

Trade Openness-Government Size Nexus: Compensation Hypothesis Considered for Nigeria

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Abstract: Over the years, substantial theoretical and empirical studies have been carried out on the trade openness-government size nexus. While a strand of the literature reported positive linkage, the other suggests otherwise. This study contributes to the debate by examining this relationship for Nigeria using the bounds testing approach to cointegration within an ARDL framework proposed by Pesaran *et al.* (2001). Empirical evidence reveals that government size measured by percentage share of total government expenditure in GDP and share (percent) of recurrent expenditure in GDP significantly affects trade openness in the long run but percentage share of capital expenditure in GDP as a measure of government size does not impact on trade openness in the long run. The results of the standard causality test corroborate these findings. However, the three measures of government size considered significantly affect trade openness in the short run. The major implication for our study therefore is that compensation hypothesis holds for Nigeria. Thus, the government need to continue to expand its expenditure in order to cushion the effect of increase in risk caused by rising trade openness.

Keywords: Compensation Hypothesis, trade openness, government size, Bound Test, Nigeria.

I. INTRODUCTION

The literature on macroeconomics and public finance pointed to a defined association between government size and the extent of trade openness in an economy. This followed from the pioneering studies of Cameron (1978) and Ruggie (1982) that marked the beginning of rigorous theoretical and empirical discussions on this relationship. Ruggie, following the observance of a positive correlation between the government size and trade openness puts forward the compensation hypothesis- positing that trade openness leads to an increase in the size of the government. The compensating hypothesis as furthered expounded on by Rodrik (1997, 1998) postulates that increase in trade openness may stimulate increase in government size in form of redistributive public expenditure in order to compensate for increasing risk caused by possible international market turbulence. The argument runs that increased trade openness may increase risk among the citizens thereby making them to demand for more redistributive government expenditure in order to compensate for the risk. In this connection, the government sector is seen as a safe sector in terms of employment and income thereby making it easier to isolate its function over external risk by increasing its impact to the entire economy.

In Nigeria, casual observations indicated that the government size has increased in response to extensive trade openness. This nexus has attracted significant discussions but without empirical evidence. Yet empirical evidences on government size and trade openness abound in the literature for the developed countries, and few developing countries. This study therefore is aimed at enriching the discussions on government size and trade openness nexus in Nigeria with empirical evidence as well as broadens the extant literature generally.

The rest of the paper is organised into five (5) sections as follows: Section II examines the trend and behaviour of component of government size and trade openness in Nigeria while Section III is a review of previous studies. The methodological approach is laid out in Section IV, while empirical results are presented in section V. Section VI concludes and draws policy implications.

II. STYLIZED FACT ON GOVERNMENT SPENDING PATTERN AND TRADE OPENNESS PROFILE IN NIGERIA (1970-2012)

The trend and pattern of government size captured by spending and trade openness (measured by the sum of exports and imports as proportion of gross domestic product) during 1970-2012 are depicted in Figures 1 to 3.

Figure 1 components are plotted using the logarithmic forms of the data. It showed the trend of capital, recurrent and total expenditures. There was on

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the average consistent increase in total and recurrent expenditure while capital expenditure fluctuated. The trend in export, import and trade, captured in Figure 2, showed that export and import (share of GDP) moved in the same direction (this is because Nigeria is characterised by high crude oil export and refined oil import). They both increased all through the period of study except for 2012 where a fall in import does not correspond to the increase in export. This can partly be attributed to the on-going reforms in the oil sector, which resulted in a 4.4% fall in oil sector imports (CBN, 2012). Accordingly and as expected, total trade openness fluctuated over the period.

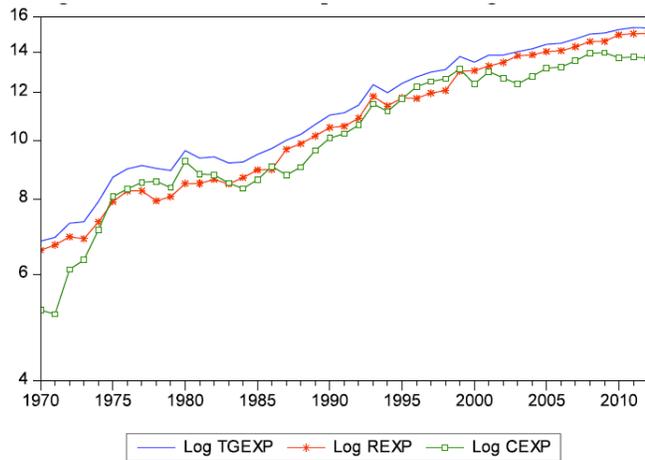


Figure 1: Trend of Total Expenditures in Nigeria (1970-2012).

