

Trade Openness and Output Variability in Nigeria: Implications for EU-ACP Economic Partnership Agreement

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Abstract

Nigeria's potentials in international trade are hobbled by so many constraints including high cost of doing business; inadequate infrastructure; poorly implemented incentives (fiscal and tariff regimes); massive smuggling; lack of standardization; and unfavorable international trade rules and practices. Nigeria, perhaps with the intention of overcoming these problems, attempted to open up the economy through bilateral free trade arrangements such as AGOA, ECOWAS-CET, and the on-going EU-ACP economic partnership agreement. These arrangements, depending on Nigeria's offensive and defensive could be vulnerably expose to external shocks. This paper examines the extent to which trade openness affects output volatility as a mirror of the likely implications of free trade arrangement between Nigeria and the EU. EGARCH-M(1,1) multivariate model was used; and the result shows that non-oil revenue and household spending volatility have stabilizing effect, while openness and oil revenue, government spending, exchange rate, private investment volatility and monetary policy rate are pro-cyclical.

Keywords: Nigeria, European Union, economic partnership agreement, output volatility, multivariate EGARCH-M

1. Introduction

This paper does not deal with the direct link between output volatility and the Economic Partnership Agreement (EPA) between the European Union and Nigeria. Rather, the comprehension of the impact of excessive trade openness, particularly given that EU-27 accounts for substantial trade (import and export) flow to Nigeria will reflect the possible implications of zero tariff in perspective. Such trade arrangement, in addition to revenue loss due to trade concessions and exemptions/waivers that are already piling up in the country will have implications for the magnitude and structure of government revenue; and could precariously push more responsibility to the already battered oil sector.

The dichotomy between the anti and pro trade liberation proponents notwithstanding, trade is desirable for growth, but carries some other undesirable economic costs that are detrimental to people's welfare. And it is this welfare implication and its management that are continually the objects of debate in trade policy analysis. While countries may not lockup their economy to external trade, it should do so with caution by gradually tampering its degree of openness because of the attendant vulnerability. Events over the last decade have shown that Nigeria is gradually, but consistently exposing her economy to external trade and trade-related shocks through various trade and economic partnership arrangements. These include the African Growth and Opportunity Acts (AGOA) with the United States; the ECOWASs Common External Tariff ECOWAS-CET; and the on-going EU-ACP economic partnership agreement.

The United State-African Growth and Opportunity Act (AGOA) was established in May 18, 2000 under title 1 of the US Trade and Development Act of 2000 and was to be in force until September 30, 2012, but has been extended to September 30, 2015 by subsequent amendments (AGOA, 2008). The objective is to offer tangible incentives for African (including Nigeria) countries to continue their efforts to open their economies and build free markets, hence weaning itself from the international financial Aids overdependence. Among the benefits expected from it is that the AGOA would enable the 40 benefiting sub-Saharan African countries the opportunity of earning more foreign exchange, diversifying their economic base, creating more jobs and income-earning opportunities for their citizens, stimulate new trading opportunities for local businesses and facilitating their integration into the global economy (AGOA, 2008).

The Nigerian government in 2003 and 2004, as a policy measure reintroduced import prohibitions on such products that have no certification of origin, but the fiscal policy measures in October 1 2005 committed Nigeria to adopting the ECOWAS CET, reducing her duty rates from 0%-150% to 0%-50% within the transitional period of 2006-2007. Today, Nigeria's average tariff rate within the framework of the ECOWAS Common External Tariff (CET), comprises four tariff bands, namely 0% for social and necessities such as educational materials; 5% for primary raw materials; 10% for intermediate goods such as CKD refrigerators, CKD television, etc; and 20% for finished goods that are not produced locally, which requires no protection such as television,

refrigerators, generators, etc. Apart from the four bands, Nigeria has added the 35% as the fifth category which is for finished goods that are manufactured locally.

In furtherance of its efforts to open up the Nigerian market, Nigeria (with other 67 countries in Africa, Caribbean, and Pacific) on September 30, 1998 open up negotiation with the European Union in Brussels (seat of the Council of the European Union) with a view to concluding a partnership agreement to succeed the fourth Lomé Convention in 2000 (EUROPA.EU, 1998). The basic EU demand is an asymmetrical trade arrangement of reduction of applied tariffs against EU imports through a compendium of evolving requirements of cooperation, including financial support that will eventually lead to duty free import of substantially all EU goods that will eventually lead to zero tariffs by 2020. Since then, the proposed pact has generated several 'controversial kudos and knocks' with most writers aligning either to the sentiments of a day old chick and hulk trading in the same market (protectionism) or opening up the economy. While the current study, at least not for now will not dabble into such argument, there are two important conclusions which require reflection by both the protectionist and full trade liberalization proponents from Nigeria and European Union: considerations for trade and trade-transmitted effects, particularly in the long run and the immediate palliative for the short run effects. While the EU looks forward to an enlarged market in the ACP countries with increase in aids and trade related development policies in the ACP countries, the ACP countries with less competitive products ultimately will rely on the expected aid as a cushion against the expected unfavourable balance of trade and loss of revenue.

The Nigeria's non-oil, and in many cases total trade balances show persistent trade deficit with astronomical fiscal deficits. From 1970, penultimate oil boom era, the Nigeria's non-oil sector went into comatose with consistent unfavourable balance of trade and has remained so in spite of these various trade arrangements. Available statistics show that between 2000 and 2011 figure 1&2 (appendix A) the oil is the balancing item in Nigeria's international trade. The favourable oil and unfavourable non-oil trade balance raises concern about what Nigeria presents at the negotiating table in these whole arrangement- given the oil dominance economy and the comatose agriculture and manufacturing sector, what should be Nigeria's offensive (what they should ask for) and defensive (what it should give) in trade arrangements, particularly with unequal trading partner?

