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UNCERTAINTIES IN GLOBAL ECONOMIC POLICY AND NIGERIA'S EXPORT EARNINGS

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ABSTRACT

This study examined the contemporaneous effect of global economic policy uncertainty on Nigeria's export earnings, using Nigerian data that spans from 1997 to 2016. The theoretical framework relied on the contemporaneous theory of external vulnerability, which posits that macroeconomic shocks from dominant economies could be transferred to lesser dominant economies through international linkages of global economies and financial market. To achieve objective, this study employed the ARDL and GARCH estimation techniques, to estimate the effect of global economic policy uncertainty on Nigeria's export earnings. The results revealed the adverse effect of global economic policy uncertainty on Nigeria's export earnings, affirming the vulnerability of Nigeria's export earnings to external shocks. The practical implication of the finding is that developing economies could insulate their domestic macroeconomic environment from external shocks by diversifying their economies. Importantly, Nigeria should increase diversification of her export base as a coping strategy for protecting against the contemporaneous effect of global economic uncertainties.

Contribution/Originality: The study contributes to existing literature focusing on export earnings, which is a major source of vulnerability to external shocks in Nigeria. The use of global economic policy uncertainty index appears novel, compare to previous studies that use global output and inflation.

1. INTRODUCTION

Exports constitute a crucial component of most economies especially a developing economy like Nigeria. It is an important catalyst for growth because it generates foreign earnings and encourages local production. Kravis (2000) found that export growth of a country has positive relationship with overall economic growth. Which implies that as the productive capacity of a country increases, its share of exports also rises. Studies have shown that both the oil and the non-oil exports have contributed to the overall growth of the Nigerian economy (Onodugo et al., 2013; Abogan et al., 2014). However, crude oil export has contributed more than the non-oil sector to the development of the Nigerian economy (Odularu, 2007).

Exports play important role in foreign exchange earnings of a country as it forms a major part of external reserves alongside other inflows. While the contribution of the non-oil export to foreign exchange reserves has

been insignificant, crude oil export remained a major contributor to the foreign exchange reserves in Nigeria (Iwueze *et al.*, 2013; Ekesiobi *et al.*, 2016).

Since the discovery of oil in commercial quantity in the late-fifties, its proceeds remain the fulcrum of Nigeria's foreign exchange reserves. Accounting for over 50 per cent of government revenue, export earnings, particularly, from crude petroleum is largely used to fund Nigeria's budget. The price of the commodity and the various fluctuations associated with it over the years has, understandably, remained a major talking point among researchers, policymakers and successive governments, because of external economic shocks perhaps, that affect most countries, resulting in macroeconomic instability.

These shocks might affect either the supply-side or the demand-side of the economy causing unpredictable movements in aggregate supply and demand. According to the neoclassical literature, shocks trigger sudden and unpredictable changes in aggregate demand and supply, particularly in the short-run, thereby, resulting in unstable short-run growth. Several studies have focused on inflation and output growth as key indicators of macroeconomic uncertainty (Shields *et al.*, 2005; Clements and Galvao, 2014) and Neanidis and Savva (2010). Recent studies have shifted the analytical spotlight to global macroeconomic and policy uncertainties (Bala and Asemota, 2013; Abbas, 2014; An *et al.*, 2014). These studies argue that since most commodity exporting countries are developing economies and commodity importing countries are mostly developed economies, global macrocosmic policy uncertainty could adversely affect developing economies. Recent global developments provide strong support for this assertion. For instance, the high and low cycle of export earnings of commodity exporting countries tend to coincide with episodes of global macroeconomic uncertainties. The 2007-9 global financial crisis (GFC) tagged the great recession started with the United States' subprime crisis and spread across the globe. It significantly affected the foreign exchange earnings of Nigeria, through the fall in the prices of commodities which constituted major sources of export earnings to Nigeria as well as the substantial capital reversals from the emerging markets and developing economies (Njiforti, 2015).

Similarly, the sharp drop in the global oil price from over $100pb in mid-2014 to as low as US$28pb by February 2016, which coincided with disruptions in crude oil supply as a result of geopolitical tensions in Europe and Middle East could have aggravated the negative impact on export earnings. Similarly, the deliberate policy of developed countries to reduce reliance on fossil fuel could also have adverse effect on export earnings. These episodes, therefore, blur our understanding of the effect of global policy uncertainties on export earnings of commodity exporting countries. Relying on anecdotal evidence could be misleading, given that global uncertainties, in most cases intertwines with geopolitical tensions.

The objective of this study, therefore, is to assess the influence of global economic policy uncertainties on Nigeria's export earnings. In particular, we focus on crude oil earnings as it constitutes over 50 per cent of Nigeria's export earnings. Apart from contributing to literature, an understanding of the effect of global policy uncertainties on Nigeria's export earnings will guide policy makers in understanding the magnitude of the effect and the designing of appropriate policy suits or strategies for mitigating the adverse effects of such developments.

Following the introduction is the review of related literature in Section Two. Section three highlights some stylized facts, while methodology and data are treated in section four. Presentation and discussion of results is contained in section 5 and section 6 concludes the paper.

2. LITERATURE REVIEW

2.1. Theoretical Literature

Earlier studies have concentrated on the impact of shocks to crude oil production on export earnings (Cunado and Perez, 2003;2005; Dibooğlu and Aleisa, 2004). The earliest oils shocks could be traced to episodes, such as the Yom Kippur War of October 6, 1973, when the Organisation of Arab Petroleum Exporting Countries (OAPEC) issued a warning of its intention to cut crude oil production by 5 per cent; the Iranian revolution of 1979; the Iraq

and Iran crisis of September 1980; and the Iraq and Kuwait crisis of August 1990 (Hamilton, 2009). These occurrences resulted in significant increases in the prices of oil. For example, oil price increased by 25 per cent during the 1980 crisis and 70 per cent in the 1990 crisis (Hamilton, 2009). In the period of oil boom, government revenue and expenditure tend to rise, while the reverse is the case when prices fall (Budina and Wijnbergen, 2008; Ilegbinosa et al., 2012). The absence of disruptions generally results in a market glut condition leading to declining crude oil price (Hamilton, 2009).

