# EFFECTS OF TRADE ON GROWTH IN NIGERIA'S OPEN ECONOMY: ECONOMETRIC ANALYSIS

## 1. Introduction

Economic analysis is of vital importance in economic theory and its purpose is to gain an understanding of an interdependent world where foreign trade has benefited participating countries. Since attaining political independence, most developing countries in Sub-Saharan Africa depend on primary exports for the bulk of their foreign exchange earnings and the OECD countries are the main markets for the various exports. Consequently, the sustained economic growth of the OECD countries seems to be a prerequisite for the growth of the exports from the developing countries of Sub-Saharan Africa. Export trade provides the bulk of the foreign exchange needed to pay for imports and other services by foreigners. International trade brings gains to a country as well as gains to various sectors or groups in the economy. The import substitution development strategy and export promotion strategy have been adopted over the years by successive governments in Nigeria for the purpose of rapid economic growth and development.

Thanks to petroleum (oil) exports, the agricultural sector has been trailing the oil sector since 1970 in terms of internal revenue and export earnings. We know from national income accounting that there is the identity Y=((C+I+G)-M)+X, where Y denotes national income or economic output, C is consumption expenditures, I is gross private domestic investment, G is government expenditures, X is total export earnings and M is total import payments. Most of Nigeria's trading partners have currencies that are convertible but the Nigerian currency – the naira – is not. Thus Nigeria has to ensure that adequate export earnings are obtained from its export sector to keep the economy in a healthy situation for the achievement of the desired objective of overall economic performance.

Fischer (1999, p. 79) argued that the primary responsibility for development rests with developing countries, which should emphasize: investing in people, improving the climate for enterprise,

opening economies to international trade and investment, and getting macroeconomic policy right. The objectives of this paper are to examine the association between international trade and economic growth in Nigeria, and to investigate the effect of international trade performance on economic growth in Nigeria. This study spans the period 1981-2012 using annual time series data from the Central Bank of Nigeria.

## 2. International trade and economic growth in Nigeria

Nigeria as a dominant country in Africa derives tremendous advantages from international trade, that is, exports and imports of goods and services of various types which play significant roles in the development and growth of Nigeria's economy. In the 1960s the focus was on agricultural exports, mineral exports and manufactured exports. Nigeria's oil exports began in 1958 through the Bonny Oil Terminal in the Niger Delta. However, in the 1970s the focus shifted to oil exports and non-oil exports (agricultural, manufactured and other minerals). The dominance of oil exports continued till today with less attention to other exports. Nigeria benefited from an oil boom in the 1970s and early 1980s partly as a result of increased production and export of oil and partly due to the Organisation of Petroleum Exporting Countries oil price shocks of 1973/74 and 1979/80.

The industrial sector, building and construction sector and services sector among others benefited from imports of raw materials, machinery and equipment that were not available in Nigeria and other economic communities of West African States countries. Nigeria's trade data are shown in Table 1 in which the trade balance was negative for only three years. The flip side of import penetration is export performance.

In order to tackle obvious abnormalities in the operations of the Nigerian economy, the federal government in July 1986 introduced an IMF/World Bank supported Structural Adjustment Programme. According to the Central Bank of Nigeria (1997, p. 11),

> "…the Structural Adjustment Programme (SAP) embraced exchange rate devaluation, liberalization of export trade, cut-back in extra-budgetary spending, reduction in subsidies, abolition of subsidized commodity boards, privatization of public enterprises as well as staff rationalization and the adoption of a tight monetary policy".