1.2 Research problem

The conclusions by (Rodrik, 1998) that: increases in external risk leads to greater volatility in domestic income and consumption; a larger share in GDP of government purchases of goods and services reduces income volatility; the risk-mitigating role of government spending is displayed most prominently in social security and welfare spending, and that causality runs from exposure to external risk to government spending; should be a matter of urgent concern in view of the increase in the loss or revenue from both EPAs and trade exemptions/waivers in Nigeria, which unguardedly is opening up the already vulnerable economy to external shocks.

Nigeria promises to become one of the world's top twenty economies by 2020 and expanding trade with other countries is an important part of its strategy for growth. Exports, like the economy in general, are dominated by petroleum, while imports include manufactured goods, chemicals, machinery and transport and food and livestock. These potentials however are hobbled by so many constraints including the high cost of doing business; inadequate infrastructure; poorly implemented incentives (fiscal and tariff regimes); massive smuggling; lack of standardisation; and unfavourable international trade rules and practices. Thus, mainstreaming the design and implementation of policies and programmes for achieving a more balanced export structure; one in which oil is less dominant remains relevant, but has continued to precariously expose the economy to external, particularly trade shocks and attendant vulnerability (Martin Oluba, 2010); and (Business, Trade and Investment Guide, 2012). Perhaps with the intention of overcoming these problems, Nigeria has embarked on several reforms with the intention of opening up the economy through free markets arrangements by fostering competition, promoting economic efficiency, and reducing the role of government in decision-making by private enterprise.

Between 2000 and 2006 Nigeria made an average of EUR 743.1 million from non-oil import tariff; by implication a zero tariff would have amounted to the same revenue loss or 0.71% of the 2006 GDP. In 2006, Nigeria lost approximately ₦50 billion to trade liberalization and trade waivers, (Ministry of finance and customs union, 2006); this is in addition to \$39.74 million compensation due for Nigeria from ECOWAS trade liberalization scheme. And between 2000 and 2008 available data shows that Nigeria lost about ₦277 billion through 183 exemptions, while in 2010 lost to waivers amounted to ₦24.72 billion - a total of about ₦301.72 billion is lost to waivers and concessions between 2000 and 2011.

The foregoing therefore, calls to attention the likely implication of a more trade liberalization that will open up the Nigerian domestic economy to the EU with eventual zero tariff. ECOWAS accounts for 18% of EU-27 exports to Africa and 16% of imports, out of which Nigeria accounts for about 48.2% making it the largest

ECOWAS partner for the EU-27 imports, exports and services flows (Mavraganis, 2012). Giving this statistics, EU-ECOWAS Economic Partnership Agreement might as well be colloquially referred to as Nigeria-EU EPA; as such there is need for complete assessment of the implementation of the EU-27 EPA on the Nigeria and Nigerians. An impact assessment by (Enterplan, 2005) for the Federal Government of Nigeria as part of capacity-building in support of the preparation of the EPA shows that the implementation of EU-ACP from 2008 to the period 2020, will generate an average loss of about 42% of tariff revenue for government, equivalent to 3% reduction in cumulative revenue. The reported shows that as small as the cumulative revenue might look, it could have a relative large impact on the economy and general welfare, given that tariff accounts for around 7% of government revenue, table 1 (appendix A). In addition revenue from agriculture will decline from \$449 million to about \$324 million by the year 2020. The EU is also aware of the fact regarding the loss of revenue that will be associated with the EPA; however promises to contribute funds to absorb the impact of this loss (Millar & Lovborn, 2007). Another study by (Andriamanananjan, Brenton, Uexkull, & Walkenhorst, 2009) suggests that the impact of the EPA with EU on import will be slight if the agreement allow the most protected sectors to be excluded from liberalization, and if the increases in import from EU occurs at the expense of other supplies of imports.

But going beyond revenue loss and the palliatives, can the palliatives also cushion the indirect trade effects—transmission of the trade effects to other areas like inequality, poverty, and general macroeconomic challenges in an import-dependent economy like Nigeria? These issues will also require critical examination since there are several pros and cons of trade arrangements, particularly an agreement between unequal trading partners.

1.3 Research question and Objective of study

Oil is known to have high level of volatility as a result of exogenous changes in international oil prices. For a country like Nigeria that is in severe need of revenue diversification, the mixture of oil and non-oil revenue is expected to be a promising policy to stabilize the domestic macroeconomic environment. In the events of removing the non-oil revenue, the resultant effect will heighten macroeconomic volatility. The question the current study attempts to address is: what is the output volatility effect of trade openness? The objective of this study therefore, is to evaluate the implications of changes in the composition of government revenue on output volatility (revenue- expenditure transmitted effect).

2. A brief review of Nigeria's trade policy

The (WTO, 2011) trade policy review described Nigeria's trade policy reforms which supposedly departs from open market-based to the traditional development approach as back-tracking as the policies do not encourage its economic wellbeing, diversification, increased private investment, and a strengthened agricultural sector. The restrictions enacted by this legislation represent a departure from the policies that have been ingredients of Nigeria's recent success.

