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# Contemporary Issues in Trade and Trade Policy in Nigeria

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# Contemporary Issues in Trade and Trade Policy in Nigeria

by

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**Abstract**

This study examines the trade-growth nexus in Nigeria during the period 1970 – 2015. In the empirical investigation, real gross domestic product is employed as the dependent variable while real imports, real exports, real gross capital formation, and oil rent as a percentage of GDP are explanatory variables. Two different models were employed in this study – a single equation error correction model (ECM) and a log-log Ordinary Least Square (OLS) regression model. In the OLS results, all of the explanatory variables returned a positive sign, with the exception of oil rent as a percentage of GDP but this is consistent with existing literature. Despite the widely cited benefits that international trade has on economic growth, there continues to be a divide on its contributions. Contributing to this debate is a bedrock of this study. The evidence here adds to existing literature to state that trade contributes to economic growth. This study recommends that policymakers should develop a right mix of policy to boost human capital development, capital formation, export promotion, and to develop a diversified economy that is less dependent on oil rent.

*Keywords: Nigeria, economic growth, human capital index, error correction model, trade, time series, ECM.*

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## Chapter I: Introduction

Nigeria is widely referred to as the "Giant of Africa", owing to its large population and economy – it is the most populous country and biggest economy in Africa. Home to an estimated 200 million people and one of the most youthful populations in the world, the West African nation is projected to overtake the United States to become the third-most populous country in the world by the year 2050.[1] The country is a key economic and political powerhouse on the African continent – an assertion which was best captured in a statement by the 44th president of the United States Barack Obama when he said: "Nigeria is critical to the rest of the continent and if Nigeria does not get it right, Africa will really not make more progress".[2] There is no gainsaying the fact that Nigeria is a major country for keen watchers of international trade dynamics.

Nigeria's economy has been largely described as monolithic, owing to an overdependence on its abundance energy reserves. Over the years, the speed and direction of economic growth and trade has simultaneously been hindered and enabled by the level of oil revenue received. Oil price volatility and revenue unpredictability continues to impact growth performance. Between 2000 and 2014, Nigeria's gross domestic product (GDP) grew at an average rate of 7% per year. Following the oil price collapse in 2014-2016, combined with negative oil production shocks, the gross domestic product (GDP) growth rate dropped to 2.7% in 2015. In 2016 the country suffered its first recession in 25 years and the economy contracted by 1.6%.[3]

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[1] United Nations Department of Economic and Social Affairs World Population Prospects Report 2019
[2] President Barack Obama during a meeting with Nigeria's Acting President at the 2010 Nuclear Security Summit in Washington D.C
[3] The World Bank in Nigeria – Country Overview. Last Updated October 13, 2019.

The dynamics of the Nigerian economy continues to generate considerable interest, particularly the direction of trade and how the government's policies impact the country's economic growth. Like most countries in the world, Nigeria since its independence recognized the need for an effective trade policy, which over the years has evolved with developments on the global scene. Thanks in large part to its abundant energy reserves and a lack of economic diversification – Nigeria is widely acknowledged as having one of the most restrictive trade regimes in the world.

This study will attempt to investigate contemporary issues affecting Nigeria's trade policy in the period 1970 – 2015, as well as address the question: has international trade been beneficial in the era of free trade and economic partnership agreements? Also, the key factors affecting trade and economic growth in Nigeria will be examined during the course of this research. Nigeria's trade policy operates on a model that was inherited from past military regimes where imposing quantitative bans on some imports and forex restrictions were fruitlessly deployed to tackle economic problems. Nigeria is a founding member of the World Trade Organization (WTO) and successive governments have pursued trade openness and liberalization but there are still some challenges preventing the country from reaping the static and dynamic benefits of international trade. Some of these challenges are due to policy missteps, political instability, slow pace of capital accumulation and lack of continuity on reform effort.

In particular, this study will contribute to existing literature on Nigeria's trade policy by studying the benefit of trade in the period under review and will further the level of scholarly work on Nigeria's strategy to defend and diversify its economy via trade. An empirical study of international trade and economic growth in Nigeria will be investigated using publicly available

data. Key indicators affecting the strength and dynamics of the relationship will be used. It is my belief that an understanding of the evolution of trade policy and economic growth for Nigeria would help us avoid policy missteps in the future and understand how best to facilitate trade and bring about growth. Despite the widely cited benefits that international trade has on economic growth, there continues to be a divide on its contributions. Trade has also been seen as a constraint to economic growth particularly in developing countries such as Nigeria. This is because countries tend to depend too much on the international market hence resulting to increased vulnerability to international market volatility (De Matteis, 2004).

