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Government Size, Openness and Income Risk Nexus: New Evidence from Some African Countries

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Abstract

Empirical evidence for the compensation hypothesis holds that trade openness independent of income risk has no significant effects on government size. Hence, using time series data for the period 1965-2013 from Egypt, Ghana, Kenya, Nigeria and South Africa and applying the bounds test method of cointegration, this paper investigates the nature of the relationship between openness, income risk, terms of trade volatility and income per capita on government size in each of the 5 African countries. Our empirical findings show a long-run relationship particularly in Egypt and Ghana and a limited evidence for other countries. Similarly, after applying both the Autoregressive Distributed Lags (ARDL) and Fully Modified OLS (FM-OLS) on original data and Moving Average (MV) converted data, our findings vary across the countries due to country-specific factors. Hence, the evidence we find does not support the compensation hypothesis. However, we observe significant positive effects of income per capita on government size for each country and some evidence of the mitigating and cushioning effects of governments when exposed to income risks and volatility due to trade openness. We therefore suggest some appropriate policy recommendations for the selected countries.

Keywords: ARDL-bounds testing, FM-OLS; trade openness; income risk; government size; Africa.

1. Introduction

The correlations between government size and trade openness have remained very controversial and opinions differ widely on the nature of such relationships. While some neoliberal thinkers are of the opinion that active public expenditures are needed to cushion the effects of external risks on a domestic economy, others hold a contrary view. The efficiency hypothesis and the compensation hypothesis are hinged on these debates. Due to international competitiveness[1], the efficiency hypothesis proponents hold the opinion that openness to trade discourages and retards welfare functions of the government in the management of domestic policies (Alesina and Perotti, 1997). This is aggravated more due to low demand for exportable commodities; mobile factors outflow and unemployment (see Gordon, 1983; Persson and Tabellini, 1992). As a result, there are situations of lower abilities of the governments to collect taxes, rising labour costs and a transmission effects to higher prices of goods and services including the inability of firms to compete internationally among others (Avelino et al., 2005; Epifani and Gancia, 2009).

Empirical evidence for the compensation hypothesis suggests that trade openness and government size are positively correlated. This relationship was first investigated by Cameron (1978) and was further advanced by Hicks and Swank (1992), Huber et al (1993), Rodrik (1997 and 1998) Alesina and Waczriag (1998). Hence, while building upon the studies of Cameron (1978), the seminal works of Rodrik (1997) appear to be the starting point in studying such a relationship. Rodrik (1997) therefore contends that higher government size is expected to cushion an economy exposed to external risks and should serve as a social safety-net in a liberalized economy. Drawing further from the study, Rodrik’s compensation hypothesis argues that a country’s exposure to external shocks induces volatility in its terms-of-trade and any associated risks thereof. To guard against such economic fluctuations, government should redirect expenditure so as to absorb the external risks. While using a cross-sectional sample of over 100 developed and developing countries, Rodrik’s estimates show that more open economies are associated with larger government size. However, having taken into cognizance the external risk factor by including it in a separate model, the findings show an insignificant relationship between openness and government size; hence the impact of openness on government spending depends on several other factors which are idiosyncratically observed in

[1] Such international competitiveness arise from international traded goods and services and the higher possibility of capital mobility to a more productive environment -see Garreth and Mitchell (2001)

each economy. Similar studies in line with Rodrik (1997) include Quin (1997), Garrett and Mitchell (2001), Avelino et al (2005), Liberati (2006), Alesina and Waczriag (1998), Sanz and Velázquez (2003) and Islam (2004). These studies with the exemption of Islam (2004) have either applied a cross-sectional or cross-sectional panel data for a group of countries with little attention given to specific characteristics and therefore leading to a loss of important homogenous factors that are specifically identified in each individual country, Islam(2004). For instance, Sanz and Velázquez (2003), obtained a positive association between openness and share of health and social security expenditures in total government expenditures which is in line with Rodrik's finding but in the contrary, a negative association was discovered with some other categories of expenditures such as education, housing, transport and communication shares of public expenditures. Contrary to the use of cross-sectional data, Islam (2004) used time series data of 6 developed countries[2], while applying the bounds test approach to cointegration for each country. Findings show that, contrary to expectations in a cross-sectional analysis, government expenditure does not react to cushion the effects of external risks due to trade openness.