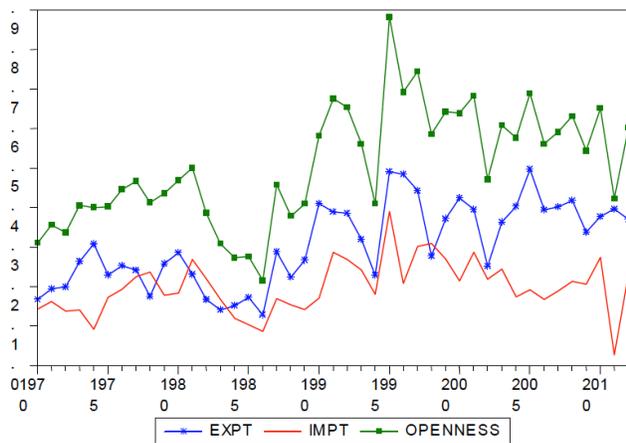


Figure 2: Trade Openness in Nigeria (1970-2012).

Figure 3 showed the trend in government size measured alternatively by total government expenditure, capital expenditure and recurrent expenditure, all share of GDP in relation to total trade openness. From the figure, it could be seen that on the average government size increased in response to the expansion in trade openness.

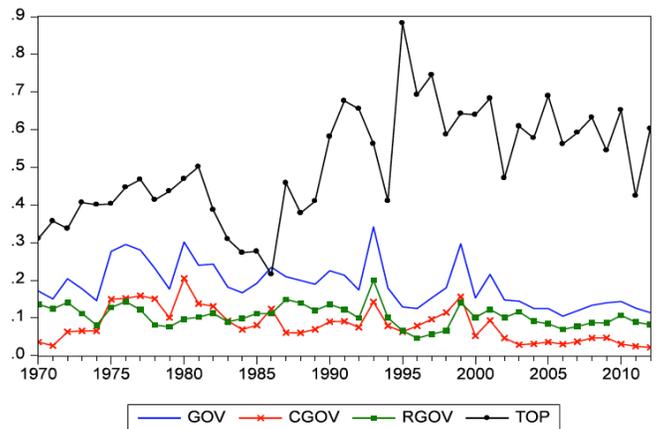


Figure 3: Government Size and Trade Openness in Nigeria (1970-2012).

III. REVIEW OF PREVIOUS STUDIES

Indeed, many studies have tested the validity of the hypothesis. These studies included cross-country and specific country studies, and produced mixed results. This review covered a broad spectrum of these studies and is ordered by the year the studies were conducted.

Starting with Alesina and Wacziarg (1998), they utilized cross-sectional data comprising Latin American, Sub-Saharan Africa, South East Asia and OECD countries to examine the nexus among trade openness, country size and government size covering the period 1960-1989. The reported results in the main showed that country size is negatively related to government size, and that it is also negatively related to trade openness.

Garrett (2000) explored the interactive effects of trade and capital mobility on government spending for the largest possible sample of countries (over 1000) around the world during 1970-1995. He focused on testing directly whether capital mobility constrains public spending on its own, or mitigates the effects of trade as Rodrik (1997, 1998) summarised. In addition, he analysed these relationships not only with respect to levels of spending, trade and capital mobility, but also for changes over time in these variables. His results showed a significant positive relationship between levels of trade and levels of government spending. Further findings concerning the relationships among changes in trade, capital mobility and government spending (measured as the difference between 1970-1984 averages and those for 1985-1995), suggested that countries in which trade grew more rapidly after 1985 tended to have public economies that grew less quickly, and this became exacerbated in countries where capital mobility increased quickly.

