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Reference: Adesoye, Bolaji Adesola (2017). Macroeconomic effects of export demand in Nigeria.

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Macroeconomic Effects of Export Demand in Nigeria

Bolaji Adesola Adesoye¹

Abstract: This study examines the macroeconomic effects of aggregate export demand in Nigeria using annual time series data between 1970 and 2013. The paper made use of the ordinary least square method to analyse the long-run relationship for the period under study. The empirical results confirm that there exists a unique and significant long-run equilibrium relationship among export volume, world income, crude oil price, domestic output, exchange rate and cost of doing business. The estimated results show that domestic income has the highest elasticity, followed by world's output and cost of doing business, which all report positive relations. Other macroeconomic factors reported negative relationship with aggregate export volume. Thus, an important policy implication of our findings is that stabilizing Nigeria's export earnings potential by counteracting the external factors that influence adversely the Nigerian exports such as crude oil price and cost of doing business.

Keywords: Export demand; domestic output; world outputs; inflation rate; Nigeria

JEL Classification: E00

1. Introduction

Over the past decades, the developmental role of export had been appreciated from the fact that it earns foreign exchange, increases firms' sales/profit, lowers production cost, creates employment, earns international recognition, enhances reputation, and improves the living standard of both the exporting and importing firms/nations. Exports have long played a role in the analysis of regional economies, primarily through the concept of the economic base. The need to export is predicated solely on economic reasons. Export promotion highlights on two most important concepts. Firstly, export in the context of regional economic development is seen as goods and services sold outside the region, not necessary international. Secondly, export may refer to goods and services sold to people in countries other than the country where the product or service is produced.

Most countries control the movement of goods crossing their borders, whether leaving (exports) or entering (imports). Some of the basic export and import documents are tariffs, quotas, etc. They are barriers to the free flow of goods between independent sovereignties and are requirements that must be met by either the exporter or the importer or both. In order to ensure good trading relationship between countries and easy movement of goods, services and human capital, trade barriers are reduced or removed (Aimiumu, 2004).

Nigeria has achieved some appreciable output growth in recent times. A number of explanations of this observed trend have been attempted in different academic papers. Non-oil exports performance has also

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improved moderately during this period. Several factors appear to have contributed to this phenomenon including a rapid improvement in trade liberalization through improved exportation, concerted efforts to diversify the productive base of the economy, and a substantial increase in foreign direct investment inflows into the country.

However, it is noteworthy that despite the policy thrust on export promotions, there has not been any satisfactory result from previous attempt to assess its contribution to Nigeria's export performance - a major channel through which export demand is determined. Hence, this study examines the impact of macroeconomic effects of export growth in Nigeria. The importance of this study is that it shows the effect of both internal and external factors on export demand and openness of trade beyond borders. Furthermore, the relationship between variable determinants and export demand in developing countries has been of continuing interest both in theoretical and empirical literature.

2. Literature Review

Export demand refers to the demand by foreign countries for goods and services produced domestically. Ultimately, these goods are exported to foreign residents. The theory of international trade and commercial policy is one of the oldest branches of economic thought. Exporting is a major component of international trade, and the macroeconomic risks and benefits of exporting are regularly discussed and disputed by economists and others. Two views concerning international trade present different perspectives. The first recognizes the benefits of international trade. The second concerns itself with the possibility that certain domestic industries (or laborers, or culture) could be harmed by foreign competition.

A lot of study has been carried for country-specific, cross-country and panel study. Senhadji and Montenegro (1999) estimates export demand elasticities for a large number of developing and industrial countries using time series techniques for 75 developing countries for a period of 1960 to 1993. Empirical findings revealed that the price and income elasticity estimates have good statistical properties. More so, the average long-run price and income elasticities are found to be approximately – 1 and 1.5, respectively. Thus, exports do react to both the trade partners' income and to relative prices. Indeed, Africa faces the lowest income elasticities for its exports, while Asia has both the highest income and price elasticities.

Osman and Evans (2005) examine the short-run and long-run elasticities of the Somalian exports for banana and livestock products in Somalia. They employed Co-integration and error correction within 1967 to 1987. The results obtained provide evidence of a long-run equilibrium relationship between the Somalian exports and its major determinants. The error correction predicts the adjustment of the variables to their long-run equilibrium value reasonably well, but there is a substantial variation in the adjustment speed across commodities.

