in Table 4.3. Furthermore, the short-run and long-run result were presented in Table 4.4 and 4.5 respectively and the result of the diagnostic test is presented in Table 4.6. Accordingly, the ADF indicates that all the variables were stationary at first difference.

Table 4.1.1: Results of Descriptive Statistics

Variable	Observations	Mean	Std. Deviation	Minimum	Maximum
LRGDP	36	13.45592	0.220447	13.18306	13.84374
LIMP	36	26.93530	2.669592	22.34936	30.24664
OPEN	36	0.159720	0.169518	0.000879	0.578149
LEXP	36	27.31229	2.648623	22.85455	30.75885

Source: Author's computation.

The summary of the data used in estimating the relationship among the variables is presented in Table 4.1.1. The mean (average rates) of real GDP, import, openness together with export of the economy all have positive values. This scenario indicated that we have more of increase than decrease in the changes among the variables. This clearly indicates that Nigeria is witnessing an important improvement in its economic growth with import and export having an estimated mean higher than all other variables during the period under review. Imports and exports have higher standard deviation, which suggests that, the degree of variability of imports and exports are higher than that of any other variable in the distribution. However, economic openness has lower standard deviation, which shows that the dispersion of the data is closer to its mean.

Table 4.1.2: Results of Unit Root Test

Variable	ADF at level	ADF at First Difference	Remark
LRGDP	1.352038	-4.838580***	I(1)
LIMP	-0.817186	-5.154805***	I(1)
LEXP	-0.866484	-7.160225***	I(1)
LOPEN	-1.323268	-6.278546***	I(1)

Source: Author's computation.

Based on the results presented in Table 4.1.2, all the variables are not stationary at their level values. However, the variables became stationary after taking their first difference. Therefore, the conditions for the application of the autoregressive distributed lag (ARDL) bound testing to cointegration is met which is the presence of the variables both at levels and their first difference. However, it is worth noting that the ARDL bound test can only be applied when variables are not integrated of order two $I(2)$.

Table 4.1.3: ARDL Bounds Test Results

Estimated Models	F-Statistics	Remark
$FL_{RGDP}/(LEMPR,LEXR,LFDI,LIMP,LEXP,LOPEN)$	5.648921	Cointegration
$F_{LIMP}/(LGRDP,LEMPR,LEXR,LFDI,LEXP,LOPEN)$	5.211376	Cointegration
$F_{LEXP}/(LGRDP,LEMPR,LEXR,LIMP,LFDI,LOPEN)$	7.300758	Cointegration
$F_{LOPEN}/(LGRDP,LEMPR,LEXR,LFDI,LEXP,LIMP)$	6.562931	Cointegration
Critical Values Bounds	Lower Bound	Upper Bound
10%	1.99	2.94
5%	2.27	3.28
2.5%	2.55	3.61
1%	2.88	3.99

Source: Author's computation.

Table 4.1.3 presents the results of ARDL bound test along the critical values bond at the lower part of the Table. The results revealed that all the models have shown an evidence of cointegration among the variables.

Table 4.1.4: Result of the Estimated Short-Run Coefficients of the ARDL

Variable	Coefficients	Std. Error	T-statistic	P-value
D(LIMP)	0.158346	0.006370	24.859353	0.0000
D(LIMP(-1))	-0.017495	0.007273	-2.405591	0.0305
D(LEXP)	0.264603	0.007443	35.550615	0.0000
D(LEXP(-1))	-0.016295	0.008877	-1.835557	0.0878
D(LEXP(-2))	0.000476	0.005015	0.094828	0.9258
D(LOPEN)	-0.422926	0.012248	-34.530701	0.0000
D(LOPEN(-1))	0.030316	0.013552	2.236999	0.0421
D(LOPEN(-2))	0.008462	0.005007	1.690078	0.1131
ECM(-1)	-0.519423	0.174225	-8.721029	0.0000

Source: Author's computation.