Using a simple analysis of correlation coefficients, Alvarez, Pascual and Romero (2003) examined the relationship between trade openness and public expenditure in the EU-15 between 1998 and 2000 and found a negative relationship. Sanz and Velázquez (2003) investigated the effects of trade openness and financial openness proxy by averaged stock of inward and outward foreign direct investments on government size in Spain. Their finding suggested a positive effect of trade openness on the share of health and social security expenditures in total government expenditures and a negative effect on education, housing, transport and communication shares of public expenditures. They argued that countries with high stock of FDI experienced more risk in labor mobility as multinational companies change their location easily compared to domestic or national companies. This in turn reduces total employment and wages in the economy.

Islam (2004) analyzed the relationship between government size and economic openness for six member countries of the Organizations for Economic Co-operation and Development (OECD) namely Australia, Canada, England, Norway, Sweden, and the United State of America. The findings indicated the existence of a long run relationship between government size and trade openness for USA and Canada, but non for the other four countries. In contrast, Molana *et al.* (2004), in an earlier study for Spain covering the period 1948-1998, observed no long run cointegration between trade openness (the sum of exports and imports as proportion of gross domestic product) and public expenditure on goods and services. Causality test also showed no causal relationship between the two. They, however, took cognizance of the fact that the unsuitable measurement of the variables used in their analysis, might be the possible reasons for their results.

Garen and Trask (2005) in their study on openness and size of government in the US used non-budgetary measures to proxy government size and also revealed that the relationship is not very robust but positive. Furthermore, Liberatti (2006) in his study on trade openness, financial openness and government size for 16 European countries, USA, Canada and Australia confirmed the non-robustness of the relationship between trade openness and government size. Using Vector Error Correction Model (VECM), Khalid (2005) examined the long-and-short run relationship between government size and trade openness in the Kingdom of Saudi-Arabia. His results showed the existence of a long run relationship between government size and

openness, while the causality test indicates a uni-directional causal relationship that runs from government size to trade openness.

Swee-Hui Kueh *et al.* (2008) used the Autoregressive Distributed Lag [ARDL] bounds testing approach to examine the relationship between trade openness and government expenditure for the Association of Southeast Asian Nations [ASEAN] countries namely Indonesia, Malaysia, Philippines and Thailand from 1974-2006. The reported results indicated a significant positive long-run linkage between government expenditure and trade openness for the four countries. Benarroch and Pandey (2008) also examined whether there exists a positive association between trade openness and government consumption using cross-country and panel regressions. This was achieved by testing for causality between external risk and government size using the Granger causality test for panel data based on the dynamic panel estimation model of Arellano and Bond (1991). The results indicated that larger government size leads to lower openness. In other words, a negative association between trade openness and government size.

Similarly, Rivas *et al.*, (2009) reported a positive long run relationship between public expenditure and trade openness for Spain during the period 1960-2000. Epifani and Gancia also in (2009) explored two different channels and hypothetical data to analyse the relationship between trade openness and government size. Their findings indicated the existence of a positive relationship between trade openness and government size. Ram (2009) presented contrasting results. He examined the link among openness, country size and government size with a 41 year panel data covering the period 1960-2000 for 154 countries. Pooled OLS estimates supported previous evidence of negative association between country size and government size and between openness and government size. But when cross- country heterogeneity was accounted for, through fixed effects model, there was little evidence of a negative association of country size with either government size or openness. Ram concluded that it did not seem likely that positive association between openness and government size arises due to the mediating role of country size.

Shahbaz, Rehman and Amir (2010) utilized the Fully Modified Ordinary Least Square (FMOLS) cointegration approach and Error Correction Mechanism (ECM) to determine the long and short run

nexus between trade openness and government size in Pakistan from 1971 to 2006. Their findings support the compensating hypothesis; that is, the existence of a positive and significant long and short run relationship between trade openness and government size.

Benarroch and Pandey (2012), extending on their earlier study of 2008 examined the causal relationship between trade openness and government size using both aggregate and disaggregated government expenditure data, including data on social security for 119 countries covering the 1972-2000. The sampled countries were classified into high and low growth countries, respectively. The dynamic panel estimation model/technique was utilized. The results from the fixed effects model showed there was no positive causal relationship for aggregate government expenditures. Separate tests for high versus low countries showed that these results hold for both groups of countries. Similar results were obtained using disaggregated data. The only evidence of a robust, statistically significant, positive causal relationship was found between openness and education expenditures in low income countries. There was no positive causal relationship whatsoever between social security and openness. The authors therefore concluded that there was no evidence to support the relationship as suggested by Rodrik (1998).