Zheng and Sayed (2012) identify the main factor influencing U.S. pistachio export demand in North America for 1989 to 2009 using descriptive and simple linear regression. Findings indicate that Canadian GDP, U.S walnut export prices, and food safety concerns explain the majority of the pistachio import demand variation in Canada, whereas Iranian pistachio export prices, the real exchange rate

between the Mexican peso and the U.S. dollar, and U.S. pecan export prices explain the majority of the Mexican pistachio import demand variation.

Husein (2008) empirically estimates the critical parameters of the aggregate export demand function for Jordan within 1970 to 2004 using Johansen-Juselius and Saikkonen-Lütkepohl multivariate cointegration. The empirical results confirm that there exists a unique and significant long-run equilibrium relationship among exports, foreign income, relative export price, and domestic output. Our estimation results show that income elasticity is much larger than unity while export price elasticity is slightly above one. The long-run estimate of the export price elasticity reveal that the Marshall-Lerner condition is satisfied for Jordan and currency devaluation may be effective in improving Jordanian exports and her trade balance. Moreover, domestic output has a positive and significant impact on Jordanian exports.

Hamori and Matsubayashi (2009) use panel data to empirically analyze the stability of the export functions of Less Developing Countries within 1980 to 2004 by employing cointegration estimation. They find that the use of panel data for the region of the LDC clearly supports a cointegrating relationship. Their empirical results also show that price elasticity ranges between -0.24 and -0.34 and income elasticity ranges between 1.36 and 1.79 for the panel of LDCs.

Nanang (2010) analyzed the factors that affect the export demand for Ghana's timber products using cointegration and ECM techniques for a period of 1961 to 2006. They find that exchange rates and income were significant determinants of exported timber products and had the theoretically expected positive signs. The three policy initiatives significantly reduced the exports of sawnwood, but increased the exports of plywood and veneer. Price was moderately elastic for sawnwood and plywood and had the expected negative signs in both cases, while it was positive and inelastic for veneer. The error-correction coefficients show that 68% of shocks to veneer exported is corrected in the following year, while only approximately 20% and 19% of this are corrected for sawnwood and plywood, respectively. Sawnwood and plywood face stiff competition in the international market and this has revenue and tax policy implications for Ghana's forestry sector.

Hossain (2009) investigates the aggregate export demand behaviour in Indonesia for a period of 1963 to 2005 using Pesaran bounds testing and the Johansen cointegration tests, and long-run estimate. Pesaran bounds testing and the Johansen cointegration tests results suggest that there exists a long-run relationship between real exports, world income and the relative export prices in Indonesia. The long-run income elasticity of the demand for Indonesia's exports is significantly greater than one and the long-run relative export price elasticity of the demand for its exports is significantly lower than one. The recursive and rolling regressions and the Hansen-Johansen stability test results suggest that the export demand function for Indonesia has undergone a significant structural change since the late-1990s, which is reflected in the decrease of the income elasticity, and an increase in the relative export price elasticity, of demand for Indonesian exports.

Timmer and Vries (2015) analyze the impact of foreign demand on Chinese employment creation from 1995 to 2012 using Global input-output methodology. They find that between 1995 and 2001, fast growth in foreign demand was offset by strong increases in labour productivity and the net effect on employment was nil. Between 2001 and 2006, booming foreign demand added about 70 million jobs.

These jobs were overriding for workers with only primary education. Since 2006 growth in domestic demand for non-tradables has become more important for job creation than foreign demand, signalling a rebalancing of the Chinese economy.

Dike (2013) determines the external crude oil demand security risks of OPEC member states using a panel estimation technique. In assessing these risks, this study introduces two indexes. The first index, Risky Energy Exports Demand (REED), indicates the level of energy export demand security risks for OPEC members. It combines measures of export dependence, economic dependence, monopsony risk and transportation risk. The second index, Contribution to OPEC Risk Exposure (CORE), indicates the individual contribution of the OPEC members to OPEC's risk exposure. His study utilises the disaggregated index approach in measuring energy demand security risks for crude oil and natural gas and involves a country level analysis.