Apparently as it is today, Nigeria does not have a comprehensive and coherent trade policy framework to adequately govern and guide the nation on domestic and international trade in view of the dynamism of the global market environment. Some of the existing trade rules, regulations and practices are out-dated and applied haphazardly, thus resulting in the ad hoc and sometimes conflicting approach to implementation" – Hon. Minister for Trade and Investment, Mr Olunsegun Aganga, Thisday, August 25, 2011. Nonetheless, Nigeria is part of different regional and bilateral trade arrangements including the ECOWAS-CET, the AGOA, and currently part of the on-going EU-ACP economic partnership arrangement. A question will then be asked – in these entire arrangements, where lies the interest of Nigeria with regards to the conflict between these trade arrangements and her domestic macroeconomic objectives? Is it also possible for Nigeria to keep some distance away from these arrangements to protect its macroeconomic policies? International trade arrangements are Sequa non in today's globalization; but what should be Nigeria's offensive (what it should seek) and defensive (how it should respond) in international trade arrangements? What countries ask for in any trade negotiation is determined by the relative advantage of its domestic output and their competitiveness in international market. Nigeria is a monoculture economy with its total export tied around oil, while the bulk of the imports are finished and semi-finished goods. Apart from oil, agriculture is the main stay of the economy. But, the sector is not only at the level of subsistence, it is also not subsidized. The only attempt to subsidize agriculture is at the level of fertilizer which has never reached the farmers but, the middlemen who in most cases are politicians who have little or nothing to do with agriculture. They short-circuit the supply chain, divert it and latter sell it to the farmers at exorbitant market rate. The implication being that, in the international market agricultural products from Nigeria are never competitive in terms of price. For one it can hardly match with high technological advanced agricultural output of the west, which in effect leads to reduction in cost of production; secondly most agricultural products from the developed economies, especially the OECD countries are highly subsidized in

complex and expensive manner in defiance of the WTO agricultural agreement, making them cheaper than those of the developing economies, like Nigeria.

While Nigeria as a developing economy adopts trade arrangements hook line and sinker – after unsuccessfully defending its positions in several WTO meetings, experience has shown that countries observe trade agreement/rules as far as it is not in conflict with their domestic policies, be it economic, social or political. They draw a policy-scale of preference where their domestic socioeconomic and political priority is ranked first among equals. Countries like India and China, though not friends, presented a case of common interest and refused to bow to USA's demands on agricultural subsidy. Opposition by these two countries brought the negotiations over the World Trade Organization's Doha Round of trade liberalization to an inglorious halt in July 29, 2008 amid disagreements about agricultural subsidies.

The case of Europe is of a particular interest to Nigeria given that six (United Kingdom, Spain, Belgium, Italy, Netherlands, France, and Australia) out of the top ten destinations and import of Nigeria are from the EU-27 (National Bureau of Statistics, 2012). Available statistics shows that more than \$70.0 billion or 24% of Nigeria's export went to EU countries in 2010, with about 7% going to Spain. Of the estimated \$54 billion of Nigeria's import in 2010 about 31% is from EU countries. Apart from trade, the bulk of Foreign Direct Investment (FDI) stock in Nigeria is held by EU investors. The stock of EU FDI was estimated at \$76 billion in 2011, while the FDI inflow was estimated at \$6.3 billion, representing 2.3% of GDP.

3. Trade liberalization and output volatility

The study by (Kose, Prasad, & Terrones, 2005) concluded that there is a positive link between trade and volatility. Nonetheless, the role of trade and openness is similarly complex. Greater openness allows better insulation against domestic demand shocks. Yet if accompanied by greater specialization, it may also lead to greater exposure to sectoral shocks, and enhance exposure to external demand and supply shocks. Openness also enhances the role of the real exchange rate, which in turn can act both as a stabilizing element and as a source of additional input volatility (Wolf, 2004). According to (World Bank, 1999) terms of trade shocks may slow growth, worsen the distribution of income, and raise the odds of highly disruptive currency crises. How can countries cope with terms of trade shocks? Can commodity price stabilization funds help? And how can the private sector hedge? There are evidences that countries with high macroeconomic volatility have a lower long-run growth rate because there is a negative relationship between volatility and economic growth (Zhang, 2000). Therefore, moderation of macroeconomic volatility enhances economic growth (Cevik, 2005).

The (World Trade Report, 2004) tried to link the channel of transmission between international trade and macroeconomic volatility and concluded that; there are the linkages are of two kinds. First, macroeconomic variables, such as national income, employment, price level, aggregate investment and consumption (and hence savings), are affected by trade; and that domestic growth will increase demand for imports and divert resources away from exports oriented to production for domestic markets. Other things being equal, the trade balance will tend to deteriorate. By the same token, stagnating domestic demand will "push" producers to look for markets abroad. Consequently, exports will tend to grow and the trade balance will improve.

The relationship between trade liberalization and macroeconomic volatility, apart from been an end itself, is also a source of transmission mechanism between trade liberalization and other economic indicators (It is both an intermediate and causal variable). Despite this unique relationship, it is difficult to define a specific relationship between trade and volatility. Generally, World Trade Report (World Trade Report, 2004) identified two linkages. First, macroeconomic variables, such as national income, employment, price level, aggregate investment and consumption (and hence savings), are affected by trade. Trade affects macroeconomic performance in terms of the dynamics of the economy's growth, its stability and distribution. This happens either, through export as a component of aggregate demand or import as production inputs which in turn affects labour demand and commodity prices.

The second linkage is through a reverse causality from macroeconomic variables to trade. Domestic growth will increase demand for imports and divert resources away from production for export to production for domestic markets. Other things being equal, the trade balance will tend to deteriorate. In the same token, stagnating domestic demand will "push" producers to look for markets abroad. Consequently, exports will tend to grow and the trade balance will improve. No matter the sources of transmission to volatility, there is ample evidence to suggest that liberalization affects volatility.