TABLE 1 - *Nigeria: International Trade (Naira million), 1981-2012*

| YEAR | IMPORTS | EXPORTS | TRADE BALANCE | EXPP % | IMPP % |
|---|---|---|---|---|---|
| 1981 | 13505.0 | 11478.0 | -2027 | 22.2 | 26.1 |
| 1982 | 10686.0 | 9569.5 | -1116.5 | 17.8 | 19.9 |
| 1983 | 7246.0 | 8425.6 | 1179.6 | 14.5 | 12.5 |
| 1984 | 5084.0 | 10102.7 | 5018.7 | 15.7 | 7.9 |
| 1985 | 6262.0 | 12785.4 | 6523.4 | 17.4 | 8.5 |
| 1986 | 7791.0 | 9974.8 | 2183.8 | 13.3 | 10.4 |
| 1987 | 16456.6 | 30151.4 | 13694.8 | 26.9 | 14.9 |
| 1988 | 18429.6 | 33811.4 | 15381.8 | 22.9 | 12.5 |
| 1989 | 37489.9 | 100476.0 | 62986.1 | 44.0 | 16.4 |
| 1990 | 49794.9 | 99511.8 | 49716.9 | 35.3 | 17.7 |
| 1991 | 76263.9 | 137226.1 | 60962.2 | 41.7 | 23.2 |
| 1992 | 130649.7 | 2083442.2 | 1952793 | 37.5 | 23.5 |
| 1993 | 173660.6 | 241965.3 | 68304.7 | 33.8 | 24.3 |
| 1994 | 170187.4 | 229867.1 | 59679.7 | 24.3 | 18.0 |
| 1995 | 482182.7 | 718292.5 | 236109.8 | 35.8 | 24.0 |
| 1996 | 712422.6 | 902369.2 | 189946.6 | 32.2 | 22.5 |
| 1997 | 1019800.8 | 1214230.8 | 194430 | 41.8 | 35.1 |
| 1998 | 1027473.5 | 836233.8 | -191240 | 29.7 | 36.5 |
| 1999 | 727926.5 | 1121840.5 | 393914 | 33.9 | 22.0 |
| 2000 | 926963.8 | 2440292.9 | 1513329 | 51.8 | 19.7 |
| 2001 | 1785338.4 | 2231285.1 | 445946.7 | 45.4 | 36.4 |
| 2002 | 1954406.9 | 2563707.7 | 609300.8 | 36.0 | 27.4 |
| 2003 | 3097607.4 | 3478515.5 | 380908.1 | 40.0 | 35.4 |
| 2004 | 2134795.8 | 3520846.2 | 1386050 | 30.2 | 18.3 |
| 2005 | 2813177.9 | 4664757.3 | 1851579 | 31.7 | 19.1 |
| 2006 | 4022227.0 | 8066037.7 | 4043811 | 43.1 | 21.5 |
| 2007 | 5912234.5 | 7091314.0 | 1179080 | 34.0 | 28.3 |
| 2008 | 4973922.0 | 9799693.1 | 4825771 | 38.5 | 19.6 |
| 2009 | 6383531.5 | 10063304.7 | 3679773 | 39.5 | 25.0 |
| 2010 | 8005374.4 | 11035794.5 | 3030420 | 40.8 | 24.0 |
| 2011 | 10235174.22 | 14240232.15 | 4005057.93 | 37.46 | 10.2 |
| 2012 | 9109032.49 | 15002867.70 | 5893835.21 | 36.43 | 8.3 |

*Note*: EXPP=Export performance (EXPORTS/GDP).
IMPP=Import penetration (IMPORTS/GDP).

*Sources*: (i) Central Bank of Nigeria Statistical Bulletin, December 2010 and December 2008;
(ii) Central Bank of Nigeria Annual Report 2010 and 2012.

Using the expenditure approach we have GDP at current purchaser's price and GDP at constant basic prices. In the 1981-1990 period real GDP growth for Nigeria ranged from -1.8 per cent in 1981 to 9.5 per cent in 1985 (CBN, 2010). However, the real

GDP growth rates were very low in the 1991-2002 period which the Central Bank of Nigeria (1995) attributed to low savings and investment ratios which are due partly to institutional factors and partly to inappropriate macroeconomic policy environment. The growth rates were impressive during 2003-2010 and peaked at 9.6 per cent for the entire period (Table 2). According to the Central Bank of Nigeria (1995, p. 80) capital accumulation is basic to growth.