The concept of uncertainty is basically related to the perception of agents about potential future developments (Joëts et al., 2015). The notion of time variability implies that different horizons lead to distinct perceptions of uncertainty, and thus disparate economic behaviors. Macroeconomic uncertainty denotes the variance in indicators such as unemployment and productivity. Therefore, macroeconomic uncertainty impact on variables such as output growth, inflation, interest rates, exchange rates and commodity prices to deviate from their expectations simultaneously. As these indicators start to deviate substantially from their expected path, a level of uncertainty sets in.

Focusing on the uncertainty channel of contagion by Kannan and Kohler-Geib (2009) "an unanticipated crisis in one country raises investors doubts about available information on fundamentals and leads them to make decisions that increase the probability of a crisis in a second country where they invest." Bloom (2009) sees uncertainty as a driver of business cycle fluctuation while Bloom et al. (2012) show uncertainty to be strongly counter-cyclical with positive shocks to uncertainty leading to a temporary fall in output and investment.

While the neoclassical theories of growth attempt to distinguish between short-term and long-term impact of shocks, it has been challenged by some other alternative schools of thought. For instance, the real business cycle approach does not have a clear distinction between growth and fluctuation, maintaining that the two phenomena occur together. According to this school of thought, economic fluctuations are largely direct outcome of persistent supply-side shocks induced by random changes in technology leading to changes in price.

The structuralist theory has also been employed to explain the effects of shocks on macroeconomic variables. The theory argues that structural shocks such as sudden large changes in the prices of food and oil could be attributed to macroeconomic fluctuations (Sommer, 2002). However, disagreement exists among the structuralist school of thought, particularly, on the magnitude of shocks. One school argues that supply shocks usually occur in the short-run and therefore has only a transitory effect on the macro-economy (Ball and Mankiw, 1995). In their opinion, since policy makers are expected to ensure a favourable macroeconomic environment in the long term, there would be no need to respond to adverse pressures from food and oil prices that are highly volatile in the short-run. Instead, policymakers should focus on mitigating "the second-round effects"; which are likely to be more prolonged and lead to economic recession (Ball and Mankiw, 1995). Fischer (1985) also argued that as long as there is no real wage resistance by workers, supply shocks by themselves does not require policy response.

Drawing from extensive evidence in Latin America and other developing countries, another school of thought showed that structural shocks could be persistent and rooted in bottlenecks of inelastic supply in the agricultural and oil sectors (Watcher, 1979). In his view, institutional rigidities that impede growth in agriculture, oil, foreign trade, and government sectors cause prices to rise with economic development. The author advocated for the elimination of such institutional rigidities by the fiscal authorities as a measure for curbing the adverse effects of structural shocks.

Another strand of theoretical literature relied on the rational expectation theory to argue that the amplitude of supply-side shock is contingent on behaviour of expectation (Sommer, 2002). For instance, the effect of high expectations by each agent contributes to large and persistent shocks. In the same vein, when agents are convinced that the effects of shocks are only temporary; macroeconomic fundamentals quickly return to their initial equilibrium. They therefore argue that, knowing whether shocks have a permanent or transitory effect and what determines the magnitude of the effects is important in formulating policy.

2.2. Empirical Literature

Several empirical literatures have documented the relationship between global macroeconomic uncertainties and domestic economic output. Such literature has focused on the volatility of commodity prices and the balance of payment implications. These types of studies are especially relevant to this paper as Nigeria's major export is crude oil. Robays (2012) evaluated whether periods of increased uncertainty affected the impact of fundamental oil shocks using a Structural threshold VAR model with monthly data over the period of January 1986 to July 2011. His results showed that increased macroeconomic uncertainty, using advanced economy industrial production volatility as a proxy, significantly increased the responsiveness of oil price to oil shocks. In addition, he found that the impact of oil shocks on domestic economic activity appeared to be significant in times of uncertainty.

Kusi (2002) found a positive relationship between global uncertainty and export performance in South Africa. The author employed a time series regression analysis of annual data covering the period 1976-1999. Export earnings were presumed to be determined by the degree of diversification of the commodity composition of exports, global market conditions as well as the ability to compete in global markets. The study developed indexes of determinants of exports and included them in the model as independent variables to describe changes in real total, mining, manufacturing and agricultural exports, respectively. It was revealed that the conditions of external demand were significant in determining the outcome of export earnings in all the sectors within the period of observation; however, the coefficients of elasticity were relatively low. The coefficients fell between a high of 0.8 (for manufacturing exports) and 0.5 (for agricultural and total exports). The result also showed that the performance of export was enhanced by competitiveness; however, its elasticity coefficients were very low and considerably smaller in magnitude compared with the coefficients of the world demand conditions. On the other hand, diversification was found not to be a significant determinant of the performance of export in the period under review. This study reflects the comparatively strong institutional structure of South Africa's economy, vis-à-vis the rest of Sub-Saharan Africa, considering that it relies more on secondary than on primary production.