Woerter and Roper (2010) reconsider the role of 'home' and 'export' market demand in stimulating manufacturing innovation using comparable panel data for two small open economies – Ireland and Switzerland. They employed panel techniques using a data set of 1994 to 2005. They find little evidence of any significant market demand effects, with innovation performance instead determined largely by firm-level capability effects and characteristics. In policy and strategy terms, they suggest the continued value of measures to improve innovation capability regardless of market demand conditions. In more methodological terms their results suggest the validity of the usual assumption implicit in modelling innovation outputs that supply-side factors predominate.

Nadeesha and Silva (2013) evaluate the development of Sri Lankan exports over the recent past and try to highlight a relationship between exports and shipping services for Sri-Lanka within 1987-2011, using descriptive, regression (OLS) and VAR analysis. Findings show that there is strong straight line relationship between the value of exports and the amount of cargo loaded. The VAR techniques reports that the derived demand for shipping by exports can be forecasted by using export performance data over a period of time.

Senhadji and Montenegro (1998) estimates export demand elasticities for a large number of 73 developing and industrial countries using time series techniques for a period of 1960 to 1993. Empirical findings revealed that the price and income elasticity estimates have good statistical properties. More so, the average long-run price and income elasticities are found to be approximately -1 and 1.5 , respectively. Thus, exports do react to both the trade partners' income and to relative prices. Indeed, Africa faces the lowest income elasticities for its exports, while Asia has both the highest income and price elasticities.

3. Methodology

To estimate the rest of the world's demand for Nigerian exports, the traditional long-run specification of export demand function that relates the volume of a country's exports to world buying power (foreign income) and the ratio of the price of its exports to the world export price will be included. Furthermore, following Guisan and Cancelo (2002), domestic GDP proxied by the industrial production index will be

included to capture supply side effects on host country's exports. The aggregate export demand function is specified as follows:

$$\ln X_t^d = \delta_0 + \delta_1 \ln YW_t + \delta_2 \ln \left(\frac{PX_t}{PXW_t} \right) + \delta_3 \ln YD_t + u_t \quad (3.1)$$

Where; X_t^d is the volume of country's export, YW is the rest of the world income, PX is home country's export price, PXW is world export price, YD is domestic GDP and u_t is a serially uncorrelated random term all at time t , and \ln stands for the natural logarithm of the relevant variables.

For the purpose of this study, the relative price of country export price to world price is replaced by oil price since Nigeria is an oil-export dependent country. More so, exchange rate and cost of doing business i.e. inflation rate is added as a control variable in the model adopted. It is thus specified as:

$$\ln X_t^d = \delta_0 + \delta_1 \ln YW_t + \delta_2 \ln OP_t + \delta_3 \ln YD_t + \delta_4 EXR_t + \delta_5 CDB_t + u_t \quad (3.2)$$

Where; X_t^d is the volume of country's export, YW is the rest of the world income, OP is crude oil price, YD is domestic GDP, EXR is exchange rate; CDB is cost of doing business proxy by inflation rate and u_t is a serially uncorrelated random term all at time t , and \ln stands for the natural logarithm of the relevant variables.

The study expect δ_1 to be positive, an indication that as world income rises, their demand for goods and services increases, including those of Nigeria, δ_2 to be positive reflecting the fact that as price of crude oil increases, Nigerian export earnings would also increase. Moreover, we expect δ_3 to be positive, an indication that strong economic performance measured by higher GDP will directly lead to higher exports. It is worthy to note that if the increase in world income is due to an increase in their production of import substitute goods, δ_1 could be negative. Moreover, strong economic performance measured by higher domestic income (GDP) can also indirectly lead to higher exports through improved levels of education. And, δ_4 to be negative reflecting the fact that as inflation rate increases, Nigerian goods and services become more expensive to foreign buyers.

In estimating the multiple regression model the unrestricted Ordinary Least Square (OLS) is used. The estimated parameters are subjected to evaluation by using the student t-statistic test and F-statistic test. While, the overall stability of the specified empirical model is tested using multiple co-efficient of determination (R^2), adjusted R^2 and Durbin-Watson test.