## Chapter II: Literature Review

The literature on the relationship between trade and economic growth is large and diverse. This large and growing body of empirical literature has also produced mixed results, but there seem to be a consensus on the critical importance of trade. According to Zahonogo (2017), the widely accepted notion on the dynamics between international trade and economic growth rests on the assumption that trade engineers incentives that stimulates productivity through two channels: in the short-run, it reduces misallocation of resources; while in the long run, it enables the transfer of technological know-how.

Goldberg and Pavcnik (2016) in their research opined that much of the literature on trade policy outcomes reports the static and short-run effects of the trade policy under review and that the long-run effects of trade policy are much harder to investigate using empirical methods. The implication of this is that arguments about long-run effects are often based on principles and theoretical models. Different authors have studied the trade-economic growth linkage with the conclusion that trade policy may itself be the outcome of economic conditions in a country: Bagwell and Staiger (2004) propounded that economic conditions affect the timing of trade liberalizations and their reversals.

The empirical analyses in trade literature on the benefit of international trade to economic growth are as inconclusive as the theoretical perspectives on it. While Liu, Shu, and Sinclair (2009), Kim et al. (2011) and Jouini (2015) identified a positive association between trade openness and economic growth, others like Musila and Yiheyis (2015), and Ulaşan (2015) have found a negative association or no association between trade openness and economic growth. Egbetunde and Obamuyi (2018) posited that the literature is inconclusive

because partly because different studies have employed diverse indicators or proxies for trade openness and these studies have largely employed different methodologies.

The literature on challenges of trade on economic growth in developing countries continues to grow. In examining the Nigeria and Pakistan experience, Jamali and Anka (2011) reviewed trade policy issues and its direction, they reported that existing policies and regulations are generally in tune with Nigeria's commitments to various bilateral, regional and multilateral agreements. They identified custom and excise tariff, import prohibition, and comprehensive import substitution scheme as the main instruments of import policy. Their study also found that these are applied on a non-discriminatory basis to imports from all countries. They also identified the efforts that has gone into the abolition of restrictive trade policies, including tariff reforms, liberalization of the investment and ownership rules and streamlining of port operating procedures.

Rodriguez and Rodrik (2001) investigated the question of if countries with lower barriers to international trade experience faster economic progress, once other relevant country characteristics are controlled for. They pointed out that trade policies can have welfare effects without affecting the rate of economic growth. In assessing voluminous research on the subject, they observed that so many authors, using varying methods, observed a negative relationship between trade restrictions and economic growth. In a study investigating trade and economic growth in sub-Saharan Africa (SSA) countries, Zahonogo (2017) used a dynamic growth model with data from 42 SSA countries covering 1980 to 2012. The research indicates that a trade threshold exists below which greater trade openness has beneficial effects on economic growth and above which the trade effect on growth declines.  Evidence from the research also suggests

the existence of an inverted U-curve (Laffer Curve of Trade) response, suggesting the non-fragility of the nexus between growth and trade openness for SSA countries, which was detected to be non-linear.

Andersen and Babula (2008) reviewed the most cited empirical analyses of the link between international trade and economic growth, as well the analyses of the link between trade and productivity growth; they confirmed the existence of a positive relationship between the two. They also delved into the problems of the handling of measurement error and endogeneity in empirical literature. According to Raja, Fabio, and Javier (2007), the structure of trade, independently of trade level, has an important effect on the rate of economic growth. Their study suggests that the number of trading partners is positively correlated with growth rate for all countries, and the effect is concentrated in poor countries, even though previous studies have overlooked these characteristics of trade.

Using OLS method, Were (2015) confirmed the existence of the positive effect of trade on growth found in literature. However, this only holds for developed and developing countries, its effect is insignificant for least developed countries (LDCs), which largely include countries like Nigeria. In investigating the nexus of trade openness and growth in transition economics, Silajdzic and Mehic (2018) employed fixed effect panel estimation using Prais-Winsten-correlated panels corrected standard errors method and the dynamic least squares dummy variable method. Their research found that openness measured by trade intensity indicators may lead to misleading conclusions about the trade-growth nexus.

Evidence in the literature from Nigeria focused research is also included in this review. Adeleye, Adeteye, and Adewuyi (2015) examined the impact of international trade on

economic growth in Nigeria during the period 1988 – 2012. Their study employed total export, balance of trade, and balance of payment as proxies for international trade, and GDP for economic growth. Using OLS regression technique, the study found only total export to be positive and statistically significant while the other variables remain insignificant, with the implication that Nigeria is running a monocultural economy where oil acts as the sole support of the economy without significant contribution from other sectors of the economy.

In a causality analysis to determine if foreign trade can propel economic growth in Nigeria, Ogbokor (2017) incorporated trade openness, GDP as indicator of growth, import, export, and exchange rate as control variables to counter the issue of omitted variable bias. The study reported existence of unidirectional causalities running from trade openness to exchange rates, as well as from real GDP to exchange rates. Using the cointegration method, Abayomi (2013) investigated the determinants of external trade in Nigeria through variables like GDP, inflation rate, capacity utilization, government expenditure, import, exchange rate, and export. The study found all variables as significant determinants of external trade in Nigeria with the exception of government expenditure, inflation, and interest rate, but it failed to test for causalities among the variables. It also made use of nominal GDP instead of real GDP as an independent variable.