Sly (2016) using quarterly data of 26 countries from 2002 to 2015 which represented about 85 per cent of US total exports, estimated how global uncertainty influenced external demand for U.S. exports. The result revealed that there was substantially reduced foreign demand for U.S. exports during episodes of greater uncertainty. The study found that a 2.8 per cent fall in U.S. export activity on an annualized basis results in a 1 percentage point surge in the spread between reported high and low foreign GDP growth forecasts. The study also showed that instability in financial conditions of trading partners also lead to considerably lower demand for U.S. exports, separate from the role global uncertainty plays. The results further suggested that the U.S. exports benefit significantly from changes in global uncertainty and financial instability.

In another study, Grier and Smallwood (2007) using a GARCH model considered nine developed and nine developing countries to examine the relationship between uncertainty and exports. The authors examined how uncertainty in exchange rates and income affected export earnings of countries and therefore, studied how uncertainty relating to real effective exchange rate and trade weighted foreign income affect aggregate exports. They made use of monthly data from January 1973 to May 2003 for the following countries: Sweden, Japan, the UK, Switzerland, South Africa, the US, Argentina, Australia, Brazil, Canada, Denmark, India, Norway, Peru, South Korea, Thailand, Turkey and Mexico. The result revealed that trade for developing countries is more likely to be influenced by uncertainty concerning real exchange rate (RER). They found negative relationship between RER uncertainty and growth in export in six out of the nine developing countries, and there was no evidence of a positive relationship among the other countries. On the other hand, only two cases of a significant and negative relationship exist and five cases with no significant relationship between developed countries' export growth and uncertainty. They also found that export growth was significantly influenced by uncertainty about foreign income. There was no significant relationship between income uncertainty and export growth for three countries.

Taglioni and Zavacka (2013) investigated how uncertainty and confidence factors affected international trade using a VAR model with United States data from June 1962 to June 2008. The results showed that uncertainty in the importer country has a strong negative effect on countries' exports. They also found that the flow of trade was influenced by uncertainty shocks in a non-linear way, meaning that uncertainty shocks must get to a particular level before they can exert significant aggregate effects on trade. The level of uncertainty must be very high in order for it to be significant, as was the case during 2008-09, when there was crisis of confidence. In addition, exports recorded a short but sharp rise, before falling quickly to their previous path. On the other hand, imports fell quickly and the negative response is prolonged. Kassim (2013) and Kingu (2014) used trade liberalization as a proxy to define macroeconomic uncertainties in Africa. Kasim using panel data investigated how trade liberalization impacted the growth of export and import from $1981 - 2010$ in 28 countries in Sub-Saharan Africa. The results showed that trade liberalization tend to increase export growth. Although, the study indicated that imports quickened by two percentage points, while evidence showed that in the post liberalization era there was a deterioration in the trade balance of the region. The results showed consistency with Santos-Paulino and Thirlwall (2004) on developing economies and least developed countries. Babatunde (2009) examined the impact of trade liberalization on export performance using the fixed and random effects model from 1980 to 2005 across 20 SSA countries and found no significant correlation between trade liberalization and export performance. This is not unexpected because average tariff rate was used as a proxy for trade liberalization and tariff rates do not directly affect exports. Using real income and price competitiveness as a proxy for uncertainty, Olofin and Babatunde (2007) examined the price and income elasticity of Sub-Saharan African exports from 1980 to 2003. Applying a fixed effects model on a panel dataset of 20 countries, they found that in the long run, income elasticity of demand for exports would range between 0.94 and 1.33 while the price elasticity of demand would range between -0.01 to -0.17. Therefore, the study concluded that the variables, real income of trading partners and price competitiveness of exporting countries determine SSA exports.

Sharma (2000) using export prices to proxy macroeconomic uncertainty, investigated export determinants in India from 1970 to 1998. Using simultaneous equations, Sharma (2000) found that demand for Indian exports increase when export prices fall relative to world prices and an appreciating rupee adversely affects Indian exports. Furthermore, export supply is positively correlated with domestic price of exports and higher domestic demand reduces export supply. Also, the impact of foreign investors on export performance is statistically insignificant even though the FDI coefficient is positive. Using relative price of exports, relative domestic demand and domestic profitability as proxies for uncertainty, Riedel *et al.* (1984) using time-series data from 1968-1978, examine the determinants of export performance in India. In examining the effects of relative price of exports, relative domestic demand and domestic profitability on export performance, Riedel *et al.* (1984) found that domestic market conditions significantly influence export behavior. Domestic profitability and relative domestic demand explain export behavior in 23 of 30 sectors sampled. Relative price, incorporating export policy incentives and the exchange rate explained only 10 of the 30 sectors sampled. However, relative price was significant in those sectors where comparative advantage was presumed to be strongest. The dependent variable was expressed as a ratio of the indices of constant price of exports to industrial production, so as to include the expansion effect on the production capacity. The reviewed literature revealed that bulk of the studies concentrated on developed economies with a few on developing economies. The studies also concentrated on the impact of oil price shocks on global uncertainties, particularly in non-oil producing countries. Nigeria presents a case for understanding the effect of global uncertainties on export earnings. For instance, global uncertainties such as fluctuations in commodity prices, inflation expectations, interest rates, output, and exchange rates could have severe implications on export earnings. Given the extreme importance of export earnings in a monolithic and commodity-dependent Nigerian economy, studies that clarify our understanding of the effect global economic policy uncertainty on export earnings would be important for policy prescription.