Therefore, while building upon Islam's work on the relationship between trade openness and government size for 6 countries in the Organization for Economic Cooperation and Development (OECD), this study aims at further investigating the nature of the relationship between government size, trade openness and income risk for Egypt, Ghana, Kenya, Nigeria and South Africa using time series data between 1965 and 2013. Even though the characteristics of these countries differ widely from that of the developed counterpart, their relative impacts in the international market cannot be overlooked. Also, heterogeneity across these countries arises due to differences in economic characteristics ranging from population sizes, economic growth rates, institutional framework and macroeconomic policy[3] implementations. Hence, country-specific studies are needed to control for these attributes. Accordingly studies related to the effects of trade policy are better analyzed through country case studies (Srinivasan and Bhagwati 1999). Additionally, the relative sizes of government changes over time, hence a better appreciation of such dynamic relationship is better scrutinized through country-specific time series data (see Islam 2006; Bird 1971). Given that most economies of these nations are primary sector driven,

[2] Australia, Canada, England, Norway, Sweden and USA

[3] The Structural Adjustment Programme (SAP) of the World Bank/ IMF was implemented across these African countries at different years and other conditionalities. While Nigeria and Kenya and Egypt adopted theirs in 1986, Ghana -1983 and South-Africa's openness policy was made visible after the apartheid regime.

hence volatility in international prices of primary goods including openness are often associated with vulnerabilities to external shocks and the relative role of the government as a mitigating agent is the basis of Rodrik's argument.

Garrett (2001) holds that studies related to the compensation hypothesis of openness and government size nexus can be better appreciated when applied to the developing countries. Again, this study, therefore contributes to the existing literature on government size, trade openness and income risk nexus in the following ways: First, to the best of our knowledge, no study had attempted to analyze such a relationship for Egypt, Ghana, Kenya, Nigeria and South Africa respectively. Our aim is to investigate if increases in trade openness and income risk have any significant effects on the government size for each of the listed African countries. Second, by applying GARCH(1,1) on terms of trade volatility and a measure of income risk, our empirical strategy uses the Autoregressive Distributed Lag (ARDL) model of bounds testing (Pesaran and Shin 1999) to estimate the level relationship between government size and other regressors in the model (see Islam 2004). Third, further robust checks are estimated for each of the countries using the Fully Modified Ordinary Least Squares (FM-OLS) regressions due to Phillips and Hansen (1990), Philips (1995). In most empirical works, FM estimator has proven to have better performances with consistency compared to other methods of estimating the long-run relationship in the model. Finally, since time series data are subject to short-run cyclical fluctuations, we analyzed all the variables using their Moving Average (MA) converted values.

Our empirical estimates show a strong evidence of a long run relationship between our dependent variable (government size) and other explanatory variables such as trade openness, income risk, and terms of trade volatility particularly for Egypt and Ghana. Against the Rodrik (1998) argument that trade openness does not have an independent effect on government size in the presence of income risk, our findings show a significant, but mixed effect of trade openness on government size across the 5 African countries. While openness is associated with a rise in government size in South Africa and Nigeria, its effects on other countries partly conforms to the Rodrik's argument. Also, contrary to Rodrik hypothesized risk mitigating mechanism associated with openness and government size, we observe that the external risk variable (Income Risk) has significant negative impacts on government size for a majority of the models. We also find a negative impact of neoliberal SAP policies on government size for all countries except South

Africa. Also consistent with time series analysis due to Bohl (1996) and Islam (2004), we find positive effects of GDP per capita on government size for the studied countries. Additionally, estimates arising from the moving average data and fully modified OLS present more robust estimates across the 5 African countries. Hence, our result is similar to Islam's (2004) empirical analysis for other industrialized countries.

As a result of the foregoing, this paper has 4 other sections that follow the introduction. Section 2 briefly reviews trade openness policies and government consumption in the selected African countries, which is followed by data description and methodology in section 3. In section 4, our study compares the empirical results from the models, while section 5 concludes the paper.