4. Data Analysis and Interpretation

The time series data employed for the estimation of the empirical model specified to capture the effect of macroeconomic factors on export demand in Nigeria is presented in Figure 4.1.

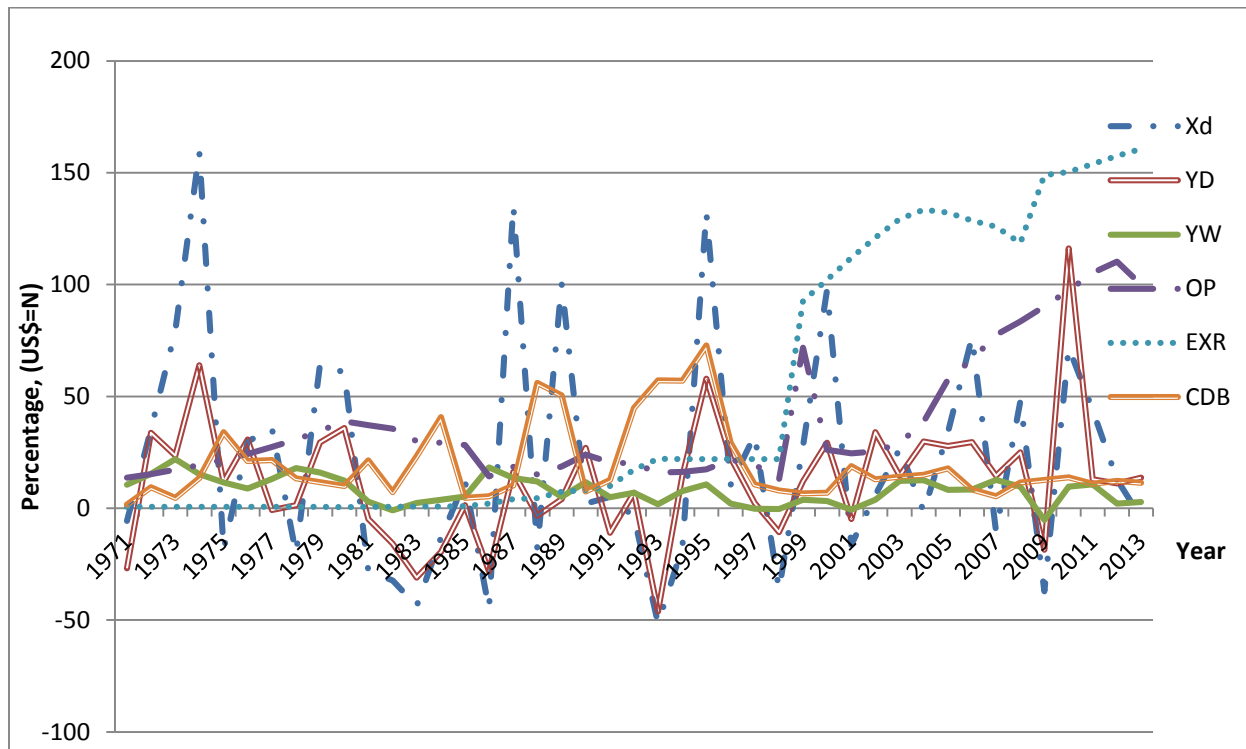


Figure 4.1. Macroeconomic Factors of Export Demand in Nigeria

The relationship between the variables is not clear enough to indicate whether it is positive or negative. The inconclusiveness of the direction of our variables necessitates the need for an empirical analysis. The result of the estimated regression is presented in Table 4.1.

Table 4.1. Estimated Regression Results

Dependent Variable: LOG(XD)
Method: Least Squares
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.466654	1.518242	-5.576616	0.0000
CDB	0.000106	0.002994	0.035251	0.9721
LOG(OP)	-0.029636	0.182267	-0.162596	0.8717
LOG(YD)	0.906215	0.139105	6.514629	0.0000
LOG(YW)	0.492961	0.097647	5.048405	0.0000
EXR	-0.000909	0.001567	-0.580381	0.5651
R-squared	0.953900	Mean dependent var		9.416704
Adjusted R-squared	0.947834	S.D. dependent var		1.234665
S.E. of regression	0.281997	Akaike info criterion		0.432283
Sum squared resid	3.021847	Schwarz criterion		0.675582
Log likelihood	-3.510225	Hannan-Quinn criter.		0.522510
F-statistic	157.2573	Durbin-Watson stat		1.694403
Prob(F-statistic)	0.000000			