Economists are of the opinion that while free trade may not be "technically optimal", it remains "pragmatically optimal". That is, of all the policies, trade is likely to produce the highest level of economic efficiency, (Suranovic, 2007). What remains unclear is whether the level of efficiency recorded by trade has not been eroded by unguarded trade liberalization. For efficiency to be total, some indicators of development need to be addressed. These indicators are direct outcomes of trade and trade degree of openness.

Empirical works on United State trade deficits suggest that trade is responsible for 20 to 25% of the income inequality which has occurred in the U.S over the past two decades, (Scott, 1999). Thus, the implication here transcends distributional problem. This is because there is a link between inequality, volatility and poverty. The works by (Suranovic, 2007); and (García-Peñalosa & Turnovsky, 2004) justified the assertion that macroeconomic volatility could be an important link through with inequality and the economy is related. Also (Breen & Garcia-Penalosa, 1999) used 1990 Gini coefficients of the distribution of income in 1999 in Brazil, Chile, Mexico, and Venezuela ranged between 55-64%, while those of Hong Kong, Korea, Taiwan, and Singapore, were between 30 and 41%. At the same time, the former were subject to much greater fluctuations in their respective growth rates than were the latter: during the 1980s, the standard deviation of the rate of output growth was, on average, 5.9% for the four Latin American economies, and 2.8% for the East Asian countries. The work of (Breen & Garcia-Penalosa, 1999) supported the findings. Using a cross-section of developed and developing countries, they regressed income inequality on volatility. They discovered that greater volatility increases the Gini coefficient and the income share of the top quintile, while it reduces the share of the other quintiles. In the study by (Laursen & Mahajan, 2004) also demonstrated that greater volatility has a negative impact on equality (positively correlated with inequality).

4. Methodology

4.1 Model specification

Following (Orszag, 2007); (Wolf, 2004); and (Romer C. D., 1999) output volatility is measured as the standard deviation of change in real output. However instead of modelling the determinants of volatility through the conventional conditional mean random variable we used a multivariate model approach of modelling the conditional variance using the GARCH-M (1, 1) order by incorporating predetermined predictors of output volatility in the variance equation. The multivariate model of determinants of output volatility in Nigeria is specified in the following sequence:

$$\Delta \text{Log}(\text{RGDP}_t) = \alpha_i + \beta_{ii} \sum_{i=1}^p \Delta \text{Log}(\text{RGDP}_{t-i}) + \delta \text{Log}(\sigma_t^2) + \mu_t \quad (1)$$

Equation (1) is the mean reverting equation of real gross domestic product (RGDP) since output volatility is defined as the standard deviation of RGDP. We also introduce conditional variance variable (volatility) in the mean equation to show the impact of volatility on output growth following the conclusion in literature that there is a positive relationship between volatility and output growth. To estimate output variability, we take the conditional standard deviation of RGDP in GARCH-M (1, 1) order as specified in equation 2.

$$\sigma_{\text{rgdp}}^2 = \bar{\omega} + \alpha v_{t-1}^2 + \beta \sigma_{t-1}^2 \quad (2)$$

Where σ_{rgdp}^2 is the squared variance (conditional variance) which is the same thing as the volatility of output (RGDP); $\bar{\omega}$ is the long run weighted variance (constant term); v_{t-1}^2 is the one period lagged return (same as the ARCH variable); σ_{t-1}^2 is the one period lagged variance (GARCH variable); while (α and β) are the ARCH and GARCH parameters. The summation of α and β gives volatility persistence; the closer their sum is to one the more persistent is volatility. The condition required to have mean reverting variance therefore is that: the long run weighted average (>0); ARCH parameter ($\alpha >0$); and GARCH parameter ($\beta >0$). But the introduction of predetermined (regressors) variables in the variance equation does not guarantee these underlying conditions, hence the forecasted variance in equation are not guaranteed to be positive. To estimate the determinants of output volatility, we include trade openness in the variance equation, controlling for other exogenous shocks. The conditional variance-trade openness inclusive equation is specified as:

$$\sigma_{\text{rgdp}}^2 = \bar{\omega} + \alpha v_{t-1}^2 + \beta \sigma_{t-1}^2 + \sum_{i=0}^p \gamma_i Y_{t-i} \quad (3)$$

Where “Y” is a vector of stationary explanatory variables predetermined to influence output volatility. The explanatory variables included in the variance equation are: (1) trade openness TRDO; (2) private expenditure volatility PCE; (3) oil revenue volatility OILR; (4) non-oil revenue volatility NOILR; (5) monetary policy rate MPR; (6) government expenditure volatility GCE; (7) inflation volatility INF; (8) exchange rate volatility EXR; and (9) private investment volatility INV. The regressors in the variance equation are specified in their order of integration to ensure that they are well behaved – variables are tested for unit root using the Augmented Dickey-Fuller unit root (ADF) test equation specified in equation (4).

$$Y_{it} = \pi_i Y_{it-i} + \sum_{i=1}^p v_i \Delta Y_{it-1} + \varepsilon_{it} \quad (4)$$

5.0 Analysis of findings

5.1 Data handling

All the data used for analysis are integrated except real GDP, exchange rate, government spending, and private investment volatility that are integrated of order one after the first difference. Results of the ADF unit root test are in table 2(appendix A). The exogenous (constant and or trend) parameter included in the ADF test are government spending (constant); inflation (constant); oil and non-oil revenue (constant); real GDP (constant); output variability (constant and linear trend); trade openness (constant); private consumption volatility (constant); exchange rate and private investment volatility have no exogenous parameter. All the variables are logged except rates (monetary policy and inflation rates).