Owolabi-Merus, Odediran, and Inuk (2015) investigated the impact of international trade in the growth of Nigeria's economy during the period 1971 – 2012 using log of GDP, imports, exports, government expenditure, exchange rate, foreign direct investment, and inflation. Using OLS and Johansen cointegration test, they found a long-run relationship existing between international trade and economic growth. The OLS analysis found export to

be positively associated with economic growth while import was found to be negative. All of the variables reported positive signs, with the exception of exchange rate and inflation rate. Similarly, Omoju and Adesanya (2012) used Nigeria as a case study in exploring the benefits of trade in developing countries. The impact of trade on economic growth in Nigeria during the period 1980 to 2010 was examined and their study concluded, exchange rate, government expenditure, and FDI have a significant positive impact on economic growth in Nigeria.

Ogunkola, Bankole, and Adewuyi (2006) examined how the trade literature has concerned itself with the nature and extent of short-term adjustment costs and long-term benefits of trade and investment liberalizations. They opined that trade liberalization is often interpreted to mean export promotion and import policy reform, benefits of which have been envisaged to be derived on a long-term basis. Their study presented an analysis of the costs and benefits of import liberalization and export policy reform, particularly for a developing country like Nigeria.

According to them, the concerns about import liberalization and export policy reform for Nigeria have gravitated around the costs and benefits associated with import liberalization in the form of reducing the number of prohibited goods and subjecting them to tariffs and reduction of existing high tariffs. Some listed benefits of import liberalization include the expansion of supply base, lower prices, improved access to intermediate materials, development of export-oriented firms that are better positioned to compete in an open economy, and an environment for local industries to compete towards efficiency. They perceive increased income and consumption as the final long-term gains of import liberalization, with export diversification constituting a dynamic gain from liberalization.

Alaba, Adenikinju, and Collier (2008) explored the different routes to trade policy reform for Nigeria and the distinctive effects of oil on Nigeria's trade aspirations; and in recognition of whether the trade policy that is appropriate for Nigeria is the same as that for its non-oil producing neighbors. They presented a series of trade liberalization routes for Nigeria, including a path through the regional Economic Community of West African States that would help Nigeria create a sub-regional market and enable some scale economies to be reaped. A downside to this is the disadvantage of Nigeria's dependence on oil (which the other members of ECOWAS do not share) potentially making the effects of any trade policy quite distinctive. As such, there will always be considerations for Nigeria to avoid getting locked-in to a trade policy regime that is inappropriate for the country, given that it has an economy that is uniquely oil dependent.

In an empirical study that examined the effect of trade openness and financial investment on economic growth in Nigeria between 1960 and 2011, Adelowokan and Maku (2013) used a dynamic regression model which found that trade openness and foreign investment impact both positive and negative effect on economic growth. Their work proved the existence of long-run relationship between trade openness, foreign investment, and economic growth in Nigeria. Some determinants like partial adjustment term, fiscal deficit, inflation and lending rate were found to have significant effect.

Ikpesu, Olusegun, and Dakare (2012) investigated the Macroeconomic impact of trade on Nigeria's economic growth over the periods of 1970 to 2008 using a combination of bi-variate and multivariate models. The empirical examination points out that exports and Foreign Direct Investment inflows have positive and significant impact on economic growth in the Nigerian

economy and that there should be a harmonization of export and fiscal policies, towards a greater shift in nonoil exports by the Nigerian government in order to achieve a desirable growth prospects of external trade. Their study employed GDP, export, and FDI.

This study will contribute towards expanding the body of literature in the field of trade policy and empirical investigation of international trade effect on economic growth in a developing country such as Nigeria.

**Theoretical framework**

The bedrock of this study is the augmented version of the Solow growth model. Mankiw, Romer, and Weil (1992) developed a human capital augmented version of the Solow-Swann model that explains the inability of poor countries to attract flow of international investments. The augmented Solow model posits that for any country to achieve sustained economic growth, human capital must be present in its growth trajectory, because the marginal product of capital (K) is lower in poor countries because they have less human capital than rich countries.

Following from the initial Solow-Swan model, they assume that the economy produces one good or output (Y) and the production function for the augmented model is also of Cobb-Douglas type:

$$Y(t) = K(t)^{\alpha} H(t)^{\beta} (A(t)L(t))^{1-\alpha-\beta} \quad \ldots (1)$$

The production function exhibits constant returns to scale in all three factors: physical capital *K(t),* human capital *H(t),* and productivity-augmented labour *A(t)L(t). H(t)* depreciates at the same rate $\delta$ as physical capital.