3. STYLIZED FACTS

Developments in the global economy tend to impact on open domestic economies and Nigeria is not exempted from this phenomenon. Trade in goods and services are driven by positive economic activity. Recently, there has been a continued sluggish global growth underpinned by weak demand and slowing productivity. Most worrisome for Nigeria is the slowdown in growth; declining global aggregate demand; rising inflation; decrease in global capital flows; rising debt levels; exchange rate volatility and dwindling foreign reserves owing to declining global commodity prices. This section therefore examined the relationship between the Global Output, Commodity Prices, Consumer Price Index (CPI) and Export Earnings.
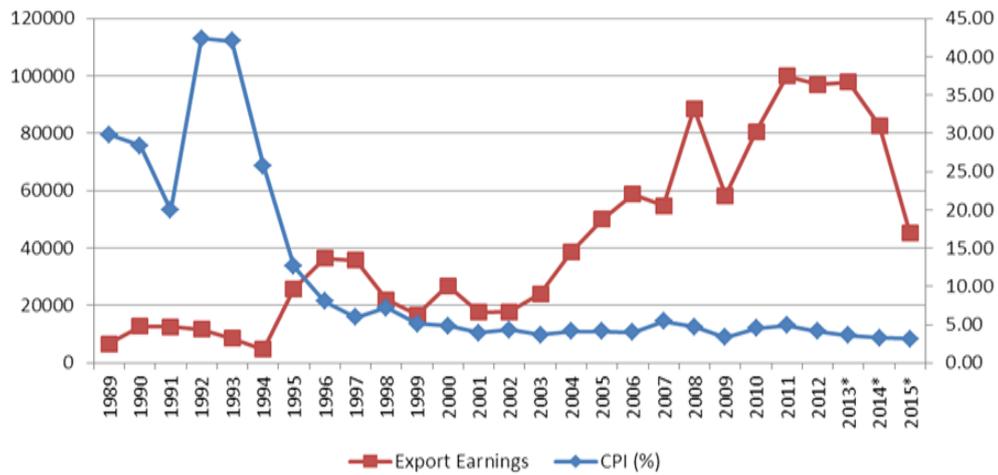

Figure-1. Relationship between Global CPI and Nigeria's Export Earnings
Source: Authors' Computation using Data from Bloomberg

Figure 1 depicts the relationship between Nigeria's total export earnings and global CPI from 1989 to 2015. The figure clearly shows that there has been a reverse in the direction between the two variables. However, the past decade till date was characterized by relative stability in CPI. The impact has been a steady rise in total export earnings, given that the relatively stable global CPI has a moderate positive effect on Nigeria's trading partners, thereby resulting in higher demands for Nigeria's export. The sharp decline experienced between 2008 and 2009 was due to the global economic crisis, indicating the likely impact of uncertainty on the Nigerian economy. However, export earnings rose slightly around 2010-2011 and started declining most probably due to the fall in crude oil price which contributes almost 90 per cent of Nigeria's export earnings.
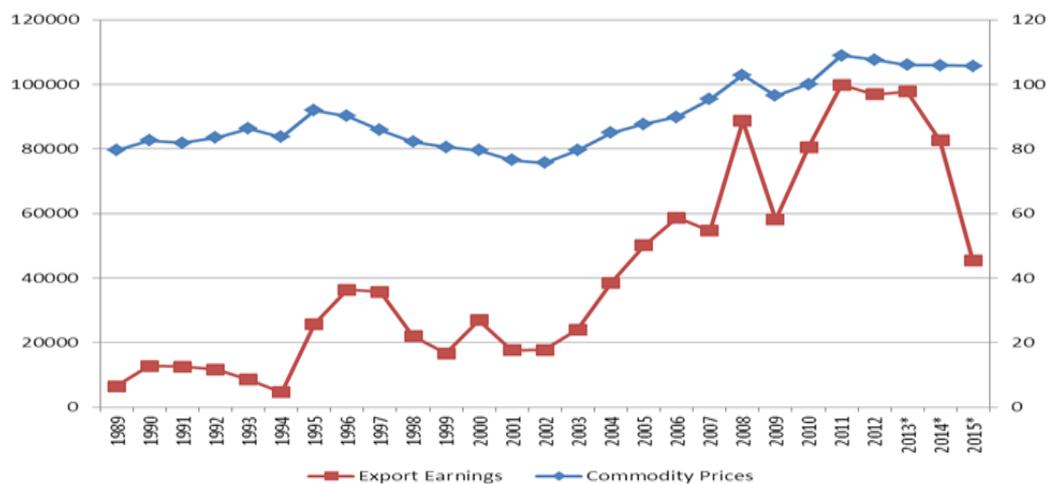

Figure-2. Relationship between Global Commodity Prices and Nigeria Export Earnings
Source: Authors' Computation using Data from Bloomberg

Figure 2 showed the relationship between global commodity prices and Nigeria's export earnings. The tapered growth and continued decline in global output and commodity prices since 2014 has impacted negatively on the Nigerian economy. Specifically, the collapse of crude oil prices in 2014 Q2 significantly impacted negatively on the total export earnings. Volatility in export earnings rose sharply during the fall in commodity prices during 2008, and earnings have steadily declined since then. The same trend could also be seen in Figure 3.0 due to the global growth which remains weak and fragile owing largely to weak global demand and tight financing conditions (IMF WEO, 2016) as well as geopolitical tensions in Europe and Middle East.
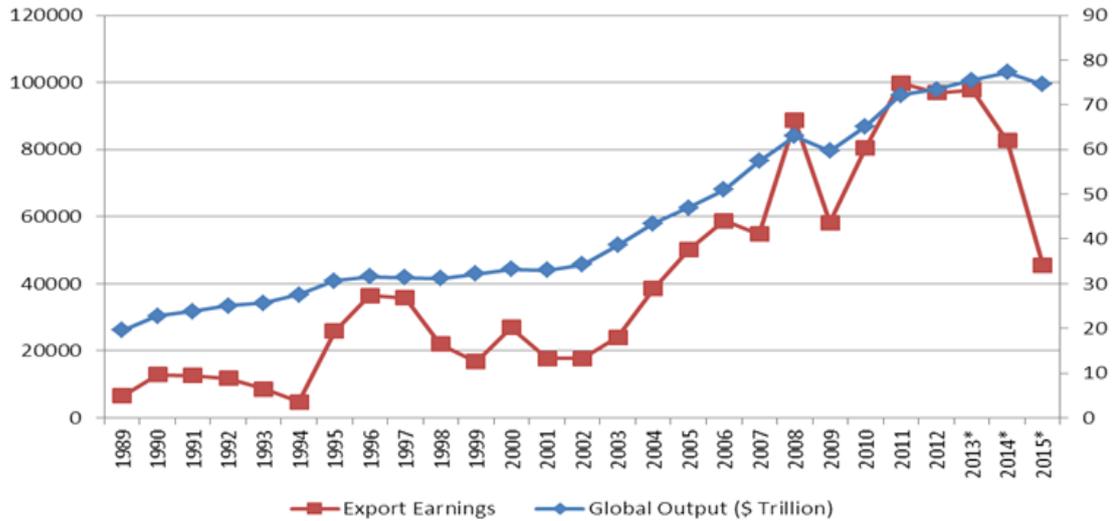