2. Trade Openness and Government Consumption in the selected African countries

The implementation of the trade openness policies in developing countries varies from one nation to another. In most of the African countries, trade liberalization policy was part of the Structural Adjustments Programmes (SAP) of the IMF/World Bank. Prior to the adoption of the policy framework, the countries adopted inward oriented trade policy of import substitution, however, with the success stories of some East Asian countries that opened up their economies to international trade[4], developing countries similarly adopted the same policy framework on their respective economies. For instance, Nigeria adopted the policy package through the Structural Adjustment Programme (SAP) of the 1980s, aimed at encouraging trade without restriction (Nwaka et al, 2015). From the development planning era of the 1960s and 1970s to the Transformation Agenda policy of Ex-President Goodluck Jonathan, the country has often depicted large public spending alongside with rising oil revenues and trade. The GDP growth rate as at 2014 was 6.3% while total government expenditure as percentage of GDP was 6% in 2010 which is lower compared to its value of 9.2% in 2008 (WDI, 2014). With over reliance on oil exports, the nation is vulnerable to fluctuations in the international market. Furthermore, from about 0.5% in 1960, the impacts of the oil sector on the GDP has risen rapidly to about 12%, 25% and 20% in 1970, 1975 and 1979 respectively. At the moment, oil has remained Nigeria's most single export accounting for about 95% of export earnings and over 80% of the national

[4] See Ian, Tibor and Maurice (1970) and Frank, C. et al (1975)

revenue. However, the last decade has seen a substantial increase in the earnings potentials of other viable sectors.

Following the post-apartheid in 1994, there has been an acceleration of trade openness policy, including government social and capital expenditure in South Africa (SA). Especially between 1995-2005, about 2.5%, 4.4% and 6.2% growth rates of the South African GDP is associated with government's final consumption expenditure, export and imports respectively (Mabugu and Chitiga 2007). Its GDP growth rate stood at about 3% between 1995 to 2010 while the income per capita show a substantial improvement from its 3973USD in 1995 to 6477USD as of 2014(WDI 2014). In Egypt, the major trade reforms are traced back to August 1986 through 1991 with the introduction of Economic Reform and Structural Adjustment Program (ERSAP). Statistics from the World Bank, 2014 also shows a GDP growth rate of 5% and a reduction of foreign debt from 33billion USD as of 1995 to about 26.1billion USD in 2001, which coincides with the economic policy reform era. Also the years following the reform led to a growth of exports as percentage of GDP from 32.7% to 38.6% between 1990 and 2008 respectively. A decline in such export as a percentage of GDP was observed in the years following the Arab spring including political instability across the region.

While Kenya signed its Structural Adjustment conditional loan with the World Bank in 1980, its effective implementation rather commenced in 1986 (Gertz, 2009). From about 447USD in 1980 to about 406USD in 2000, Kenya's income per capita currently stands at about 1337USD for 2014. Government expenditure as a percentage of GDP is about 18% on an average between 1994 and 2010 while its annual GDP growth rate fell from 8.4% in 2010 to 5.3% in 2014. Similarly, Ghana signed its Structural Adjustment conditional loan in 1983. Several development and growth related effects are equally associated with the introduction of the policy. For 2014, government expenditure as a percentage of GDP stood at 21% and a GDP growth rate of about 8%, 14% and 4% in 2010, 2011 and 2014 respectively (WDI 2014).

Figure 1 (near here)

Figure 1 above summarizes the rate of trade openness for the 5 African countries studied in this paper. As seen from the figure, various countries experienced an upward trend in the years following the adoption of the trade openness policies which varies from one country to another.

Ghana adopted its openness policy in 1983 which is depicted by an upward trend in the trade openness for the country. Similarly, Nigeria adopted its trade openness policy in 1986 which is characterized by a slight rise in the series until the late 1980s. As for Egypt, a downward trend in the series is observed especially between 1990 and 2000. This period coincides with the introduction of neoliberal policies in form of trade liberalization policy in the country. We also observe that South Africa and Kenya particularly depict almost similar patterns in the series except between 1992 and 2000 for Kenya. South Africa however shows a slight rise in the rate of trade openness especially in the post-apartheid period of 1994 onwards. Government consumption as a ratio of real gross domestic product (RGDP) is almost similar for the countries investigated. As shown in Table 1 below, about 90% of Ghana's government consumption expenditure between 1965 and 1970 is from the RGDP. This value is however different for South Africa with 71% and 81% between 1991 and 2013.