Nahidi *et al.* (2013) investigated the relationship between trade openness, financial openness and government size for Economic Cooperation Organization countries comprising Azerbaijan, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan and Turkey during 2000-2009. The reported results suggested a positive long run relationship between trade openness and government size and a negative relationship between financial openness and government size. For Turkey, Aydogus and Topcu (2013) used residual based cointegration and the standard causality test to investigate the long-run and causal relationship between trade and openness and government size during 1974 and 2011. Their results reveal negative and significant relationships between the two variables. And Liberati (2013) reexamined the relationship between government size and trade openness using an unbalanced panel of 156 countries variously observed during 1962 to 2009. The results reported showed on one hand that country size is not relevant to determine the sign of the relationship between government size and economic openness, but

on the other confirmed the relevance of the cross-country heterogeneity as suggested by Ram (2009) to buttress the compensation hypothesis was weak. Consequently, the author concluded that the compensation hypothesis cannot be assigned general validity on this ground. However, was acknowledged that these results were robust to alternative specifications of the explanatory variables.

Parvizkhanlou (2014) looked at the relationship between trade openness, financial openness and government size in seven Economic Cooperation Organization (ECO) countries (namely Azerbaijan, Iran, Kazakhstan, Kyrgyz Republic, Pakistan, Tajikistan and Turkey) during 2000-2009. The results indicated that more trade openness will increase government size (proxied by government consumption expenditures) as hypothesized by Cameroon (1978) and Roderick (1998). In contrast, financial openness was negatively related with the government size.

In summary, it obvious from the foregoing review that the empirical relationship between government size and trade openness has varied from study to study; country to country and by the measures of government size and the methodology adopted.

VI. VI. METHODOLOGY

VI.1. Estimation Method

From the literature survey above, the relationship between trade openness and government size can either be unidirectional or bi-directional. Thus, the functional form is expressed as:

$$TOP = f(GOV) \quad (1)$$

Where: TOP is trade openness (the sum of exports and imports on Gross Domestic Product – GDP) and GOV is measured as the share (percent) of government expenditure in GDP.

Disaggregating government expenditure into recurrent and capital expenditures gives us two additional measurement of government size. Therefore, we have two other possible functional forms on the relationship between trade openness and government size thus:

$$TOP = f(RGOV) \quad (2)$$

$$TOP = f(CGOV) \quad (3)$$

Where: RGOV and CGOV represent the share (percent) of recurrent and capital expenditure in GDP, respectively.

The Autoregressive Distributed Lag (ARDL) model specification was adopted to estimate these functional forms empirically. The ARDL co-integration test (which is popularly known as the bound test) was utilised to determine the long-run relationships and dynamic interactions between trade openness and the alternative measures of government size. Three reasons inform the decision of adopting this approach. These are: compared to other co-integration methods like Johansen; Engle and Granger, the bounds test allows the co-integration relationship to be estimated by OLS once the lag order of the model is identified; there is no need to conduct unit root test implying that the regressors can be either I(0), purely I(1) or mutually co-integrated; and the long-run and short run parameters of the models are simultaneously determined.

The ARDL model specifications for the three functional forms of our model are expressed thus:

$$\Delta \ln TOP_t = a_0 + a_1 \ln TOP_{t-1} + a_2 \ln GOV_{t-1} + \sum_{i=1}^j \alpha_i \Delta \ln TOP_{t-i} + \sum_{i=1}^j \gamma_i \Delta \ln GOV_{t-i} + \varepsilon_t \quad (4)$$

$$\Delta \ln TOP_t = \phi_0 + \phi_1 \ln TOP_{t-1} + \phi_2 \ln RGOV_{t-1} + \sum_{i=1}^n \beta_i \Delta \ln TOP_{t-i} + \sum_{i=1}^n \lambda_i \Delta \ln RGOV_{t-i} + e_t \quad (5)$$

$$\Delta \ln TOP_t = b_0 + b_1 \ln TOP_{t-1} + b_2 \ln CGOV_{t-1} + \sum_{i=1}^m \theta_i \Delta \ln TOP_{t-i} + \sum_{i=1}^m \kappa_i \Delta \ln CGOV_{t-i} + \mu_t \quad (6)$$

Where: Δ denotes a first difference operator; \ln represents natural logarithmic transformation; a_0, ϕ_0 and b_0 are intercept while ε, e and μ are white noise error terms.