Figure-3. Relationship between Global Output and Nigeria Export Earnings
Source: Authors' Computation using Data from Bloomberg

In addition, weak trade, sluggish investment, protracted weak aggregate demand and low commodity prices; have translated to output declines in the Emerging Market and Developing Economies (EMDEs) including Nigeria as seen in the sharp decline in Nigeria's export earnings from 2012 to 2014 (see figure 3). Earnings declined further due to the current increases in economic and political uncertainty and the attendant financial market repercussions which have affected investors, confidence.

Aside the external factors that could affect Nigeria's export earnings; there are several internal factors that could also affect Nigeria's export earnings. Such factors include natural disaster such as flood, earthquake, and increasing internal conflicts. For this study, we considered two measures of armed conflict, such as conflict intensity and militancy. Conflict intensity is measured by the number of fatalities arising from internal conflict, while we use crude oil production to gauge militancy activities. Figure 4 revealed that fatalities from armed conflict intensified in Nigeria between 2013 and 2015. However, crude oil production dropped the least in 2016. This period coincided with the era of declining crude oil. The red tail on the fatalities line is the estimated values from 1989 to 1996. This was estimated due to a lack of data availability. The graph shows that crude oil production mirrors fatalities arising from armed conflict. There is a direct, though weak relationship between crude oil production and fatalities. For instance, when fatalities increased in 2013, crude oil production decreased only slightly.
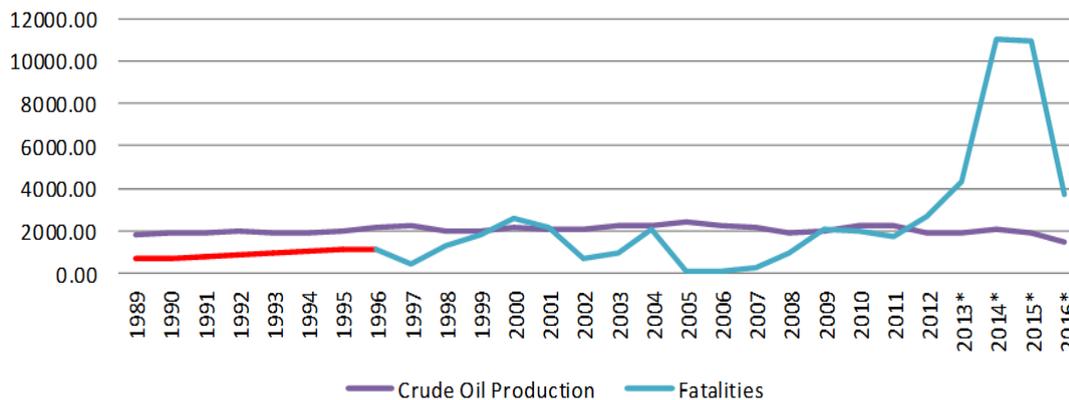
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Figure-4. Conflict Intensity and Crude Oil Production in Nigeria

Source: Authors' Computation using Data from Bloomberg

4. DATA AND MODEL SPECIFICATION

To assess effect of global macroeconomic policy uncertainties on Nigeria's export earnings, it is appropriate to identify robust measures of global policy uncertainty. Extant literature has identified different proxies of macroeconomic uncertainties such as the moving standard deviation or standard deviation across 12 forecasting terms of the output growth (Mendoza, 1997; Ghosal and Loungani, 2000) and inflation rate in the next 12 months (Driver and Moreton, 1991).

For this study, we adopted the global economic policy uncertainty index computed by Baker *et al.* (2012;2015;2016)[1] as measure of global uncertainty (GPU). Other data used in the model include crude oil price, Nigeria's crude oil production (CROPR), armed conflict intensity (Conflict intensity) in Nigeria, interbank foreign exchange rate (IBER) and Nigeria's export earnings (NEE).