Table 4.1.4 presents the results of the short run impact of the variables on the dependent variable. The coefficients of imports and exports have positive and significant impact of economic growth. Thus, a 1% increase in imports and exports, could leads to increase 15% and 26% increase in economic growth, respectively. However, the coefficient of openness has negative and significant impact on economic growth at 1% level of significance. The coefficient of error correction model (ECM (-1)) revealed a correct sign and statistically significant which measure the speed of adjustment of the dependent variables at which equilibrium is restored. The results implied that 52% of any disequilibrium in the economic growth could be corrected within a lag (one year in this study).

Table 4.1.5: Results of the Estimated Long-Run Coefficients of the ARDL

Variable	Coefficient	Std Error	T-statistic	P-value
LIMP	0.161215	0.007144	22.565218	0.0000
LEXP	0.270215	0.007142	37.831986	0.0000
LOPEN	-0.431019	0.004040	-106.677467	0.0000
CONSTANT	0.366414	0.103715	3.532882	0.0033

Source: Author's computation.

The long run impacts of the coefficients are presented in Table 4.1.5. The results revealed that imports and exports have positive and significant impact on economic growth in the long run at 1% level of significance. However, openness has been found to have impacted negatively on economic growth in the long run.

Table 4.1.6: Results of Diagnostic Tests

Test	Test Statistic	P-value
Normality	1.7099	0.4253
Serial Correlation	0.8841	0.7078
Heteroskedasticity	1.1652	0.3914
Functional Form	1.7795	0.0985

Source: Author's computation.

Diagnostic tests have been conducted to check the reliability of the results based on the results presented in Table 4.1.6, the findings are reliable because it passed all the major tests in the form of normality, serial correlation, heteroscedasticity, and function form.

This study further conducted stability tests in order to establish the stability or otherwise of the model. The cumulative sum of recursive residual (CUSUM) and cumulative sum of squares of recursive residual (CUSUMQ) testing approaches were applied and the results are presented in figure 1 and 2. According to tests, the estimated model is stable because the recursive errors fall between the two critical lines of the CUSUM and CUSUMQ tests respectively.

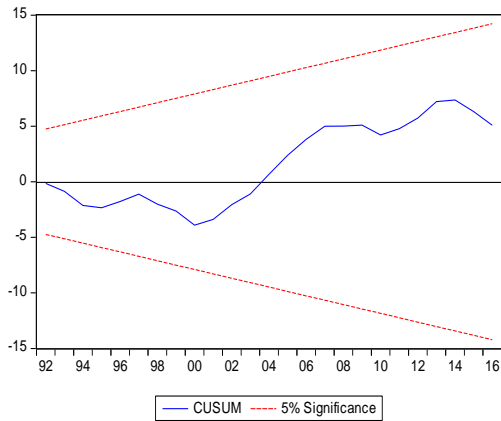


Figure 1

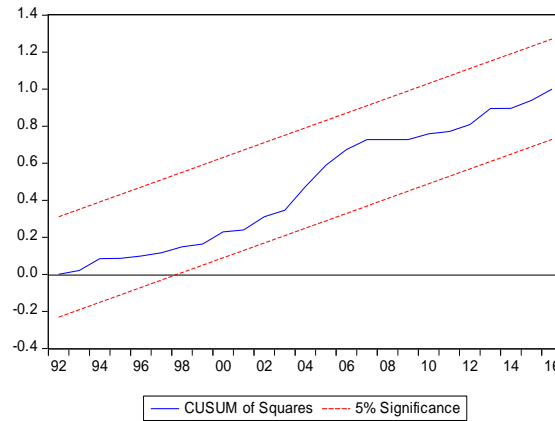


Figure 2

5. CONCLUSION/ RECOMMENDATIONS

Nigeria economy is characterized as an import dependent economy. It is very essential to understand the factors underlying the factors that determine the sources of economic growth in order to give room for the government authorities, expert and policy makers to device and design strong policy that will ensure sustainable economic growth. This is because in the period of economic crisis (economic recession), international trade and investment, production and job creation, price level could be affected negatively. It is in this respect that this study an assessment of the impact of trade openness and economic growth in Nigeria is carried out. The ARDL results reveals that economic openness, do not cause economic growth throughout the study period. However, economic growth is caused by imports, exports during the study period.