The bound test approach is based on the Wald test (F statistic), by imposing restrictions on the long-run estimated coefficients of one period lagged level of trade openness and government size in equations (4) to (6) to be equal to zero. That is, $H_0: a_1 = a_2 = 0$; $H_0: \phi_1 = \phi_2 = 0$; and $H_0: b_1 = b_2 = 0$. The calculated F-statistic is compared to the tabulated critical value in (Pesaran *et al.* (2001)). The decision rule is that if computed F-statistic falls below the lower bound value, the null hypothesis (no co-integration) cannot be

rejected. Contrarily, if the computed F-statistic exceeds the upper bound value, then it is concluded that trade openness and government size are co-integrated.

The error correction model was used to capture the speed of adjustments of trade openness and government size in the models. This is because to immediately restore equilibrium may not be possible due to the lags and adjustment process used to capture changes in any of the factors affecting trade openness and government size overtime. Thus, these models are expressed below:

$$\Delta \ln TOP_t = a_0 + \sum_{i=1}^j \alpha_i \Delta \ln TOP_{t-i} + \sum_{i=1}^j \gamma_i \Delta \ln GOV_{t-i} + \vartheta_t ect_{t-1} + \varepsilon_t \quad (7)$$

$$\Delta \ln TOP_t = \phi_0 + \sum_{i=1}^n \beta_i \Delta \ln TOP_{t-i} + \sum_{i=1}^n \lambda_i \Delta \ln RGOV_{t-i} + \ell_t ect_{t-1} + e_t \quad (8)$$

$$\Delta \ln TOP_t = b_0 + \sum_{i=1}^m \theta_i \Delta \ln TOP_{t-i} + \sum_{i=1}^m \kappa_i \Delta \ln CGOV_{t-i} + \vartheta_t ect_{t-1} + \mu_t \quad (9)$$

Where:

$j, n,$ and m = lag length for the Unrestricted Error-Correction Model (UECM)

ect_{t-1} = the error correction term lagged for one period

$\vartheta, \ell,$ and ϑ = the coefficients for measuring speed of adjustment in equation 7, 8 and 9 respectively. Other variables are as defined earlier.

In agreement with the argument in the literature that it might be important to determine the direction of causality between government size and trade openness, and following on the lead by Benarroch and Pandey (2012); and Aydogus and Topcu, (2013), we conducted the standard pairwise causality technique to determine the direction of causality between our various measures of government size and trade openness.

IV.2. Sources of Data

This study employed annual data that covered the period 1970-2012. The data were sourced from the Central Bank of Nigeria Statistical Bulletin (2012).

Table 1: Bound Testing for Cointegration

	F-stat	Critical Bound		K
		Lower	Upper	
Equation (4)	5.9133	4.94	5.73	1
Equation (5)	8.2453	4.94	5.73	1
Equation (6)	5.2453	4.94	5.73	1

Notes: Asymptotic critical value bounds are obtained from Table CI (iii); Case III: unrestricted intercept and no trend for $k=1$ (Pesaran *et al.*, 2001).

V. EMPIRICAL RESULTS

The bounds test results for equations (4), (5) and (6) are presented in Table 1. From the table, the computed F-Statistic for equation (4), (5) and (6) is 5.9133, 8.2453 and 5.2453 respectively. These values exceeded the upper bounds critical value of 5.73 at the 5% significance level except for equation (6). This implies that there exist a long run relationship between trade openness and total government expenditure as a measure of government size; trade openness and recurrent expenditure as a measure of government size while no long-run relationship was found between trade openness and capital expenditure as a measure of government size.