We assume the functional relationship of the variables as follows:

$$\ln NEE_t = f(\ln GPU_t, \ln Crude\_oil\_price_t, \ln IBER_t, \ln Cropr_t, \ln Conflict\_Intensity_t) \qquad (1)$$

Where,

lnNEE is the natural logarithm of Nigeria's export earnings dominated in United States Dollars; lnGPU is the natural logarithm of global economic policy uncertainty computed by Baker *et al.* (2012;2015;2016) which is considered a robust measure of global uncertainty since it captures at least, seventeen (17) biggest economies in the globe; lnCrude_oil_price reflects the global crude oil price (the introduction of this variable in the model is based on the known fact that Nigeria's export earnings is predominately from crude oil receipt and oil price volatility affect export earnings); lnIBER is interbank exchange rate (which is introduced to capture the effect of Naira to dollar fluctuations on Nigeria's export earnings); lnCropro represents crude oil production in Nigeria (which is also a major determinant of Nigeria's export earnings); and lnConflict_Intensity is a proxy for fatalities from armed conflicts in Nigeria (see Ezeoha and Ugwu (2015)). Conflict intensity is defined in line with Arm Conflict Location and Event Data Project (2016) as "political violence on civil and communal conflicts, violence against civilians, militia interactions, rioting and protesting". Conflict intensity is an endogenous shock that could disrupt productive activities and adversely affect export earnings from non-oil economic activities such as cash crops.

The monthly data used for the study covered the period 1997(M1) to 2016(M12). Data on global economic uncertainty index were sourced from Baker *et al.* (2016) while crude oil production and fatalities from armed conflict

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[1]Global Economic Policy Uncertainty is calculated as the GDP-weighted average of monthly EPU index values for US, Canada, Brazil, Chile, UK, Germany, Italy, Spain, France, Netherlands, Russia, India, China, South Korea, Japan, Ireland, and Australia, using GDP data from the IMF's World Economic Outlook Database. Each national EPU Index is renormalized to a mean of 100 from 1997 to 2015 before calculating the Global EPU Index.

were sourced from Bloomberg and Armed Conflict Locations and Event Database, respectively. The remaining data – interbank exchange rate, crude oil price and Nigeria's export earnings – were sourced from the Central Bank of Nigeria Statistical database.

We adopt the Autoregressive Distributed Lag (ARDL) model to estimate the long and short run relationships between the variables of interest in equation (1). ADRL is generally considered appropriate when the variables are integrated of I(0) and I(1) or a combination of both, but cannot be applied when the underlying variables are integrated of order I(2) (Pesaran and Shin, 1999; Pesaran *et al.*, 2001). The study used annual data that covered the period of 1989 to 2015, which is considered a small sample size. In contrast to conventional multivariate co-integration methods that are more suitable for large sample sizes, the bounds test approach is more suitable for small sample sizes (Pesaran *et al.*, 2001). The following ARDL model is used to test the cointegration relationship between Nigeria's export earnings, global output, global inflation and commodity prices.

$$\Delta \ln NEE_t = c_0 + \delta_1 \ln NEE_{t-1} + \delta_2 \ln GPU_{t-1} + \delta \ln Crude\_oil\_price_3 c_{t-1} + \delta_3 \ln IBER_{t-1} + \delta_4 \ln Cropro_{t-1} + \delta_5 \ln Conflict\_Intensity_{t-1} + \sum_{i=1}^{p} \varphi_i \Delta \ln NEE_{t-i}$$

$$+ \sum_{j=0}^{q1} \phi_j \Delta \ln GPU_{t-j} + \sum_{j=0}^{q1} \phi_j \Delta \ln Crude\_oil\_price_{t-j} + \sum_{j=0}^{q1} \phi_j \Delta \ln IBER_{t-j} + \sum_{j=0}^{q1} \phi_j \Delta \ln Cropro_{t-j} + \sum_{l=0}^{q2} \gamma_l \Delta \ln Conflict\_Intensity_{t-l} + \varepsilon_t$$

$$(2)$$

Where δi are the long run multipliers, c0 is the intercept and εt are white noise errors.

5. DISCUSSION OF RESULTS

5.1. Descriptive Statistics

The descriptive results in Table 1 revealed serious variation in government export earnings (NEE) and conflict intensity for the period under review, with a standard deviation of 428303.9 and 398.33 respectively. This could be explained by the volatility in crude oil price that accounted for over 90 per cent of government export earnings and the ever-increasing activities of terrorism in Nigeria. The standard deviation of global economic uncertainty index (GPU) was 41.91, which revealed the presence of policy uncertainty in the global environment within the period under review.

Table-1. Descriptive Statistics

	NEE	Global Policy Uncertainty	Oil Prices	IBER	Crude Oil Production	Conflict Intensity
Mean	609652.3	105.5035	58.86347	138.32	2061.174	237.00
Median	576084.3	96.87333	51.5	132.19	2050	69.00
Maximum	1701638	277.8094	138.74	313	2460	3251.00
Minimum	27905.52	50.25752	10.22	75.3	1390	1.00
Std. Dev.	428303.9	41.90575	35.65259	41.526	187.7099	398.33
Skewness	0.357016	1.372539	0.44965	1.768	-0.445286	3.42
Kurtosis	1.94533	5.477127	1.874225	8.2666	4.079356	19.54
Jarque-Bera	15.95133	134.4375	20.4151	395.69	19.25491	3153.06
Probability	0.000344	0.0000	0.000037	0.0000	0.000066	0.00
Sum	1.44E+08	24898.84	13891.78	32644	486437	55931.00
Sum Sq. Dev.	4.31E+13	412681.5	298710.2	405241	8280224	37285887.00
Observations	236	236	236	236	236	236.00

Source: Authors' Computation using EViews 9

5.2. Correlation Matrix

The correlation matrix shows strong and positive correlation between the export earnings, crude oil price and crude oil production. Interestingly, the result confirmed the *a prori* expectation that crude oil price and production are major determinants of Nigeria's export earnings, as well as providing strong justification for including the variables in the model. The result also revealed negative correlation between export earnings and global economic uncertainty, suggesting that heightened global economic uncertainty could have adverse effect on Nigeria's export

earnings. These results could be influenced by emerging and developing economies that are relatively commodity-based economies. During declining commodity prices, most commodity-based economies witness significant output drop, which serves as a serious drag on global output. The result also showed negative correlation between conflict intensity and crude oil production and Nigeria's export earnings, which enforces our expectation that increasing armed conflict disrupts economic activities as well as reducing export earnings. Importantly, the correlation between the independent variables are either weak not very strong (maximum is 75 per cent) suggesting unlikely presence of multicollinearity in the series.