Table 1 (near here)

Despite the macroeconomic performance of the various countries that adopted trade liberalization policies especially in the developing countries, their colossal effects in widening inequality, inducing poverty and creating unemployment at the micro level are still felt in some of these economies (Asongu et al., 2015; Asongu and Nwachukwu, 2016ab). In Nigeria, the policy led to a contraction in jobs and weakening of institutions and trade unions (Fashoyin, 1993). Even in Egypt, such neoliberal policies have dramatically enlarged the number of people living on less than $2 per day from 20% as of when the policy was introduced to about 44% at the present, and at the same time striking an uneven balance between the rich and the poor. Hence, inequality is observed in its highest levels while the average GDP per capita income fell from 4.7% before the 1990s to about 3% after the neoliberalism (Hickel, 2012).

3. Data and Methodology

The study utilizes annual time series data from 1965 to 2013 for each representative country. Data was obtained from the Central Bank of Nigeria's Statistical Bulletin[5] (2009, 2012, 2013),

[5] Especially in some exceptional cases due to unavailability of data for Nigeria, complementary data was obtained from this source.

NBS (2011) and the World Bank's (2014) Development Indicators dataset. The variables of interest include a measure of government size (GS) obtained as Government final consumption expenditure, a proxy for trade openness (OPEN) computed from a summation of Real Imports and Real Exports, divided by RGDP, Income per capita (GDPC) and a dummy variable (D) such that$D_t SAP = 0$ for $t \leq SAP$ and $D_t SAP = 1$ for $t > SAP$. Hence periods before the introduction of the SAP policy takes the value of 0 and 1 afterwards across the countries. Also included in the analysis are measures of Volatility (VOL) and income risk (IRISK). Islam (2004) noted that in time series variables, the generalized autoregressive conditional heteroskedastic (GARCH) models are often used to capture volatility unlike in the regular cross-sectional variables. In cross sectional study, volatility is often captured by the standard deviation of the log difference in terms of trade but for the purpose of the study, we measured volatility with GARCH (1,1) model since we are dealing with series of data points that are generated at specific interval of time. With the GARCH (1,1) model, the log difference of the terms of trade follows the first order autoregressive process (AR_1). The measure of the external risk that is associated with terms of trade was computed with the expression $\frac{1}{2}[VOL * OPEN]$.

Rodrik (1998) developed an empirical model which we shall be adopting for the purpose of this study. The model specification is as follows:

$$GS(t) = \beta_1 + \beta_2 LGDPC(t) + \beta_3 OPEN(t) + \beta_4 IRISK(t) + \beta_5 VOL(t) + \beta_6 + \mu_t \qquad (1)$$

Where β_1 is a parameter that captures the intercept term while β_2 to β_6 represent the parameters of interest that measure the effects of the independent variables on the size of government for each country in our analysis. It is therefore expected that $\beta_2 > 0$, β_4 and $\beta_5 > 0$ while $\beta_3 = 0$. This presupposes that a rise in income per capita naturally translates to a higher income level and social welfare which is also associated with a rise in government size. Also based on Rodrik (1998), when income risk and openness variables are included in the model, it is expected that the openness variable will have no significant impact on the size of government. An economy's rise in trade openness is associated with vulnerabilities to external risks and volatility. Hence, for governments to absorb such shocks that are associated with income risks and volatilities, it is expected to increase expenditure so as to stabilize the system.

Since the postulates due to Cameron (1978) and Rodrik (1997; 1998) are of the views that there is a possible long run relationship between trade openness and size of government (Islam 2004), our initial model is to test for the existence of a possible level relationship between government size and all the variables. As a result, the bound test approach of Pesaran et al. (2001) was applied to test for the existence of level relationship among variables in Equation (1). The desirable properties of this approach, its asymptotic power and special qualities that address some situation where there may be uncertainty in the order of integration of variables among the system prompted our decision about the choice of this approach[6]. In application, the bounds test approach is not limited for use in situation where variables are mixtures of I(0) or I(1).