In Table 2, we present the estimates of long run association between trade openness and government size(s). The coefficients are 0.59, 2.05 and 0.19 for equation 4, 5 and 6 respectively. The coefficients of GOV and RGOV are significant while that of CGOV is insignificant. The estimates suggest that a 10% increase in total government expenditure would lead to 5.9% increase in trade openness while 10% increase in recurrent expenditure would results to 20.5% increase in trade openness. Though, the coefficient of capital expenditure is positive but insignificant indicates that in the long run, capital expenditure does not affect trade openness in Nigeria.

Following the long-run analysis, we examine the effect of changes in government size on trade openness by estimating an unrestricted error correction model. Table 3 showed that the lagged values of the residual (ECM_{t-1}) in equations (7), (8) and (9) which measures the speed of adjustment of the models to equilibrium are rightly signed, significant and are all less than one. This means that approximately 26%, 23% and 27% of the discrepancies in the previous year is adjusted for in the current year for equation (7), (8) and (9), respectively. The results also reveal that $\Delta GOV(-1)$, $\Delta RGOV(-1)$ and $\Delta CGOV(-1)$ impact positively on trade openness in the short run with the coefficient of $\Delta CGOV$ been the highest.

According to Bahmani-Oskooee and Brooks (1999), the existence of a cointegration does not necessarily imply that the estimated coefficients are stable. They therefore proposed that cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) stability tests based on the recursive regression residuals should be conducted to ascertain the stability of the estimated parameter. The outputs of these tests are presented in Figure 4. From the figure, it is evident that the plotted statistics for the three equations fall inside the critical bounds of 5% significance indicating that the estimated parameters are stable.

The results of the causality test presented in Table 4 showed that there is a uni-directional causal

Table 2: The Estimated (ARDL) Expenditure Model

Variables	Equation (4)	Equation (5)	Equation (6)
C	0.30*	0.39**	0.20*
GOV(-1)	0.59**		
RGOV(-1)		2.05*	
CGOV(-1)			0.19
Jaque-Bera	0.56 [0.75]	0.78 [0.66]	0.62 [0.73]
Adjusted R square	0.51	0.61	0.56
Durbin-Watson	1.85	1.81	1.74
Observation	41	41	41

Notes: * and ** denote significance at 1% and 5% respectively. Sample: 1970 to 2012.

Table 3: Results of the ARDL Short-run Relationship

Variables	Equation (7)	Equation (8)	Equation (9)
C	0.01	0.02	0.01
$\Delta TOP(-1)$	0.37**	0.34**	0.31*
$\Delta GOV(-1)$	0.44**		
$\Delta RGOV(-1)$		1.38*	
$\Delta CGOV(-1)$			1.77**
ECM(-1)	-0.26**	-0.23**	-0.27*

Note: (*) and (**) indicates 1% and 5% significance level respectively.