Having removed the unit root effect on the non-integrated variables by differencing, next we test for the presence of GARCH effects using the ARCH-LM test. It shows that real output exhibits ARCH effect at 5% significant level as shown in table 3(appendix A).

5.2 Predictors of output volatility

Result of predictors of output volatility was divided into international trade and trade transmitted shocks based on existing literature. Trade openness, oil and customs (non-oil revenue) revenue, and exchange rate are identified as direct trade shocks, while government and private consumption volatility, inflation volatility, and private investment volatility are identified as international trade shocks transmission mechanisms.

In support of (Lee, 2010) we found a positive relationship between volatility and real output; the volatility parameter in the mean equation shows that the GARCH parameter is positively related with real output (RGDP), table 3(appendix A); but might require further scrutiny to ascertain the transmission mechanism.

All the impacts are short run impacts with highest lag of (4) which is one year- the data used is quarterly series which means that lag 4 corresponds to instantaneous transmission in the current; although some variables (openness, exchange rate volatility, household spending and private investment volatility, inflation volatility, and policy rate) relatively have shorter run effect than others.

5.1 Trade shocks

5.1.1 Economy degree of openness

Trade degree of openness (Trade/GDP) is an important external shock that influences domestic output fluctuation as shown in table 3 (appendix A). For every 10% increase in opening up of the economy affects output fluctuation by about 8.5%; thus corroborating with (Satyanath & Subramanian, 2004) who concluded that trade degree of openness has a direct relationship with output fluctuation. This impact is however expected to through some other domestic macroeconomic variables as noted in (Romer D. , 1993) that the impact of openness is transmitted through its impact on general price level, inflation and unanticipated changes in the exchange rate. This perhaps accounted for the immense impact of exchange rate volatility (both in the short and long run) as the second most import variable, next to private investment on output variability.

5.1.2 Oil revenue volatility

Fluctuation in oil revenue is identified as a major source of shock to growth fluctuation, especially developing countries with mono-product export. This fluctuation is as a result of the fact that, oil prices are exogenously determined; and any economy that depends on it as a major source of revenue tends to follow the trend in crude oil price and revenue fluctuations. Result of the estimation shows that oil revenue is pro-cyclical; and a 10% increase in oil revenue volatility leads to 6.1% increase in output volatility.

5.1.3 Non-oil revenue volatility (tariff)

In spite of the argument the customs duty (tariff) constitutes a relatively small proportion of Nigeria's total revenue (table 1 appendix A), it is also important to emphasise that increase in revenue from tariff is an indirect measure of trade restriction policy which also reinforces the positive relationship between trade openness and volatility. What this result shows is that non-oil revenue is relative better than oil revenue in terms of economic planning since it is more stable. The dynamic structure of the model confirms that it has a minimal short (three quarters) run effect than oil (one year). The result shows that 10% increase in revenue generated from custom duties decreases output volatility by 7.4%, table 3 (appendix A). This has been the main reason behind the advocacy for the diversification of the Nigerian economy from oil to non-oil sector - supports the argument of pro-trade restriction and anti-excessive liberalization. This result re-enforced the impact of trade openness on volatility.

5.1.4 Exchange rate volatility

Exchange rate is an intermediate variable between the domestic shock and external shock on output volatility on one hand, and between the monetary and the real side shock on the other hand. The stability of exchange rate is an important factor in output trend; especially when we factor in external factors like trade related variables. Result from the regression shows that exchange rate volatility positively drives output volatility. It shows that a 10% increase in exchange volatility results in about 11% increase in output volatility, in the immediate short run and about 14% in short run. The importance of exchange rate as a transmission variable of the external factors

also played out in the time part of exchange rate, particularly given that Nigeria is an import-dependent economy.

However, the effectiveness of exchange rate on volatility depends on the exchange rate regime the economy is operating. According to (Bastourre & Carrera, 2004) consistently pegged regime is more prone to affect output fluctuation than a flexible regime; but whether this argument applies to import-dependent economies is another question. When their conclusion is considered, one will expect a more subtle impact of the mid-way exchange liberalization (managed float) currently operational in Nigeria.

5.5 Government consumption expenditure volatility

Table 3(appendix A) shows that government spending has a positive and significant effect on output volatility. Thus, it was evident that a 10% increase or decrease in government spending results to approximately 11.7% increase in output volatility. The dynamic structure of the model also shows that the influence of government expenditure on output volatility follows the same four period lag with oil revenue. This result is an interesting one; considering the focus of this study. Economic literature recorded government expenditure as one of the sources of business cycle from the real or supply side of the economy. Since public sector is the largest consumer in every economy, the magnitude of its impact depends on the size of the public sector (Debrun, Pisani-Ferry, & Sapir, 2008), sources and direction of government spending, particularly in the developing countries (J.Turnovsky & Chattopadhyay, 2003). For Nigeria, bulk of government spending (more than 80%) is generated through oil revenue which in itself is highly volatile, driven by changes in international crude prices; while the direction of spending is purely on direct government consumption which constitutes about 43% of total spending. The positive relationship between government spending and output volatility reflects the skewed non-stabilizing spending pattern of government.