TABLE 2 - *Nigeria's Gross Domestic Product and Growth (Naira million), 1981-2012*

| YEAR | GDP at Current Purchaser's price | ECONOMIC GROWTH % | YEAR | GDP at Current Purchaser's price | ECONOMIC GROWTH % |
|---|---|---|---|---|---|
| 1981 | 51731.8 | -1.8 | 1997 | 2906624.9 | 3.2 |
| 1982 | 53659.0 | -0.3 | 1998 | 2816406.0 | 2.4 |
| 1983 | 57963.3 | -5.4 | 1999 | 3312240.9 | 2.8 |
| 1984 | 64326.3 | -5.1 | 2000 | 4717332.1 | 3.9 |
| 1985 | 73542.0 | 9.4 | 2001 | 4909526.5 | 4.6 |
| 1986 | 74908.2 | 3.2 | 2002 | 7128203.1 | 4.6 |
| 1987 | 111912.9 | -0.6 | 2003 | 8742646.7 | 9.6 |
| 1988 | 147941.1 | 10.0 | 2004 | 11673602.2 | 6.6 |
| 1989 | 228451.5 | 7.3 | 2005 | 14735324.0 | 6.5 |
| 1990 | 281550.3 | 8.2 | 2006 | 18709786.5 | 5.6 |
| 1991 | 329070.8 | 4.8 | 2007 | 20874172.4 | 6.5 |
| 1992 | 555445.5 | 3.0 | 2008 | 25424947.7 | 6.1 |
| 1993 | 715241.9 | 2.7 | 2009 | 25489985.6 | 6.9 |
| 1994 | 945557.0 | 1.0 | 2010 | 29498000.0* | 7.9 |
| 1995 | 2008564.0 | 2.2 | 2011 | 38016971.1 | 7.4 |
| 1996 | 2799036.1 | 3.4 | 2012 | 41,177,816.6 | 6.6 |

GROWTH refers to real economic growth rate.
*From p. 249 Central Bank of Nigeria Annual Report 2010.
*Sources*: (i) Central Bank of Nigeria Statistics Bulletin December 2010;
(ii) Central Bank of Nigeria Statistics Bulletin December 2008;
(iii) Central Bank of Nigeria 2012 Annual Report.

## 3. LITERATURE REVIEW

A large body of empirical knowledge is available relating international trade to economic growth of a country or group of countries in the 1960s and 1970s. Previous empirical studies using cross-section as well as time series data have provided evidence on the positive effect of exports and imports on real economic

growth (see Odusola and Akinlo, 1995; Ekpo, 1995; Tombofa, 1985; Salvatore, 1983 among others, where the research has been extensively surveyed). In the 1980s, Tyler (1981), Feder (1982), Balassa (1985), Ram (1985), Salvatore (1983), Tombofa (1985), and Mânas-Anton (1987), among others, using either export growth or share of exports in GDP provided evidence that exports positively affected economic growth.

During the 1990s and the 2000-2009 decade, Dollar (1992), Levine and Renelt (1992), Sachs and Warner (1995), Ekpo (1995), Odusola and Akinlo (1995), Edwards (1998), Ben-David *et al*. (2000), and Ades and Glaeser (1999) to mention but a few, found that international trade enhanced economic growth. Four studies are directly related to this article: Mânas-Anton (1987), Genberg and Swoboda (1987), Obaseki (1999) and Odusola and Akinlo (1995). Both Genberg and Swoboda (1987) and Mânas-Anton (1987) using real GDP growth as a measure of real economic growth in a cross-section study found that total government expenditure as a share of GDP was negatively related to economic growth whereas real government capital expenditure as a share of GDP had a significant effect on real growth. Also that export performance had a significant positive effect on growth. In essence both studies used monetary, fiscal and trade policies, among other regressors. Odusola and Akinlo (1995) focused on trade openness (ratio of total trade to GDP) but also used growth of exports and imports with export growth having a positive effect on economic growth. Obaseki (1999) merely presented an openness model: GDPg (growth rate of GDP) as a function of index of openness, real exchange rate, money supply, inflation and the ratio of budget deficit to GDP. This can as well be called a growth model which according to Obaseki has not been helpful to developing countries. Adenikinju and Enofe (2006) modified Obaseki's openness model by replacement of the dependent variable with GDP *per capita* and added a new regressor (maximum lending rate). The present study seeks to overcome some of the drawbacks of previous studies by using stationary time series, cointegration analysis and error correction mechanism in a simple growth model.