Let R_t be a (1+K) vector of random variables such that $R_t = \begin{bmatrix} Q_t \\ S_t \end{bmatrix}$ where $Q_t = GS_t$ and $S_t =$ ($LGDPC_t, OPEN_t, IRISK_t, VOL_t$). The underlying VAR model is given in the equation (2):

$$\Delta R_t = \alpha + \pi R_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta R_{t-i} + \varepsilon_t \qquad (2)$$

Equation (2) is such that i ranges from 1 to $p-1$ and if $\varepsilon_t = (\varepsilon_{St}, \varepsilon_{Qt})$ then; the conditional error correction model (ECM) for ΔQ_t assuming unrestricted intercept and no trend will be:

$$\Delta Q_t = \alpha + \gamma R_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta R_{t-i} + \phi \Delta S_t + \mu_t \qquad (3)$$

Equation (3) is such that i ranges from 1 to $p-1$ and if μ_t is independent ofε_{St}. Consequently, we have:

$$\Delta S_t = C_0 + \pi S_{t-1} + \textstyle\sum_{i=1}^{p-1} \lambda_i \Delta R_{t-i} + \varepsilon_{St} \qquad (4)$$

From equation (4), if the assumption about the error terms is standing, there won't be a synchronous correlation between S_t and μ_t in equation (3) thereby ensuring consistency in least squares estimation of the equation (3). In essence, if $\gamma \neq 0$ then there will be effects of changes

[6]Pesaran et al. (2001) demonstrated that the bounds test is consistent and they provided two polar cases in which all the regressors are purely I(0) and I(1). They maintained that with the availability of the critical values for all these two possible classification of regressors, the bounds test will be applicable regardless of whether any of the regressor in the system is pure I(0), purely I(1) or mutually cointegrated. PSS (2001), p.290.

in S_t on Q_t since $R_t = f(S_t)$ but from (4); there is no effect from levels of Q_t to S_t since $S_t \neq f(Q_t)$. This helps to take care of issues relating to endogeneity and simultaneity[7]. In order to test for the presence of a level relationship in Equation (3); we then jointly test the null hypothesis (H_0) that $\gamma = 0$ against the alternative hypothesis (H_1) that $\gamma \neq 0$ using the F-statistics with respect to the applicable PSS computed critical values for lower and upper boundaries. The decision follows that the null hypothesis can be rejected in favour of the alternative hypothesis of presence of a level relationship among variables if the F-statistics lies above the upper boundary.

The autoregressive distributed lag model (ARDL) procedure of Pesaran and Shin (1999) can now be applied to estimate the model parameters having established the presence of level relationship among the variables. Given ARDL (p,q), where i ranges from 1 to p and j ranges from 1 to $q-1$ and r ranges from 1 to s, we have the equation as follows:

$$Q_t = a_0 + \sum_{i=1}^{p} \psi_i Q_{t-i} + \sum_{j=1}^{q-1} \theta_j \Delta S_{t-j} + \beta S_t + \mu_t \qquad (5)$$

$$\Delta S_t = \sum \omega_r S_{t-r} + \varepsilon_{St} \qquad (6)$$

Where μ_t is independent of ε_{St}. Therefore; in all, a total of $(k+1)^q$ ARDL models will be estimated assuming we have k number of regressors and q lags. The optimal order can be selected following the model selection criteria.

We employ the FM-OLS regression of Phillips and Hansen (1990)[8] for robustness checks. The FM-OLS estimator modifies the standard OLS as well as directly controlling for the cointegrating relationship in the data. Its application to the OLS helps to check and control for possible correlation and endogeneity. Similarly, FM-OLS correction helps to determine the

[7]Pesaran et al. (2001) under the empirical application explained that the use of the usual instrumental variable wouldn't be necessary as this approach has already taken care of endogeneity problems. See (PSS, 2001), p. 308.

[8]The FM-OLS helps in complimenting optimal estimate by modifying the least squares so as to control for any possible serial correlation and endogeneity effects in cointegration relationship. Also seePhillips (1995) for detailed explanation of the model. Islam (2004) carried out a similar study in which this approach was also used when he studied the long run relationship between openness and government size using some six industrialized countries

actual relevance of the variables in the model while providing additional information on the data irrespective of the stationarity properties of the cointegrating variables.

4. Estimation Results

Table 2 (near here)

In order to save space, we have reported the bounds test for cointergration with respect to each of the analyzed countries in Table 2. The bounds test result suggests that there is existence of level relationship between government size and the identified variables in the case of Egypt and this was further confirmed by the moving average estimates. There are mixed evidences in the case of Kenya and South Africa as the initial estimate do not provide evidence of level relationship while on the other hand, the moving average estimates suggested the existence of level relationship. In case of Ghana and Nigeria, there is no evidence for the existence of a level relationship among the variables in either of the cases. For a robust check on the nature of the cointegrating vectors, Johansen cointegration test was also applied and the results indicated some levels of cointegration relations. The results of these estimates are available on request. We shall however proceed to estimate the level parameters for each of the countries assuming that there is level relationship in each country.