5.6 Private consumption expenditure volatility

Although private consumption, the tradition economic workhorse of aggregate spending has been adversely affected by loss of confidence (Oduh, O.Oduh, & C.Ekeocha, 2012); in the current study it is evident that such precarious situation is not enough to drive a positive relationship between private spending and output volatility. The result shows that a 10% increase in household spending reduces output volatility to about 6.7%, table 3 (appendix A). This is desirable because household demand is a final and transmitting parameter for all the macroeconomic variables (Bank of England, 2006).

5.7 Inflation volatility

Inflation has a direct relationship with output volatility. The result was suggestive of the fact that volatility is macroeconomic instability driven; and the dynamic structure of inflation shows that a 10% increase in the immediate past inflation rate contributes and stimulates about 0.5% increase in output volatility.

5.8 Private investment volatility

Literature identified private sector investment as the most volatile of all the macroeconomic variables and pro-cyclical in nature. The result suggests that private investment is not only positively related to output volatility, but has the highest (coefficient of 2.6) influence. Table 3 (appendix A) reveals that a 10% increase in investment volatility indices about 25.7% increase in output fluctuation. This magnitude is expected to increase if the domestic industry is not protected against the influx of superior and more advanced product of the developed economies. This is because decrease in public sector revenue will put an upward pressure on fiscal variables and bring about increase in interest rate and crowding out of the private sector.

5.9 Monetary Policy Rate (MPR)

Monetary policy in Nigeria lately become dominated with quantitative easing as a result of weak monetary transmission to the real sector –resulting from poor macroeconomic environment that rendered interest rate ineffective (Oduh *et al*). This attributes also played out in this result as monetary policy is shown to have a positive impact on output volatility. This puts the economy in a conundrum situation because the fiscal sector (government spending) which is expected to make up for the loss of monetary volatility is equally problematic as shown in table 3 (appendix A).

6. Conclusion

6.1 Conclusion

The study x-rayed factors that affect output volatility with emphasis on external trade. This is with the hope of pre-empting the possible implication of the EU-ACP economic partnership agreement on macroeconomic volatility, knowing that volatility is one of the factors that increase inequality. A distributed lag model in EGARCH-M(1,1) order 2 was estimated; and household spending and tariff revenue were found to have inverse relationship with output volatility; while oil revenue volatility, inflation volatility, government spending volatility, private investment volatility, and monetary policy are positively linked with output volatility.

6.2 Policy implication

The relatively small contribution of revenue from tariff notwithstanding, its negative relationship with output variability corollary means that zero tariffs will lead to precariously affect volatility. Instructively, since EU-27 constitute about 30% of total Nigeria trade, zero tariff will also mean that non-oil revenue will fall by the same margin, hence a rise in volatility. Moreover, oil revenue is pro-cyclical as such a decline in non-oil revenue will increase the already worsened government revenue dependence on oil.

Finally, since literature documented that income inequality and macroeconomic volatility increase poverty, and that macroeconomic volatility is potentially an important channel through which income inequality and growth may be mutually related; this is because macroeconomic volatility raises the mean growth rate and income inequality. Therefore, one expects that any trade policy that fuels volatility might as well lead to poverty and inequality which are already at an astronomical rate in Nigeria.

References

- AGOA. (2008, July 30). *Nigeria: Optimising gains from AGOA*. Retrieved from Africa Growth and Opportunity Act: <http://www.agoa.info/?view=.&story=news&subtext=955>
- Andriamananjara, S., Brenton, P., Uexkull, J. E., & Walkenhorst, P. (2009). *Assessing the Economic Impacts of an Economic Partnership Agreement on Nigeria*. The World Bank African Region; Policy Research Working Paper WPS4920.
- Bastourre, D., & Carrera, J. (2004). *Could the Exchange Rate Regime Reduce Macroeconomic Volatility?* Econometric Society in its series Econometric Society 2004 Latin American Meetings with number 309.
- Breen, R., & Garcia-Penalosa, C. (1999). Income Inequality and Macroeconomic Volatility: an Empirical Investigation. *Economics Papers*, 1999-w20.
- Business, Trade and Investment Guide. (2012). *Nigeria's Trade Relations: Doing Business With the World*. Retrieved from Corporate Nigeria: http://www.corporate-nigeria.com/index/industry/trade_relations.html
- Cevik, S. (2005, June 21). *Turkey: Spectacularly Normal*. Retrieved from Morgan Stanley: www.morganstanley.com/views/gef/archive/2005/200550621-Tue.html
- Debrun, X., Pisani-Ferry, J., & Sapir, A. (2008). *Government Size and Output Volatility: Should We Forsake Automatic Stabilization?* B-1049 Brussels, Belgium: European Commission.
- Enterplan. (2005). *Government of Nigeria: Capacity-Building in Support of the Preparation of the Economic Partnership Agreement (8 ACP TPS 110) #093 Nigeria*. 1 Northfield Road Reading RG1 8AH, UK: Enterplan Limited.
- EUROPA.EU. (1998, October 12). *Opening of EU-ACP Negotiation (Reference: PRES/98/329 Date: 12/10/1998)*. Retrieved from European Union: <http://europa.eu/rapid/pressReleasesAction.do?reference=PRES/98/329&format=HTML&aged=1&language=EN&guiLanguage=en>
- García-Peñalosa, C., & Turnovsky, S. J. (2004). Macroeconomic Volatility and Income Inequality in a Stochastically Growing Economy. *Economic Growth and Income Distribution: On the Nature and Causes of the Wealth of Nations*. Lucca, Italy.
- J.Turnovsky, S., & Chattopadhyay, P. (2003). Volatility and Growth in Developing Economies: Some numerical Results and Empirical Evidence. *Journal of International Economics*, 267-295; Vol 59, Issue 2.
- Kose, M. A., Prasad, E. S., & Terrones, M. E. (2005). *How Do Trade and Financial Integration Affect the Relationship Between Growth and Volatility?* International Monetary Fund, Working Paper 05/19.
- Laursen, T., & Mahajan, S. (2004). *Managing Volatility and Crises: A Practitioners Guide*.
- Lee, J. (2010). The link between output growth and volatility: Evidence from GARCH model with panel data. *Economic Letters*, 143-145, 106.
- Martin Oluba. (2010, November 14). *Nigeria's terms of trade challenges*. Retrieved from BusinessDay: <http://www.businessdayonline.com/NG/index.php/analysis/columnists/16112-nigerias-terms-of-trade-challenges>
- Mavraganis, N. (2012). *Trade between EU and West Africa, 2000-2010*. Eurostat and European Commission.
- Millar, T., & Lovborn, J. (2007). *Nigeria and the European Union Trade for Development: An Introduction to the Economic Partnership Agreement (EPA)*. Luxembourg: European Commission.
- National Bureau of Statistics. (2012). *Foreign Trade Statistics: Strong Merchandise Trade Growth in Q4*