They assume the same function of accumulation for both types of capital and the economic agent saves output to have more of capital in the physical or human form. This follows from Solow-Swan, a fraction of output, *sY(t)* is saved periodically, but in the augmented model, this is split up and partly invested in both human capital and physical capital, such that *S* = $s_K + s_H$

Based on this, two fundamental dynamic equations evolve from this model:

$$\dot{k} = s_K k^{\alpha} h^{\beta} - (n + g + \delta)k \quad \dots (2)$$

$$\dot{h} = s_H k^{\alpha} h^{\beta} - (n + g + \delta)h \quad \dots (3)$$

Rewriting (ii) and (iii) gives the simplified form:

$s_K k^{\alpha} h^{\beta} - (n + g + \delta)k = 0$ … (iv) and $s_H k^{\alpha} h^{\beta} - (n + g + \delta)h = 0$ … (4)

Since we acknowledge a depreciation rate *δ;* given that *n* and *g* are exogenously given growth rates, the steady-state equilibrium growth path is determined by $\dot{k} = \dot{h} = 0$ , which solving for the steady-state yields:

$$k^* = \left(\frac{s_K^{1-\beta} s_H^{\beta}}{n + g + \delta}\right)^{\frac{1}{1-\alpha-\beta}} \quad \dots (5)$$

$$h^* = \left(\frac{s_K^{\alpha} s_H^{1-\alpha}}{n + g + \delta}\right)^{\frac{1}{1-\alpha-\beta}} \quad \dots (6)$$

Output factor in the steady-state gives $y^* = (k^*)^{\alpha}(h^*)^{\beta}$.

Mankiw, Romer and Weil (1992) in their model specify similar long run growth experiences for all countries. However, the addition of human capital increases our ability to explain what's peculiar to each country. The formation of human capital and physical capital come under observation. Following from the above, it becomes pertinent to understand dynamics of the relationship between human capital formation, gross fixed capital formation, and economic growth. The growth equation stated above will be augmented with the trade variables used in this study.

## Chapter III: Model and Methodology

This study will make use of econometric approach for the empirical investigation. In terms of the primary econometric framework, the data to be used will be tested for their order of integration (i.e., stationarity). Following Engle and Granger (1987), the co-integration approach offers a useful procedure for testing for a relationship and identify patterns of co-movement among variables in a study. Conventional Augmented Dickey Fuller test (Dickey and Fuller 1979, 1981) will be employed for the unit root test. A second step in the research methodology for this study will employ the Ordinary Least Square (OLS) regression method. Based on the unit root test, if the regression is not spurious as determined by test criteria, the method of OLS will be valid and consistent (Stock, 1987).

Initial selection of variables of interest to be used in this study follows from a desire to capture variables related to economic growth, trade measure, macroeconomic stability, human capital, and institutional variables, some of which are composite variables. The variables of interest are listed below in Table 3.1:

**Table 3.1**

*Identifiers and Variables*

| Identifier | Variable | Definition |
|---|---|---|
| Dependent variable: RGDP | Real Gross Domestic Product | An inflation-adjusted measure that reflects the value of goods and services produced in a given year (expressed in base-year prices) and is often referred to as "constant-price" GDP. |
| Independent variables: | | |
| R_Import | Real Import (nominal import/price index) *100 | Imports of goods and services consists of goods which add to the stock of material resources of the country by entering its economic territory. |
| R_Export | Real Export (nominal export/price index) *100 | Exports of goods and services consist of sales, barter, or gifts or grants, of goods and services from residents to non-residents. |
| HCapital | Human Capital Index | Human Capital Index based on years of schooling and an assumed rate of return to education. Cohen and Leker (2014) PWT 9.0 |

**Table 3.1** (continued)

| | | |
|---|---|---|
| Oil | Oil rents percentage of GDP | Oil rents percentage of GDP - Estimates based on sources and methods described in "The Changing Wealth of Nations: Measuring Sustainable Development in the New Millennium". Jarvis, Lange, Hamilton, Desai, Farumeni, Edens, Ruta (2011). |
| RGCF | Real Gross Capital Formation | Total value of acquisitions, less disposals, of fixed assets during an accounting period plus certain additions to the value of non- produced assets. |
| e | Error term | Stochastic error term |

**Dependent variable Gross Domestic Product Per Capita is a widely used proxy for economic growth. Independent variables include: Trade share, oil rents, net barter terms of trade, labor force participation rate, and real gross capital formation.*

The explanatory variable for oil rent as a percentage of GDP is included in the model to capture the reality of Nigeria being a natural – resource rich economy. This is important in helping us understand the role of oil in the dynamics of the issue under investigation. Vespignani et al (2019) examined the paradox known as “resource curse” and the trade-growth nexus. Their panel data regression models of 95 countries suggest that having an abundance of oil resources

plays a significant role in slowing economic growth – that is, it serves as a resource curse, while trade openness significantly decrease the resource curse in the sample period (1970-2015).