Table 3 (near here)

The estimates of the ARDL and FM-OLS models were carried out using Microfit 4 and estimated Long run parameters are gotten from each of the selected model as suggested by Schwarz criteria. The level coefficients are reported alongside with the standard error in parenthesis.

4.1. *Egypt*

The estimated level coefficients for Egypt following the ARDL results show that GDP, RISK and volatility are significant determinant of government size. This finding was further supported by the results of the FM-OLS which are also consistent with the former. The data from Egypt clearly showed that the income per capita (GDPC) and Volatility are significant and positive determinant of government size. In the case of Egypt, the results contradict the hypothesis that at the inclusion of income risk in the model, openness has no effects on government size. Although the result suggests that external risk is significant determinant of government size which is partly in support of Rodrik position that when government size is regressed against openness and volatility; having taken into cognizance the external risk factor, openness becomes statistically insignificant. However, contrary to Rodrik's hypothesized risk mitigating mechanism between increasing government size and rising external risk; the findings show that the rising government size responds negatively to increasing external risk[9]. Furthermore, we noticed a consistent and negative effect of the SAP policy dummy on government size and this observation is in consonance with the SAP objectives. One of the objectives of the SAP policy is to encourage limited role of government while allowing the market to take its course in production and consumption through massive privatization of government controlled enterprises.

Table 4 (near here)

4.2. *Ghana*

In the case of Ghana, the estimates are consistent across all the estimation techniques vis-à-vis the ARDL, FM-OLS and even the computed moving averages across the lag structure. The data from Ghana do not support the Rodrik hypothesis. The Risk variable is negative and significant for all the estimates. The data also clearly show that both the GDP and trade volatility are significant positive determinants of government size. Rodrik hypothesized that trade openness does not exert an independent effect on government size rather, government spending increase with external risk. Contrary to this, the data from Ghana show that openness exhibits an independent effect on government size as there exists a significant positive relationship between openness variable and government spending across all the estimation techniques. The introduction of the SAP policy in Ghana has a negative effect on government size for all equations except for the MV-ARDL model. Hence, this negative relationship is consistent with the neoliberal policy framework that allowed for the privatization and limited role of government in the economic system.

Table 5 (near here)

[9] External risk term is used interchangeable to also describe the Income Risk term. These connote similar meaning and interpretations.

4.3. *Kenya*

In the case of Kenya, there are mixed evidences as there are levels of inconsistency in the results from the various estimation techniques. In general, data for Kenya show that the GDPC is a significant and positive determinant of government size in all the estimation techniques and lag structure. Contrary to the estimates of the FM-OLS and those of the moving average, the ARDL estimate supports the hypothesis that larger openness creates larger government size. On the other hand, the FM-OLS and estimates from the moving average support Rodrik risk mitigating hypothesis that government size rises to mitigate the external risk that are usually associated with greater openness. This is demonstrated by the significant positive relationship between risk and government size. We find no significant effect of the SAP policy on government size except that of the ARDL model where the policy framework exerts a significant positive effect.

Table 6 (near here)

4.4. *Nigeria*

The estimated level coefficients for Nigeria following the ARDL results show that income per capita, Openness and terms of trade volatility are significant determinants of government size. This finding was further supported by the results of the FM-OLS which are also consistent with those of the ARDL. Although the data from Nigeria clearly showed that both GDP and volatility exert a positive impact on the government size, it is also quite consistent with the hypothesis that greater openness-generated volatility motivates the government into increasing its spending so as to mitigate any negative influence. Therefore, the Rodrik's risk mitigating mechanism was not supported by the finding as external risk exert a negative and significant effect on government size as shown by the FM-OLS estimate which was further supported by the moving average estimates. Though, the estimates from the MV FM-OLS are in line with Rodrik (1998) findings that openness will have no effects on government size in the presence of other income risk (IRISK) variable. The dummy variable capturing the SAP policy in Nigeria has a positive significant relationship with government size only in the moving average estimates (FM-OLS). In other models, SAP has a negative, but statistical insignificance effect on government size. This finding however is might be associated to Nigeria's distorted political developments from 1960 to 1999 which comprises periods of military dictatorship and various sanctions across the international community.