The academic growth literature has bifurcated into arguments for two competing views – a neoclassical and a new growth view (Stiroh, 2001). Modern economic theory tells us that capital (physical and human), labour, energy, materials, and entrepreneurship are essential in the production process. However, in all growth theories, capital accumulation is generally recognised as the key factor.

The neoclassical economic growth theories (or models) started with the Harrod-Domar Growth Model and the Solow Growth Model with both models using the standard assumption that aggregate output (Y) is produced efficiently using capital (K) and labour (L) as primary inputs.

The Harrod-Domar model assumed fixed factor coefficients, like capital-output ratio (k) and that k equals K/Y. With S and I denoting saving and investment, respectively, K=I and S=I the model had it that output growth equals the product of the output capital ratio and the saving ratio. According to the Harrod-Domar theory, the main obstacle to growth is the relatively low level of new capital formation in developing countries. Under the neoclassical assumptions of competitive factor markets and input exhaustion when technology is Hick-neutral, output in the Solow model (1957) is based on Y=A *f* (K, L) where A denotes the level of technology and rate of Hick-neutral technical change equals total factor productivity. The model assumes constant returns to scale production function and savings is a fixed proportion of national income. The model asserts that capital accumulation affects growth only during the transition to the steady state; long-term growth is determined only by the rate of technical change. Moreover, the model assumes that long-term rate of growth is out of reach of policymakers. The standard neoclassical theory assumes that knowledge is given and fixed.

More recently, the new growth theory, that is, endogenous growth theory created new interest in economic growth and the determinants of technological progress and also the proper role of central government in education and development. The new growth theory which is associated with Romer (1987, 1986), Grossman and Helpman (1991), Lucas (1988), and Rebelo (1991) to mention just a few, has its focus on private knowledge creation and characteristics of knowledge for the realization of unbounded economic growth in a nation. In the new growth theory, physical capital, human capital, labour and technical knowledge are treated as factor inputs in the production of domestic economic output. According to Stiroh (2001, p. 41)

> "The endogenous or new growth theory was developed to move beyond the neoclassical model of providing an endogenous mechanism for long-run productivity growth, either by removing the diminishing returns to capital or by explaining technical change as the result of specific actions".

## 4. Methodology, data and estimation results

### *4.1 Model and Data*

Following national income accounting there are aggregate final demand components and there is Y=C+I+G+X–M where Y is national income (=GDP), C is personal consumption expenditures, I is gross private domestic investment, G is government expenditures, X is total exports, M is total imports and net exports is X-M. Economic growth has been identified in the economic literature concerning fiscal policy, monetary policy, exchange rate policy and trade policy (see Manas-Anton, 1987; Genberg and Swobodo 1987; Loungani *et al*., 1991; Easterly and Levine 2001, among others). Our focus is on trade policy and econometric investigation with annual time series data using a regression with economic growth as the regressand:

$$GROWTH=\alpha+\beta EXPP+\gamma IMPP+\theta FIND+\varepsilon \quad (1)$$

where GROWTH denotes real economic growth, EXPP is share of exports in GDP, IMPP is share of imports in GDP and ε is an error term. In the economic literature export growth is important for measuring a country's capacity to increase imports of capital goods that are readily available in industrial countries. The shares of exports and imports as a percentage of GDP are used as a measure of trade performance. Genberg and Swoboda (1987) and Manas-Anton (1987) used similar ordinary least-squares time series regression without unit root tests for spurious results. Modern econometric methods allow the use of augmented Dickey-Fuller and Phillips-Perron unit root tests when using time series data. We augmented equation (2) with financial deepening (FIND), that is, the ratio of M2 money supply to GDP.