2011. Plot 762, Independence Avenue, Central Business Area, Abuja: National Bureau of Statistics.

Oduh, M. O., O.Oduh, M., & C.Ekeocha, P. (2012). The Impact of Consumer Confidence and Expectation of Consumption in Nigeria: Evidence from Pannel Data. *European Journal of Business and Managment*, 86-100.

Orszag, P. R. (2007, January 31). Congressional Budget Office Testimony . *Economic Volatility*. Second ans D Street,S.W, Washington, D.C, United State of America: Committee on Ways and Means, U.S. House of Representatives.

Rodrik, D. (1998). Why Do More Open Economies Have Bigger Governments? *The Journal of Political Economy*, 997-1032; Vol. 106, No. 5.

Romer, C. D. (1999). Changes in Business Cycles: Evidence and Explanations. *The Journal of Economic Perspectives*, Vol. 13, No. 2. (Spring, 1999), 23-44.

Romer, D. (1993, November). Openness and Inflation: Theory and Evidence. *Quarterly Journal of Economics*, pp. 869-903; Vol.CVIII; Issue 4.

Satyanath, S., & Subramanian, A. (2004). *What Determines Long-Run Macroeconomic Stability? Democratic Institutions*. International Monetary Fund, Working Paper 04/215.

Scott, R. (1999, July 22). *The U.S. Trade Deficit: Are We Trading Away Our Future*. Retrieved from Economic Policy Institute: <http://www.docstoc.com/docs/19456510/THE-US-TRADE-DEFICIT-ARE-WE-TRADING-AWAY-OUR-FUTURE--House-Congressional-Hearing-106th-Congress-1999-2000>

Suranovic, S. M. (2007). *International Trade Theory and Policy*. internationalecon.com .

Wolf, H. (2004, March). Volatility: Definitions And Consequences. *Managing Volatility and Crises: A Practitioner's Guide*.

World Bank. (1999, February 18). Managing terms of trade volatility. *Economic Policy*.

World Trade Report. (2004). *International Trade and Macroeconomic Policy*. World Trade.

WTO. (2011, June 28). *WTO Trade Policy Review of Nigeria: Statement of the U.S. Representative*. Retrieved from World Trade Organization: <http://geneva.usmission.gov/2011/06/28/tpr-nigeria/>

Zhang, H. (2000). Corruption, Economic Growth and Macroeconomic Volatility. *Perspectives*. Retrieved from Perspectives.

Appendix A: Econometric results and Charts used in the analysis

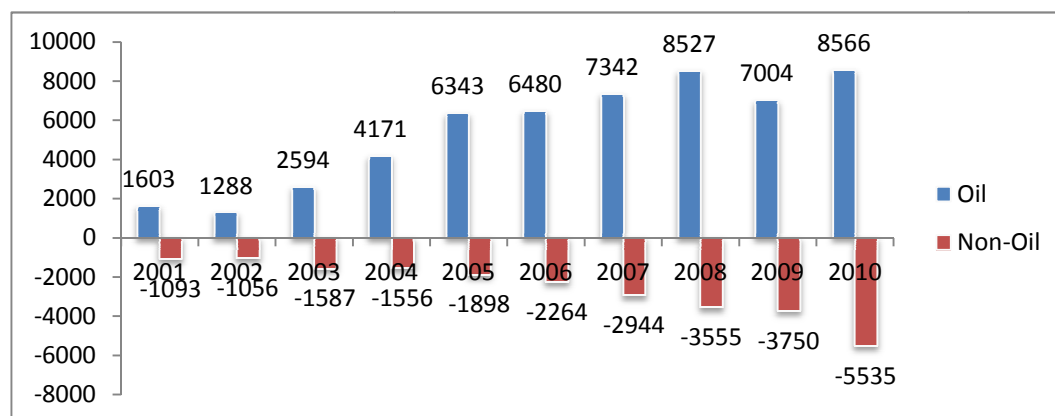


Figure 1: Nigeria's Oil and Non-oil Trade balance Nbn';Source: Computed based on data from CBN