Table-2. Correlation Matrix

	NEE	GPU	OIL PRICE	Exchange Rate	Crude oil Production	Conflict Intensity
NEE	1.0000					
Global Policy Uncertainty	−0.3904	1.0000				
Crude Oil Price	0.7360	0.2738	1.0000			
Exchange Rate	0.5710	0.6117	0.36762	1.0000		
Crude Oil Production	0.6651	−0.4549	−0.06001	0.4949	1.0000	
Conflict_Intensity	−0.2353	−0.2065	0.15200	0.3307	−0.2157	1.0000

Source: Authors' Computation using EViews 9

5.3. Unit Root Test

Consistent with the principles of the ARDL bounds test, we used the Dickey-Fuller Unit root test to determine the order of integration of the variables of interest (Udoh *et al.*, 2014). This is to ensure that all the variables are 1(0) and/or 1(1) stationary. Specifically, the computed F-statistics provided by Pesaran *et al.* (2001) is not valid for variables higher order than I(1), because the bounds test assumes that the variables are 1(0) and 1(1) (see Nkoro and Uko (2016)). The results of table 3 shows that all the time series in the study are stationary at 1(0) and 1(1).

Table-3. Augmented Dickey-Fuller Unit root tests

Variables	Stationarity Level	Test statistic
Global Policy Uncertainty (GPU)	I(1)	−13.42774***
Nigeria Export Earnings (NEE)	I (1)	−21.79771***
Conflict Intensity	I(0)	−6.963897***
Crude Oil Production (CROPR)	I(1)	−19.36244***
Crude Oil Price	I(1)	−10.68820***
Interbank Exchange Rate	I(1)	11.9446***

Null Hypothesis: variable has a unit root significant at 10% (*); 5% (**);1% (***) levels

5.4. Cointegration Test

To test for cointegration or the existence of long-run relation between the variables under investigation, the Bound F-statistic (bound test for cointegration) was estimated. Table 4 presents the Bound test cointegration result. The calculated F-statistic of 4.601047 revealed the existence of cointegration at 1 per cent significance level. Recall that the asymptotic critical at 1 per cent significance level are equal to 3.41 and 4.68 for 10 Bound and 11 Bound, respectively.

Table-4. Bound Cointegration Test

Test Statistic	Value	k
F-statistic	4.714924	5
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	2.26	3.35
5%	2.62	3.79
2.50%	2.96	4.18
1%	3.41	4.68

Null Hypothesis: No long-run relationships exist

5.5. ARDL Results

Table 5 presents the short-run ARDL results. From the results of our analysis, the coefficient of the major variable of interest— global economic uncertainty, crude oil price, crude oil production and the intensity of armed conflict—appears to be very consistent with theoretical projections. The result revealed that the coefficient of the global economic policy uncertainty and armed conflict variables are largely negative and significant. This is consistent with the general expectation that global economic policy uncertainty and armed conflicts adversely affect Nigeria export earnings.

Other variables such as crude oil price and crude oil production are also found to be very significant in promoting Nigeria's export earnings. This is essentially influenced by the mere fact that approximately 90% of Nigeria's export earnings are from crude oil receipt. Generally, the dynamic result showed that if there is a deviation (movement away) from the equilibrium path, 18% of the disequilibrium would be adjusted within the year.

Table-5. Short-Run ARDL Result

Cointegrating Form				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
DLOG(GPU)	–0.409896	0.072854	–5.62629	0.0000
DLOG(CRUDE_OIL_PRICE)	0.720099	0.119798	6.010957	0.0000
D(IBER)	0.007227	0.002697	2.679884	0.0080
DLOG(CROPR)	0.780165	0.272856	2.859253	0.0047
DLOG(CONFLICT_INTENSITY)	–0.015368	0.008671	–1.77226	0.0778
CointEq(-1)	–0.178221	0.052252	–3.41078	0.0008

Source: Authors' Computation using Eviews 9

Table 6 also contains the long-run ARDL result. First, there is significant negative effect of global economic uncertainty on export earnings but the adverse effect begins to diminish over time. This is consistent with the finding of Ball and Mankiw (1995) who documented the transitory effect external shocks. Importantly, the result reinforced the vulnerability (potential exposure) of Nigeria export earnings to external shocks. The adverse effect of global economic policy uncertainty on Nigeria's export earnings could structural and persistent since it is rooted in bottlenecks of inelastic export of commodity-based products and the inability of policy makers to diversify the economy (see Watcher (1979)).

Coefficient of conflict intensity is negative and significant, which signals the role of peace and security to the welfare of a nation. Importantly, negative consequences of conflict on export earnings are significant on the short and long-run. Similarly, crude oil production and crude oil price are important determinants of export earnings in Nigeria.

The results are consistent with the findings of Dibooğlu and Aleisa (2004). Dibooğlu and Aleisa (2004) for instance, investigated the sources of macroeconomic fluctuations in Saudi Arabia using structural vector auto regression methods with emphasis on oil prices and changes in terms of trade, while controlling for supply, and their findings revealed that price level, real exchange rate, and to a lesser extent output were vulnerable to terms of trade shocks. They also found that Saudi Arabia terms of trade were driven by output, trade balance, and aggregate demand shocks.