Therefore, the functional relationship between the dependent and independent variable for this study is established as follows:

$$log\_RGDP = \beta 0 + \beta 1 logR\_Import + \beta 2 logR\_Export + \beta 3 logOil + \beta 3 logHCapital + \beta 4 logRGCF + \varepsilon \quad \ldots (7)$$

The OLS regression will take the log-log form. All the variables in this model are expected to return coefficients that have positive signs, with the exception of oil rent. The data used in this study are secondary on Nigeria data for the period 1970 – 2015 that have been sourced from the United Nations National Accounts Main Aggregate Database, World Development Indicators (WDI) and Penn World Table.

**Unit Root Test.** The Augmented Dickey Fuller (ADF) test propounded by Dickey and Fuller (1979) for unit roots in time series is employed in this study to confirm that the individual time series are non-stationary. When a time series has a unit root, the series is said to be non-stationary, in which case the OLS estimator will not have normal distribution. Unit roots can cause the results of a time series analysis to be unpredictable. It is important to specify the null and alternative hypotheses when testing for unit roots, which should be in line with the trend properties of the data at hand. In our case the applicable test equation is:

$$\Delta z_t = \alpha_0 + \theta z_{t-1} + \gamma t + \alpha_1 \Delta z_{t-1} + \alpha_2 \Delta z_{t-2} + \cdots + \alpha_p \Delta z_{t-p} + a_t \ldots (8)$$

The time series variable is denoted by *Zt* and *at* is the residual. The hypotheses of our Augmented Dickey-Fuller test are:

$H_0 : \theta = 0$

The null hypothesis is that the series has unit roots and is non-stationary.

$H_1 : \theta < 0$ .

The alternative hypothesis is that the series has no unit root and is stationary.

**Cointegration and Error Correction.** The order of integration in a time series is usually I(1), if it is stationary at level then it is I(0) and if we apply first difference to make it stationary then it is stationary at I(1). Cointegration makes regressions involving I(1) variables meaningful. In learning about a potential long-run relationship between two series, the concept of cointegration enhances the model at our disposal. This concept was given a formal treatment in Engle and Granger (1987). A time series of variables in a study is said to be cointegrated when the linear combination of non-stationarity series is stationary, in which case the series is said to have the same order of integration.

According to Engle and Granger (1987), two or more cointegrated series have an error correction representation. On the other hand, two or more series that are error correcting can be described as cointegrated. As an example, in a regression of *y* on the level of *x* with an underlying model:

$$y_t = \beta_0 + \beta_1 x_t + u_t \quad \ldots(9)$$

Given *yt* – β*xt* for any number of β, if *yt* and *xt* are I(1) processes and are not cointegrated, we might estimate a dynamic model in first differences with lags like:

$$\Delta y_t = \alpha_0 + \alpha_1 \Delta y_{t-1} + \gamma_0 \Delta x_t + \gamma_1 \Delta x_{t-1} + u_t \quad \ldots (10)$$

If *yt* and *xt* are cointegrated with parameter β, then we have some additional I(0) variables that we can include in the previous equation. If we assume *st* = *yt* – β*xt*, and *st* as I(0) with zero mean, we can then include one lag of *st* in the equation to get:

$$\begin{aligned} \Delta y_t &= \alpha_0 + \alpha_1 \Delta y_{t-1} + \gamma_0 \Delta x_t + \gamma_1 \Delta x_{t-1} + \delta s_{t-1} + u_t \\ &= \alpha_0 + \alpha_1 \Delta y_{t-1} + \gamma_0 \Delta x_t + \gamma_1 \Delta x_{t-1} + \delta (y_{t-1} - \beta x_{t-1}) + u_t \end{aligned} \quad \ldots (11)$$

The term $\delta(y_{t-1} - \beta x_{t-1})$ is the error correction term, and equation 11 is an example of an error correction model (ECM), which allows us to study the short-run dynamics in the relationship between *y* and *x.* It becomes relatively easy to estimate the parameters of an ECM once we know β and its various estimators.

A general procedure in looking at a set of time series variables is to test for unit root as specified earlier (ADF in our case), test for presence of cointegration, and proceed if there is cointegration, we then estimate an error correction model that captures long-run relationship and short run dynamics among our series. This technique allows us to estimate the short-term and long-run effects of the independent time series variables in this study.

# Chapter IV: Results

## Descriptive statistics

The descriptive statistics of the data used in modeling the relationship between our dependent and explanatory variables in the period 1970 - 2015 is presented in table 4.2. The skewness score range indicates that the variables are generally moderately skewed, with the exception of RGCF, Real_Export, and Real_Import which indicates right skewness. Such situation is usually addressed through a logarithmic transformation of affected variable(s). In terms of the kurtosis, a platykurtic distribution is observed with all of the variables having kurtosis values less than zero, with the exception of Export and Oil. We have a total of 48 observations spanning the time period covered in this study.