From the above-mentioned, it has been empirically revealed that openness does not cause economic growth in Nigeria during the period under review. Since the economic openness has negative impact on economic growth, and this is related to the fact that our imports is greater than exports; its therefore recommended that there is the need for the government to sustain its current efforts in diversifying the economy in order to achieved exports led economic growth. For instance, the manufacturing industries, and the agricultural sector should be given priorities in order to produce more in such a way that the country can produce surplus for exportation and not only to produce the consumption goods.

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APPENDIX

Descriptive Statistics

	LRGDP	LEMPR	LEXP01	LEXR	LFDI	LIMP	OPEN
Mean	13.45592	2.083038	27.31229	1.619938	0.865722	26.93530	0.159720
Median	13.35063	1.748962	27.78556	1.965189	0.974033	27.60290	0.092959
Maximum	13.84374	7.769458	30.75885	2.100606	2.382556	30.24664	0.578149
Minimum	13.18306	1.735076	22.85455	-0.129791	-0.430252	22.34936	0.000879
Std. Dev.	0.220447	1.397204	2.648623	0.593347	0.709358	2.669592	0.169518
Skewness	0.593763	3.880392	-0.421685	-1.346096	-0.067007	-0.402102	0.838389
Kurtosis	1.764413	16.05800	1.804045	3.703527	2.494396	1.720276	2.601521
Jarque-Bera	4.405339	346.1118	3.212372	11.61428	0.410393	3.426658	4.455556
Probability	0.110508	0.000000	0.200651	0.003006	0.814487	0.180265	0.107768
Sum	484.4133	74.98937	983.2424	58.31778	31.16598	969.6709	5.749925
Sum Sq. Dev.	1.700890	68.32628	245.5320	12.32211	17.61158	249.4352	1.005773
Observations	36	36	36	36	36	36	36

Unit Root Tests

Null Hypothesis: LRGDP has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	1.352038	0.9984
Test critical values: 1% level	-3.626784	
5% level	-2.945842	
10% level	-2.611531	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LRGDP)
 Method: Least Squares
 Date: 05/01/15 Time: 09:14
 Sample (adjusted): 1981 2016
 Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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LRGDP(-1)	0.033185	0.024545	1.352038	0.1853
C	-0.432122	0.329969	-1.309584	0.1991
R-squared	0.051022	Mean dependent var	0.013955	
Adjusted R-squared	0.023111	S.D. dependent var	0.031050	
S.E. of regression	0.030690	Akaike info criterion	-4.075836	
Sum squared resid	0.032023	Schwarz criterion	-3.987863	
Log likelihood	75.36505	Hannan-Quinn criter.	-4.045131	
F-statistic	1.828006	Durbin-Watson stat	1.424997	
Prob(F-statistic)	0.185289			

Null Hypothesis: D(LRGDP) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.838580	0.0004
Test critical values: 1% level	-3.632900	
5% level	-2.948404	
10% level	-2.612874	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LRGDP,2)
 Method: Least Squares
 Date: 05/01/15 Time: 09:15
 Sample (adjusted): 1982 2016
 Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LRGDP(-1))	-0.739807	0.152898	-4.838580	0.0000
C	0.012315	0.005215	2.361653	0.0242
R-squared	0.415017	Mean dependent var	0.001554	
Adjusted R-squared	0.397290	S.D. dependent var	0.035941	
S.E. of regression	0.027903	Akaike info criterion	-4.264733	
Sum squared resid	0.025693	Schwarz criterion	-4.175856	
Log likelihood	76.63283	Hannan-Quinn criter.	-4.234053	
F-statistic	23.41186	Durbin-Watson stat	2.024128	
Prob(F-statistic)	0.000030			