The finding of the study is consistent with the findings of World Bank Global Monitoring Report (2004); UNCTAD Least Developed Countries Report (2002) and IMF (2003). IMF (2003) noted that exogenous shocks can have a significant negative impact on developing countries' growth, macroeconomic stability, debt sustainability, unfavourable terms of trade and poverty. Low-income countries are particularly vulnerable to terms-of-trade shocks …. and the level volatility in world commodity prices is an important transmitting channel of exogenous shocks to less developed countries".

However, the findings contrast sharply with that of Raddatz (2007) who revealed that external shocks could only explain a small fraction of output variance and terms of trade variance, while internal shocks are the major

sources of fluctuations. The inconsistency between the findings of Raddatz (2007) and the present study could be explained by the structure of the economies studied. Raddatz (2007) studied developed economies with diversified export base and whose exports are mostly finished goods and technology that could be considered inelastic.

Table-6. Long-Run ARDL Results

Long Run Coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
lnGPU	-0.001791	0.001352	-1.325	0.1867
lnCRUDE_OIL_PRICE	0.963212	0.091276	10.55273	0.0000
lnIBER	0.012779	0.002283	5.598519	0.0000
lnCROPR	1.365063	0.046267	29.5043	0.0000
lnCONFLICT_INTENSITY	-0.150332	0.074089	-2.02906	0.0438
C	17.888624	6.105582	2.92988	0.0038

Source: Authors' Computation using Eviews 9

5.6. Diagnostic Checks

To validate the ARDL results, residual diagnostic such as histogram normality test, serial correlation LM test and heteroscedasticity test, and stability diagnostic such as Ramsey RESET Test. Histogram normality test revealed that the residuals are normally distributed (Jarque-Bera is 1.277, and the probability is 0.528). Similarly, the serial correlation LM test results failed to reject the null of no serial correlation (F-Statistic = 2.236; and Prob = 0.177). Breusch-Pagan-Godfrey Heteroskedasticity Test also suggest the absence of heteroskedasticity in the results (Prob = 0.936). The Ramsey's RESET Test for regression specification error also indicated absence of regression mis-specification in the model (Prob. =0.169).

5.7. Robustness Checks

To validate the robustness of the ARDL results, the GARCH (1,1) estimation was undertaken. Table 7 presents the results the GARCH (1,1) results. The GARCH (1,1) model satisfy the covariance stationary conditions that

$\alpha + \beta \prec 1$ since $\alpha + \beta = 0.832.$ The results also revealed that ARCH term and coefficients of the GARCH term

are both positive and significant at 5% level, which confirms the presence of GARCH effect in the model. The results revealed that the identified all the variables included in the model are significant except conflict intensity and interbank exchange rate. Specifically, crude oil production and crude oil price have positive and significant impact on Nigeria's export earnings.

Table-7. GARCH Results

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	2.34894	1.278681	1.837003	0.0662
GPU	-0.000832	0.000329	-2.527851	0.0115
LOG(CRUDE_OIL_PRICE)	1.022112	0.021977	46.50735	0.000
LOG(IBER)	0.194399	0.148948	1.305149	0.1918
LOG(CROPR)	1.088205	0.071417	15.2373	0.000
LOG(CONFLICT_INTENSITY)	-0.002511	0.007058	-0.3557	0.7221
Variance Equation				
C	0.006287	0.003112	2.019881	0.0434
RESID(-1)^2	0.37316	0.146594	2.545531	0.0109
GARCH(-1)	0.459874	0.176085	2.611658	0.009
R-squared	0.942045	Mean Dependent Var		12.94312
Adjusted R-squared	0.940807	S.D. Dependent Var		1.011064
S.E. of regression	0.245989	Akaike info criterion		-0.480809
Sum squared resid	14.15947	Schwarz criterion		-0.350285
Log likelihood	66.69707	Hannan-Quinn criterion		-0.428217
Durbin-Watson stat	0.599468			

Source: Authors' Computation using Eviews 9

Global economic policy uncertainty index and conflict intensity have negative impact, though, conflict intensity is not significant. The directions of the variables are consistent with ARDL results, and validate our a priori expectation that Nigeria's export earnings are susceptible to external and internal shocks. The finding of the two estimation techniques – ARDL and GARCH results justifies the inclusion of the variables in the models.

6. CONCLUSION

This study investigated the effect of global uncertainties on Nigerian export earnings for the period of 1997 to 2016. The study relied on the contemporaneous theory of external vulnerability establish the link between global economic policy uncertainties and Nigeria's export earnings.

We estimated the model with the ARDL technique. The natural logarithm of Nigeria's export earnings was introduced into the model as the dependent variable, while the natural logarithm global economic policy uncertainty index, crude oil price, crude oil product, interbank exchange rate and conflict intensity were used as the independent variables. The results showed strong evidence that global economic policy uncertainty adversely affect Nigeria's export earnings. The test for robustness, the GARCH (1,1) estimation technique was applied, and the results were consistent with the ARDL results. The findings of the study provide strong evidence on the vulnerability of Nigeria's export earnings to global uncertainty.

Since Nigeria export earnings are largely from crude oil receipts, crude oil price and production were introduced as controlled variables and the results confirmed that the variables have significant positive effect on Nigeria export earnings. Since these commodities are raw materials in their export destination, the demand for such commodities is largely determined by country's macroeconomic environment.

Specifically, domestic aggregate demand in developed countries affect energy consumptions. That is, slowdown in the economic activities of developed economies slows down energy consumption and supply glut, with attendant negative impact on Nigeria's export earnings. Nigeria should, therefore, diversify its export earnings from commodity base to value added inelastic products as a sustainable coping strategy against global economic uncertainties.

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