The annual time series data spanning the period 1981-2012 were obtained from the Central Bank of Nigeria's *Statistical Bulletin* (various years) and *Annual Report* for various years. The various variables are real economic growth, exports performance, imports penetration, exports growth and imports growth, and financial deepening (that is, the ratio of M2 to GDP). Economic growth is annual percentage change in real GDP at factor cost as computed by the Central Bank of Nigeria. Export performance is the exports-GDP ratio while import penetration is the ratio of imports-GDP. In order to develop strong, robust and reliable model that captions the relationship between imports, exports and gross domestic product growth rate, the research work used modern econometric tests and techniques.

*4.2 Empirical Tests, Results and Discussion*

The Pearson correlation coefficients are shown in Table 3. The results revealed a positive relationship between economic growth and import penetration and export performance. The relationship between financial deepening and growth was negative. The coefficient between growth and export performance was 0.33; that between growth and import penetration was 0.23; and that between growth and financial deepening was -0.32 indicating a weak relationship between trade and economic growth in Nigeria for the period 1981-2012. Next, we subjected the variables to the augmented Dickey-Fuller (ADF) test for unit roots as a necessary step in modern time series analysis. When regression is based on time series that contain unit roots the results are often spurious but if there are some parameters such that the combination of these time series has no unit root the regression results can be interpreted as a long-run relation. This necessarily leads to error correction analysis. The ADF unit root results (see Table 4) indicate that economic growth is stationary at levels whereas export performance, import penetration and financial deepening are stationary at first differences.

TABLE 3 - *Pearson Correlation Matrix*

| Variable | GROWTH | EXPP | IMPP | FIND |
|---|---|---|---|---|
| GROWTH | 1.000000 | 0.334470 | 0.230425 | -0.318200 |
| EXPP | 0.334470 | 1.000000 | 0.562091 | 0.075742 |
| IMPP | 0.230425 | 0.562091 | 1.000000 | -0.052497 |
| FIND | -0.318200 | 0.075742 | -0.052497 | 1.000000 |

*Source*: Authors' computation.

TABLE 4 - *ADF Unit Root Test Results*

| Variable | ADF Statistic | | Included lag(s) | Order of Integration | Remark |
|---|---|---|---|---|---|
| | Level | First Difference | | | |
| GROWTH | -3.505634** | - | 1 | I(0) | Intercept No Trend |
| EXPP | -2.332211 | -5.578685*** | 1 | I(1) | Intercept No Trend |
| IMPP | -1.853681 | -5.362626*** | 1 | I(1) | Intercept No Trend |
| FIND | -0.407483 | -3.958687*** | 1 | I(1) | Intercept No Trend |

*Source*: Authors' computation.

The study relied on the OLS estimates but corrected the standard errors for arbitrary order of autocorrelation as suggested by Newey-

West for the purpose of making robust inferences. The OLS results are presented in Table 5 while those with standard errors corrected for heteroscedasticity and autocorrelation are presented in Table 6. EXPP and IMPP showed positive signs as expected but FIND had a negative sign, this negates economic expectations. These results reinforced the findings from the correlation analysis. Although only FIND was marginally significant at 5 per cent level while EXPP was significant at 10 per cent level. However, after correcting the standard errors for arbitrary order of autocorrelation both variables became significant at 5 per cent level. IMPP was statistically not significant both with the OLS and Newey-West standard errors.

TABLE 5 - *Ordinary Least Squares Estimation Results*

Sample: 1981-2012
Included observations: 32

| GROWTH | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| IMPP | 0.053351 | 0.758819 | 0.070309 | 0.9444 |
| EXPP | 0.788108 | 0.451676 | 1.744854 | 0.0920 |
| FIND | -1.062893 | 0.516837 | -2.056534 | 0.0492 |
| C | 18.32302 | 17.34745 | 1.056237 | 0.2999 |
| R-squared | 0.230702 | Mean dependent var | | 25.04406 |
| Adjusted R-squared | 0.148277 | S.D. dependent var | | 23.83757 |
| S.E. of regression | 21.99942 | Akaike info criterion | | 9.136378 |
| Sum squared resid | 13551.29 | Schwarz criterion | | 9.319595 |
| Log likelihood | -142.1821 | F-statistic | | 2.798932 |
| Durbin-Watson stat | 1.780503 | Prob(F-statistic) | | 0.058332 |

*Source*: Author's computation.