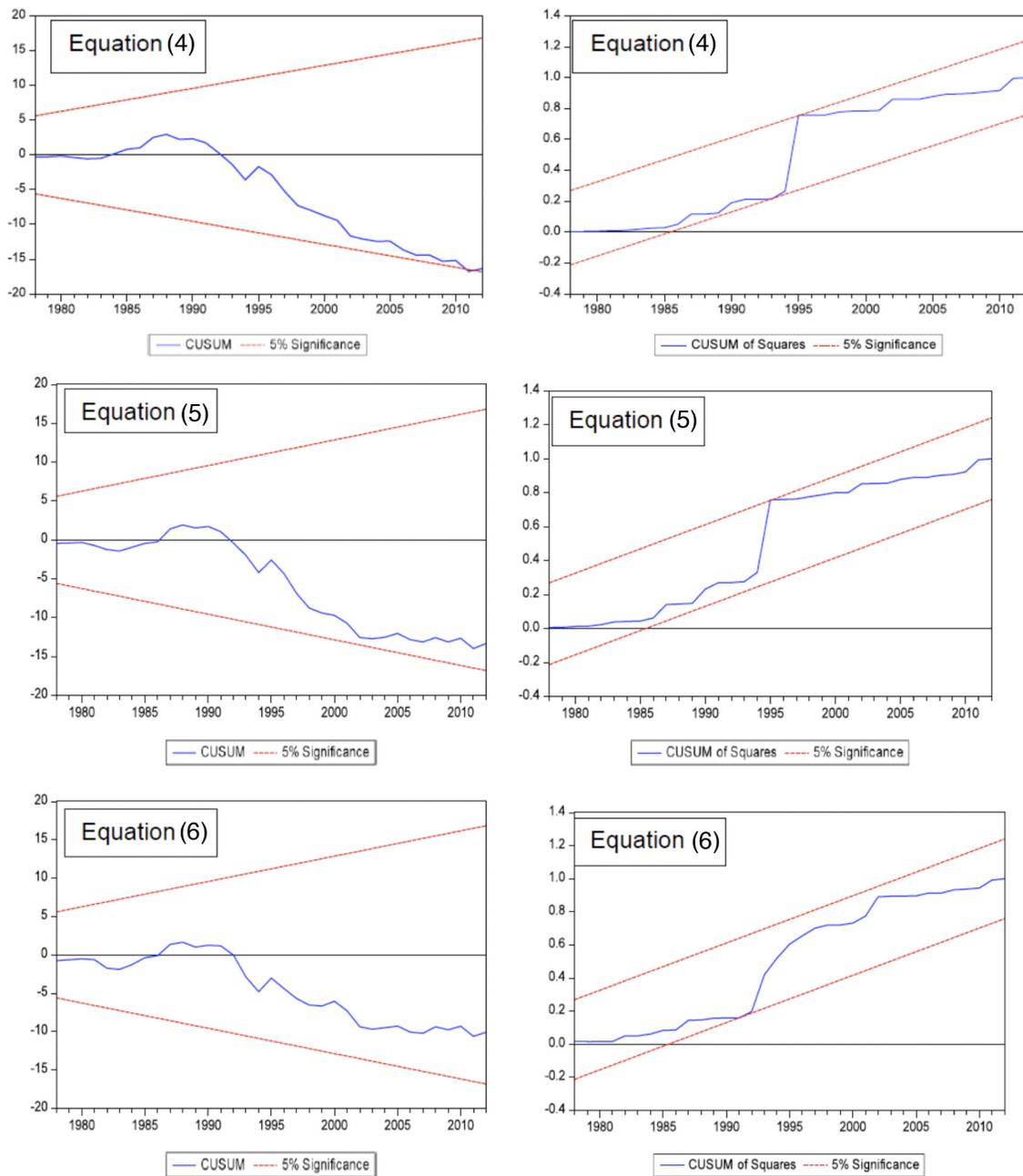


Figure 4: CUSUM and CUSUM square stability tests for Equations (4), (5) and (6).

Table 4: Standard Causality Test for the Relationship between Trade Openness and Measurements of Government Size

Null Hypothesis	Obs.	F-Statistics	Probability
TOP does not Granger cause GOV	41	3.68	0.0231**
GOV does not Granger cause TOP	41	1.32	0.1128
TOP does not Granger cause RGOV	41	6.12	0.0051*
RGOV does not Granger cause TOP	41	1.64	0.2090
TOP does not Granger cause CGOV	41	0.20	0.8224
CGOV does not Granger cause TOP	41	0.44	0.6456

Note: (*) and (**) indicates 1% and 5% significance level respectively.

relationship from trade openness to two measures of government size (total government expenditures and recurrent expenditures). There was no causality whatsoever between trade openness and capital expenditures.

VI. CONCLUDING REMARK

This study has probed the relationship between trade openness and government size in Nigeria, utilizing data from 1970-2012. The Unrestricted Error Correction Model-Bounds Test proposed by Pesaran *et al.* (2001) to investigate the long -run and short -run relationships between the two variables was employed and complemented with causality tests. The empirical results showed that trade openness and government size when measured by percentage share of total government expenditure in GDP and percentage share of recurrent expenditure in GDP are cointegrated while government size measured as the share (percent) of capital expenditure in GDP and trade openness are not cointegrated. The causality tests provide relatively strong support for a causal relationship between openness and aggregate government expenditures on one hand and disaggregated (recurrent) government expenditure on the other hand. Going by these results, we concluded that the compensation hypothesis holds in Nigeria. Accordingly, government need to continue to expand its expenditure in order to cushion the effect of increase in risk caused by rising trade openness.

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