**Table 4.1**

*Descriptive Statistics*

| | RGCF | Oil | RGDP | Hcapital | Real_M | Real_X |
|---|---|---|---|---|---|---|
| Mean | 3.05763 | 13.140217 | 357740 | 1.388913 | 7.640769 | 8.589500 |
| Std.dev | 4.340627 | 7.636901 | 284059 | 0.236072 | 1.133105 | 1.236987 |
| Min | 1.65212 | 0.370000 | 44876 | 1.150000 | 2.814944 | 3.316108 |
| Max | 1.474313 | 38.550000 | 959522 | 1.880000 | 3.619131 | 4.599851 |
| Var | 1.8841 | 58.3223 | 8.06896 | 0.0557299 | 1.28393 | 1.53014 |
| Skew | 1.3453 | 0.646931 | 0.709833 | 0.755769 | 1.35873 | 1.66127 |
| kurtosis | 0.498285 | 1.10099 | -0.52228 | -0.899979 | 0.276535 | 1.7100 |
| No. | 46 | 46 | 46 | 46 | 46 | 46 |

*Source: Author's computation in python Statsmodel (2020)*

**Unit Root Tests**

Augmented Dickey Fuller test is adopted in our unit root analysis. All of our six variables are tested both at level, expectedly most of the variables are non-stationary at the level but are stationary in first difference i.e., they are I(1). The null hypothesis is that the series has unit root. Alternative hypothesis is that the series has no unit root and the series is stationary. The result is presented in Table 4.2 below:

**Table 4.2**

*Unit Root Tests*

| Variable | Order | ADF Stat | | Critical Values (5%) | |
|---|---|---|---|---|---|
| | | Constant | Constant and Trend | Constant | Constant and Trend |
| lnRGDP | I(0) | -1.313094 | -0.928454 | -2.932 | -3.515 |
| lnRGCF | I(0) | -0.840518 | -2.461929 | -2.930 | -3.521 |
| lnOil | I(0) | -4.482666 | -3.973967 | -2.930 | -3.515 |
| lnReal_Import | I(0) | -0.794818 | -2.160539 | -2.928 | -3.515 |
| lnReal_Export | I(0) | -0.663700 | -2.130649 | -2.928 | -3.513 |
| lnHcapital | I(0) | -0.193307 | -2.092410 | -2.933 | -3.521 |

**Table 4.2** (continued)

| Variable | Order | ADF Stat | | Critical Values (5%) | |
|---|---|---|---|---|---|
| | | Constant | Constant and Trend | Constant | Constant and Trend |
| lnRGDP | I(1) | -2.733437 | -4.456017 | -2.932 | -3.515 |
| lnRGCF | I(1) | -4.075715 | -4.064398 | -2.930 | -3.515 |
| lnOil | I(1) | -4.742101 | -4.897980 | -2.932 | -3.518 |
| lnReal_Import | I(1) | -4.856611 | -3.020864 | -2.930 | -3.533 |
| lnReal_Export | I(1) | -6.762842 | -6.713374 | -2.930 | -3.515 |
| lnHcapital | I(1) | -1.374981 | -1.411965 | -2.933 | -3.521 |

*Source: Author's computation in python Statsmodel (2020)*
*Note: ***, ** and * is used to denote the rejection of the null hypothesis at the 1%, 5% or 10% significance level*

**Tests for Cointegration**

This study employs the Augmented Engel-Granger two-step cointegration test and cons tant is included in the first stage regression. Variables *y0* and *y1* are assumed to be integrated of order 1, *I(1).* Our null hypothesis is that there is no cointegration and the alternative hypothesis is that there exists cointegrating relationship.

**Table 4.3**

*Cointegration Test*

| Variable | t-statistics | Critical value | |
|---|---|---|---|
| | | 5% | 10% |
| Residual (RGDP/Import) t | -1.8723* | -1.681 | -1.302 |
| Residual (RGDP/Export) t | -1.8764* | -1.681 | -1.302 |
| Residual (RGDP/Oil) t | -2.2370** | -1.681 | -1.302 |
| Residual (RGDP/Hcapital) t | -2.2342** | -1.1.681 | -1.302 |
| Residual (RGDP/RGCF) t | -2.2840** | -1.1.681 | -1.302 |

*Source: Author's computation in python Statsmodel (2020)*

*Note: ***, ** and * is used to denote the rejection of the null hypothesis at the 1%, 5% or 10% significance level*

As seen in Table 4.3, our test result indicates presence of cointegration between the dependent variable (RGDP) and the independent variables, which confirms the existence of a long-run relationship. We then proceed to implement an Error Correction Model to evaluate the short-run dynamics and the rate of adjustment towards the long-run relationship.