TABLE 6 - *OLS Estimation Results with HAC Standard Errors*

Sample: 1981-2012
Newey-West HAC Standard Errors & Covariance (lag truncation=3)

| GROWTH | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| IMPP | 0.053351 | 1.086829 | 0.049089 | 0.9612 |
| EXPP | 0.788108 | 0.329731 | 2.390154 | 0.0238 |
| FIND | -1.062893 | 0.391880 | -2.712292 | 0.0113 |
| C | 18.32302 | 15.10004 | 1.213442 | 0.2351 |
| R-squared | 0.230702 | Mean dependent var | | 25.04406 |
| Adjusted R-squared | 0.148277 | S.D. dependent var | | 23.83757 |
| S.E. of regression | 21.99942 | Akaike info criterion | | 9.136378 |
| Sum squared resid | 13551.29 | Schwarz criterion | | 9.319595 |
| Log likelihood | -142.1821 | F-statistic | | 2.798932 |
| Durbin-Watson stat | 1.780503 | Prob(F-statistic) | | 0.058332 |

*Source*: Author's computation.

## 5. Conclusion

This study examined the effect of export performance, import penetration and financial deepening on real economic growth in Nigeria using time series data. Economic growth was stationary at levels while export performance, import penetration and financial deepening were stationary at first difference. The empirical results showed that export performance and financial deepening are more important than import penetration in explaining Nigeria's economic growth in the period 1981-2012. The results have important implications for government and non-government policymakers in Nigeria and foreigners associated with monetary, trade and exchange rate policies of Nigeria.

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## ABSTRACT

This study attempted to quantify the relationship between international trade and overall economic performance in Nigeria. Specifically, this study examined the correlation between economic growth and each of export performance and import penetration, as well as the effect of export performance, import penetration and financial deepening on real economic growth in Nigeria using time series data. The use of econometric techniques provided useful results. Real economic growth was significantly positively related to export performance. The correlation between economic growth and import penetration was also positive. However, growth was negatively related to financial deepening. Augmented Dickey-Fuller test results showed economic growth was I(*0*) whereas import penetration, export performance and financial deepening were I(*1*), respectively. The empirical results showed that export performance and financial deepening are more important than import penetration in explaining Nigeria's economic growth in the period spanning 1981-2012. The results have important implications for government and non-government policymakers in Nigeria and foreigners.

Keywords: Economic Growth, Exports, Imports, Financial Deepening, Unit Roots

JEL Classification: C01, C22, E13, E14, E51, F41, F43, O47

## RIASSUNTO

### *Effetti del commercio internazionale sulla crescita della Nigeria: un'analisi econometrica*

Scopo di questo studio è quantificare la relazione tra commercio internazionale e dinamica dell'economia della Nigeria. Specificatamente viene esaminata la relazione tra crescita economica e importazioni ed esportazioni, così come l'effetto delle esportazioni, delle importazioni e della intensità finanziaria sulla crescita della Nigeria, utilizzando dati di serie temporale. L'uso delle tecniche econometriche ha fornito risultati utili. La crescita economica reale è positivamente e significativamente correlata alle esportazioni ed alle importazioni, mentre la correlazione con la intensità finanziaria è negativa. I risultati dei test di Dickey e Fuller mostrano che la crescita economica era I(*0*), mentre la penetrazione delle importazioni, la performance delle esportazioni e l'intensità finanziaria erano I(*1*), rispettivamente.

I risultati empirici mostrano che l'export e l'intensità finanziaria sono più rilevanti delle importazioni nello spiegare la crescita economica nel periodo 1981-2012. Questi risultati hanno implicazioni importanti per la politica economica sia in Nigeria sia negli altri paesi.