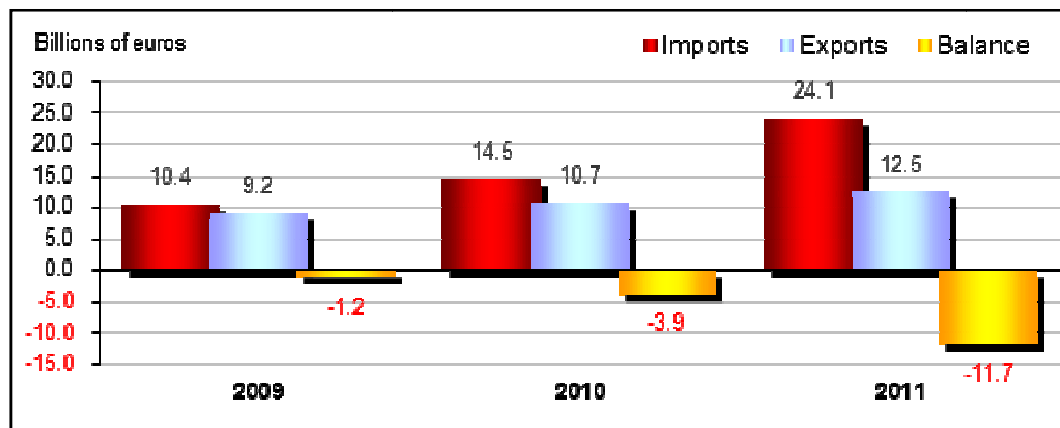


Figure 2: Nigeria's trade balance with EU-27; Source: Europa bilateral trade statistics

Table 1: Composition of Tariff revenue, 2003-2011

Year	%Non-oil revenue	%Total revenue
2003	8.1	1.3
2004	8.8	1.0
2005	8.6	1.0
2006	10.0	1.1
2007	6.2	1.2
2008	5.4	0.8
2009	6.0	1.4
2010	5.4	1.2
2011	7.0	1.4

Source: CBN Annual Reports and Account various Issues

Table 2: Unit root analysis of predictors of output volatility

variable	ADF stat	Prob.	1% level	5% level	Lag	Integration
Real GDP	-4.534393	0.0003**	-3.485586	-2.885654	12	1
Output volatility	-4.556124	0.0019**	-4.039797	-3.449365	12	0
Trade openness	-6.317179	0.0000**	-3.486064	-2.885863	12	0
Oil revenue	-6.292119	0.0000**	-3.486064	-2.885863	12	0
Non-oil revenue (tariff)	-3.668816	0.0058**	-3.486064	-2.885863	12	0
Exchange rate	-11.03719	0.0000**	-2.584707	-1.943563	12	1
Government consumption	-11.34922	0.0000**	-3.486551	-2.886074	12	1
Private consumption	-5.049213	0.0000**	-3.486064	-2.885863	12	0
Inflation rate	-6.224652	0.0000**	-3.486064	-2.885863	12	0
Private investment	-5.704305	0.0000**	-2.586753	-1.943853	12	1
Monetary policy rate	-10.90871	0.0000**	-2.584375	-1.943516	12	1

Legend: **1%; *5%

Source: Author based on ADF unit root analysis

Table 3: Result of Multivariate model of ARCH-M(1,1) of predictors of output volatility

variable	Coefficient	Std. error	z-statistics	Prob.	Lag
Mean Equation(Dependent variable: $\Delta\text{Log(RGDP)}$)					
Log(GARCH)	0.002438	0.000606	4.025847	0.0001**	
$\Delta\text{Log(RGDP)}$	0.892469	0.019548	45.65431	0.0000**	4
Constant	0.026570	0.007119	3.732097	0.0002**	
Variance Equation(Dependent variable: Volatility)					
Long run weighted variance	-3.243107	1.589135	-2.040800	0.0413*	
ABS(RESID(-1)/@SQRT(GARCH(-1)))	0.700672	0.160612	4.362515	0.0000**	
RESID(-1)/@SQRT(GARCH(-1))	0.999615	0.099713	10.02493	0.0000**	
LOG(GARCH(-1))	0.722710	0.033999	21.25666	0.0000**	
<i>Trade shocks</i>					
Trade openness	0.853498	0.148297	5.755343	0.0000**	0
Oil revenue volatility	0.614677	0.187863	3.271940	0.0011**	4
Non-oil revenue (tariff) volatility	-0.744649	0.187974	-3.961446	0.0001**	3
Exchange rate volatility	1.103001	0.121054	5.444043	0.0000**	0
Exchange rate volatility	1.400022	0.257166	4.931760	0.0000**	1
<i>Trade transmitted shocks</i>					
Government spending volatility	1.171667	0.361709	3.239257	0.0000**	4
Private consumption volatility	-0.672823	0.297255	-2.263454	0.0236*	0
Inflation volatility	0.046099	0.005390	8.552153	0.0000**	0
Private investment volatility	2.572050	0.521528	4.931760	0.0000**	0
<i>Policy variable</i>					
Monetary Policy Rate	0.274786	0.077733	3.534981	0.0004**	0
R-squared	-2.736667	Mean dependent variable	0.012776		
Adjusted R-squared	-3.340573	S.D. dependent variable	0.084186		
S.E. of regression	0.175394	Akaike info criterion	-4.446515		
Sum squared residual	3.045527	Schwarz criterion	-4.042972		
Log likelihood	274.8979	Hannan-Quinn criteria.	-4.282700		
Durbin-Watson stat	1.044489				

Method: ML - ARCH (Marquardt) - Normal distribution; Sample (adjusted): 1982Q1 2010Q4; Convergence achieved after 120 iterations; Pre-sample variance: backcast (parameter = 0.7)

Legend: **1%; *5%

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