**Single Equation Error Correction Model**

An error correction model is a single equation, which is commonly used for time series data where the underlying variables have a long-run stochastic trend or cointegration. This kind of model is particularly useful for estimating short-run dynamics and the long-term effects of one series on another, which is our objective in this subsection of the study.

Theoretically, the coefficient of the error correction parameter is expected to have statistical significance, with a negative sign and value range between zero and one. If these are confirmed in our result, then the coefficient of the error correction term would signify the period when the short-run dynamics will converge towards equilibrium in the long-run.

The residual of the cointegrating series was lagged and regressed along with the differenced series of each of our explanatory variables.

**Table 4.4**

*Error Correction Model*

| | ECM (-1) | Oil | RGCF | Hcapital | Import | Export |
|---|---|---|---|---|---|---|
| Estimate | -0.59421 | 0.050 | -0.0085 | 0.0073 | 0.9520 | 0.1773 |
| t value | 4.21 | 0.71 | 0.40 | 0.13 | 11.68 | 3.08 |
| P Value | 0.00001 | 0.4794 | 0.6931 | 0.8938 | 0.0001 | 0.0037 |
| R-square = 0.8008<br>Adj R-sq = 0.7701<br>DW Stat = 1.594 | | | | | | |
| p value = .0001 | | | | | | |

*Source: Author's computation in python Statsmodel (2020)*

The result of the error correction model in Table 4.4 shows that the coefficient of the error correction parameter is as expected (between 0 and 1), with the valid negative sign, and it is also statistically significant. The error correction term (ECM) is significant at the 5% significance level and an estimated 59% of disequilibrium among our variables affecting economic growth is adjusted within a lag period of one year. This implies that the rate of economic growth will converge towards its long-run equilibrium level after periods of imbalance.

Our coefficient of determination (denoted by $R^2$; $R^2 = 0.8008$), indicates approximately 80% of the variation in Nigeria's economic growth is explained by the ECM model. The returned p-value of the model ($p < 0.001$) indicates our model to be statistically significant at the 5% level of significance, which means that the explanatory variables collectively affect Nigeria's rate of economic growth during the period 1970 – 2015.

**Granger Causality Test**

The Granger causality test is used in examining the direction of causality between two series. Theoretically, this approach is based on the belief that the future cannot cause the past to occur, however, the past can cause present events or the future to occur Granger (1986).

For two series x1 and x2, Granger causality implies that past values of x1 have a statistically significant effect on the current value of x2 i.e. if we take past values of x1 into account, then it should contain information that helps us predict x2 beyond the information contained in past values of x2.

The result of the pairwise Granger causality tests is presented in Table 4.5 below:

**Table 4.5**

*Granger Causality Test*

| Null Hypothesis | F-stat | Prob. | Decision |
|---|---|---|---|
| Export does not Granger cause RGDP | 0.0647 | 0.9375 | Fail to reject null |
| RGDP does not Granger cause Export | 0.1350 | 0.7151 | Fail to reject null |
| Import does not Granger cause RGDP | 0.2121 | 0.6475 | Fail to reject null |
| RGDP does not Granger cause Import | 2.0356 | 0.1439 | Fail to reject null |
| Oil does not Granger cause RGDP | 0.4252 | 0.5178 | Fail to reject null |
| RGDP does not Granger cause Oil | 0.2975 | 0.7443 | Fail to reject null |
| RGCF does not Granger cause RGDP | 2.7717 | 0.1032 | Fail to reject null |
| RGDP does not Granger cause RGCF | 1.2105 | 0.3087 | Fail to reject null |
| Hcapital does not Granger cause RGDP | 4.8458 | 0.0331** | Reject null |
| RGDP does not Granger cause Hcapital | 1.7247 | 0.1912 | Fail to reject null |
| Export does not Granger cause Import | 5.1082 | 0.0289** | Reject null |
| Import does not Granger cause Export | 4.3375 | 0.0197** | Reject null |
| Oil does not Granger cause Import | 3.6763 | 0.0619 | Fail to reject null |
| Import does not Granger cause Oil | 2.8543 | 0.0694 | Fail to reject null |
| RGCF does not Granger cause Import | 1.5477 | 0.2202 | Fail to reject null |
| Import does not Granger cause RGCF | 0.8883 | 0.4193 | Fail to reject null |
| Hcapital does not Granger cause Import | 0.0281 | 0.8677 | Fail to reject null |
| Import does not Granger cause Hcapital | 0.0234 | 0.9769 | Fail to reject null |