Source: Author's computation (2016)

Table 4.1 reports that cost of doing business proxy by inflation rate (*CDB*), domestic GDP (*YD*), and rest of the world income (*YW*) exert positive influence on volume of country's export (X_t^d) in Nigeria between a decade period after Nigeria's independence and 2011 fiscal year and all of these effects conform with the theoretical expectation except cost of doing business. This implies that a 10% percentage increase in cost of doing business proxy by inflation rate (*CDB*), domestic GDP (*YD*), and rest of the world income (*YW*); volume of country's export (X_t^d) increases by 0.004, 8.9% and 4.6% per cent respectively. The table 4.2 also reports that crude oil price (*OP*) and exchange rate (*EXR*) are found to exert negative effect on volume of country's export (X_t^d) in Nigeria during the review periods and this does not conform to the apriori expectations. This implies that a 10% percentage increase in crude oil price (*OP*) and exchange rate (*EXR*) reduces the volume of country's export (X_t^d) with a magnitude of 0.42 and 0.091 percent.

In assessing the partial significance of the estimated parameters for the considered variables, the t-statistics results are presented in the Table 4.1. The result shows that the estimated parameter for domestic GDP (*YD*), and rest of the world income (*YW*) were found to be partially statistically significant on volume of country's export (X_t^d) at 5% critical level because their *p-values* are less than 0.05. Thus, the estimated parameters for crude oil price (*OP*), cost of doing business proxy by inflation rate (*CDB*) and exchange rate (*EXR*) are found to have insignificant effect on volume of country's export (X_t^d) in Nigeria at 5% critical level.

Although, the F-statistic result shows that all the incorporated determinants and macroeconomic factors are simultaneously significant at 5% critical level. Thus, the adjusted R-squared result reveals that 94.8% of the total variation in volume of country's export (X_t^d) is accounted by changes in crude oil price (*OP*), cost of doing business proxy by inflation rate (*CDB*), domestic GDP (*YD*), rest of the world income (*YW*) and exchange rate (*EXR*) during the review period. The Durbin- Watson test result reveals that there is presence of moderate negative serial correlation among the residuals, because of the d-value (1.694) is less than two. Thus, the regression is not spurious.

5. Policy and Policy Options

This study critically examined the precise the effect of macroeconomic determinants on export demand in Nigeria between a decades after independence 1970 and 2014. The estimated model results revealed that cost of doing business proxy by inflation rate, domestic output and rest of the world income exert positive influence on volume of country's export in Nigeria between a decade period after Nigeria's independence and 2014 fiscal year and all of these effects conform with the theoretical expectation except cost of doing business. Also, the study revealed that crude oil price and exchange rate is found to exert negative effect on volume of country's export in Nigeria during the review periods and this does not conform to the apriori expectations. The result shows that the estimated parameter for domestic GDP and rest of the world income were found to be partially statistically significant on volume of country's

export at 5% critical level, whereas the estimated parameters for crude oil price, cost of doing business proxy by inflation rate and exchange rate are found to have insignificant effect on volume of country's export at the same level.

On the basis of the empirical findings for the effect of macroeconomic factors on export demand in Nigeria, the following strategic policy options are proffered as follows:

- I. An important policy implication of our findings is that of stabilizing Nigeria's export earnings potential by counteracting the external factors that influence adversely the Nigerian exports such as crude oil price and cost of doing business.
- II. More importantly, diversification of the Nigerian exports would by and large improve economic fundamentals and may help bring about sustained growth in export earnings.
- III. Policies that improve the non-price competitiveness of Nigerian exports and stimulate better understanding of her external demand needs to be implemented. Moreover, in this study, supply side determinant, i.e., domestic GDP has a positive and significant impact on exports. An indication that domestic production, i.e. strong economic performance, leads to increased exports, which lends support to the GLE hypothesis.
- IV. There is need for government to strengthened and ensure a favourable image of the country to the global world as this has greater influence on her export earnings.

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