**Table 4.5** (continued)

| | | | |
|---|---|---|---|
| Oil does not Granger cause Export | 0.0042 | 0.9487 | Fail to reject null |
| Export does not Granger cause Oil | 0.6118 | 0.5474 | Fail to reject null |
| RGCF does not Granger cause Export | 0.0991 | 0.7544 | Fail to reject null |
| Export does not Granger cause RGCF | 0.1155 | 0.8912 | Fail to reject null |
| Hcapital does not Granger cause Export | 0.6799 | 0.4142 | Fail to reject null |
| Export does not Granger cause Hcapital | 0.3248 | 0.7246 | Fail to reject null |
| RGCF does not Granger cause Oil | 0.5308 | 0.4702 | Fail to reject null |
| Oil does not Granger cause RGCF | 0.8806 | 0.4224 | Fail to reject null |
| Hcapital does not Granger cause Oil | 2.4470 | 0.1251 | Fail to reject null |
| Oil does not Granger cause Hcapital | 0.9903 | 0.3804 | Fail to reject null |
| Hcapital does not Granger cause RGCF | 0.7742 | 0.3838 | Fail to reject null |
| RGCF does not Granger cause Hcapital | 1.1381 | 0.3306 | Fail to reject null |

***Notes:*** *** denotes the rejection of the hypothesis at the 5% level of significance. Number of observations: 44; Lag: 2. Source: Author's computation in python Statsmodel (2020)*

The result in Table 4.5 shows that there exists a unidirectional causality running from Human Capital to RGDP, which implies that human capital has a bearing on economic growth. Furthermore, there exists bidirectional causality between imports and exports.

**OLS Regression Result**

Because of the modest R-squared achieved in the ECM, a second non-linear regression model was conducted using the OLS regression method, with log-log model functional form:

$$logRGDP = log\_Export + logRGCF + logOil + log\_Import + logHcapital \quad \ldots 12$$

**Table 4.6**

*OLS Regression*

| | Intercept | log_Oil | log_RGCF | log_Hcapital | log_Import | log_export |
|---|---|---|---|---|---|---|
| Estimate | 0.6401 | -0.0805 | 0.3631 | 12.3190 | 0.1625 | 0.5180 |
| *t*-value | 0.134 | 1.00 | 2.708 | 8.938 | 0.917 | 2.599 |
| *p*-value | 0.894 | 0.321 | 0.010 | .0000 | 0.363 | 0.013 |
| $R^2$ = 0.8904<br>Adj R-sq = 0.880<br>DW Stat = 0.692 | | | | | | |
| *p*-value < .0001 | | | | | | |
| *N* = 46 | | | | | | |

*Source: Author's computation in python Statsmodel (2020)*

The individual explanatory variables, with the exception of Oil turned out to be statistically significant and are also jointly significant in the model. It is clear that human capital is a highly significant variable in the result. The negative coefficient on oil rent indicates that reliance on oil has been hurting Nigerian economic growth by 0.08%. Likewise, a percentage increase in export increases the GDP by 0.52% and the positive effect of the growth rate of real gross capital formation on economic growth is captured as well.

The R-square given by the OLS ($R^2 = 0.89$), indicates that the model explains approximately 89% of the variability in economic growth in Nigeria during the period 1970 – 2015.

## Chapter V: Summary and Conclusion

Empirical studies in trade literature has shown that economic growth is linked to trade. The study set out to empirically investigate the nexus of trade and economic growth in Nigeria from 1970 to 2015. Two different models were employed in this study – a single equation error correction model and a log-log OLS regression model. The ADF unit root tests and the Engel-Granger cointegration test proved that all the variables are integrated in the order of one I(1) and there exists a long-run cointegrated relationship between growth and the independent variables – human capital, real gross capital formation, real export, real import, and oil. The coefficient of the error correction model indicated that approximately 23% of the disequilibrium is adjusted within a lag of one year.

From the OLS result, it was discovered that a one percent increase in oil rent results affects GDP growth rate by 0.04 percent, which validates the existence of "oil curse" for resource dependent countries like Nigeria. Import and export are portrayed as having a positive effect on growth, which also validates the touted benefits of trade openness. The statistically significant and large positive coefficient on human capital underscores the importance of human capital development on growth direction for a country like Nigeria.

In comparison with previous studies in the literature focused on Nigeria, this study validated some of the existing findings by employing a larger data set. It also used a unique variable Human Capital Index which was presented in the Penn World Table 9.0 as a reliable explainer of human capital in a country. It is calculated based on years of schooling and an assumed rate of return to education. Studies like Were (2015) and Zahonogo (2017), which was an extensive study of the broader sub-Saharan Africa including Nigeria, have used rate of

population growth as a measurement of human capital but this study introduced human capital index as a measure of human capital, while Real Gross Capital Formation was used a measure of physical capital. The coefficient on human capital used in Zahonogo (2017) was positive and this study confirmed the same positive sign for its human capital variable.

The evidence here adds to existing literature to state that trade contributes to economic growth. This study therefore suggests for policymakers to develop the right mix of policy to boost human capital development, capital formation, export promotion, and to develop an economy that is less reliant on oil rent.

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