Table 7 (near here)

4.5. *South Africa*

Estimates from the South African data show that income per capita and the volatility variable are significant positive determinant factors for government size which is in line with Rodrik's hypothesis. The positive and significant relationship between the government size and GDP was found to be consistent in all the estimation techniques and across all the lag structures. However we find no evidence that income risk variables motivates the government to expand its size, rather we find a negative and significant relationship running between both variables. Our findings for South Africa are also similar to Islam (2004) for Norway where income risk is associated with a negative impact on government size. For all the estimation methods, our SAP policy dummy is insignificant and does not explain any changes in government size over the sampled period. This finding is similar to Islam (2004) hypothesis; that greater openness creates larger government size was confirmed by the moving average estimates.

Table 8 (near here)

Since our bounds test results for Ghana and Egypt indicate a significant long run relationship between government size and other independent variables in our model, we have reported the estimates for the selected countries as seen in Table 7. As observed, external volatility due to trade openness exerts a positive long-run relationship on size of government for both countries. The Cameron (1978) and Rodrik (1998) postulates of a long-run relationship between openness and government sizes does not hold for Egypt but can validly be affirmed in Ghana. Hence, there is a significant and positive long-run relationship between government size and trade openness in Ghana. The dummy which captures the introduction of the SAP policy on the respective economies indicates a negative long-run effect on government size for both countries. In Ghana, all variables appear to have a long-run statistical significance except for the income per capita variable.

Table 9 (near here)

The ARDL diagnostics tests are performed using the original data and the moving average generated data for all the selected countries as reported in Table 8. The null hypothesis of no serial correlation, normality and homoscedasticity cannot be rejected for all selected countries.

However, we can as well ignore the functional form issue since most of the variables do not follow peculiar functional forms. The cumulative sum(CUSUM) tests for parameter stability are shown in figure 2 for Egypt and Ghana alike.

Figure 2 (near here)

5. Conclusion

Using a time series data from 1965-2013, this study analyzed the relationship between terms of trade volatility, income risk, openness and income per capita on government size for 5 African countries. The study employed an ARDL-bounds testing approach and FM-OLS to establish the relationship for Egypt, Ghana, Kenya, Nigeria and South Africa respectively. Our choice over the ARDL lies on its flexibility in choosing the appropriate lag structure of the regressors compared to the VAR (Pesaran et al 2001). Furthermore, its estimates are consistent irrespective of the order of integration whether I(0) or I(1) and better applicability in samples sizes (Pesaran and Shin 1999). Estimates from our bounds tests show a significant long-run relationship in Egypt and Ghana with a limited evidence for other countries. Utilizing the ARDL and FM-OLS approach, the results show that income per capita and government size are positively correlated across all countries but we however find a limited evidence of the compensation hypothesis for all the countries. For instance while openness and government size is positively related in Ghana and Nigeria from the FM-OLS and MV-ARDL models, it is negatively related in Kenya. Particularly, terms of trade volatility shows positive significant impacts on government size for Ghana, Nigeria and South Africa and a mixed outcome in Kenya and Egypt. But, contrary to Rodrik (1998) almost all countries show a negative impact of income risk on government size. A possible explanation of this scenario is consistent with primary sector driven economic base of most of these African economies and hence a variability in international prices- say oil in Nigeria or Coffee in Kenya, has a negative disproportionate effects on government finances which affects the size of its expenditure. Also, we observe a negative impact of the SAP policies on the various economies. This is consistent with the policy framework which prescribes a very limited role to the government while allowing privatization of enterprises. Overall, our estimates from the ARDL and FM-OLS have shown almost a similar outcome, however, the FM-OLS appears to present more robust estimates compared to the ARDL. Our findings are not different from that of Islam (2004) for 6 industrialized countries.

As a result of the foregoing, this study therefore further recommends for a robust home grown idiosyncratic economic policy framework since individual country's peculiar multifariousness plays a significant role in explaining the intricacy of the nature of relationship that exist between the examined variables of interest vis-à-vis degree of openness, term of trade volatility, income per capita and government size.

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FIGURE 1

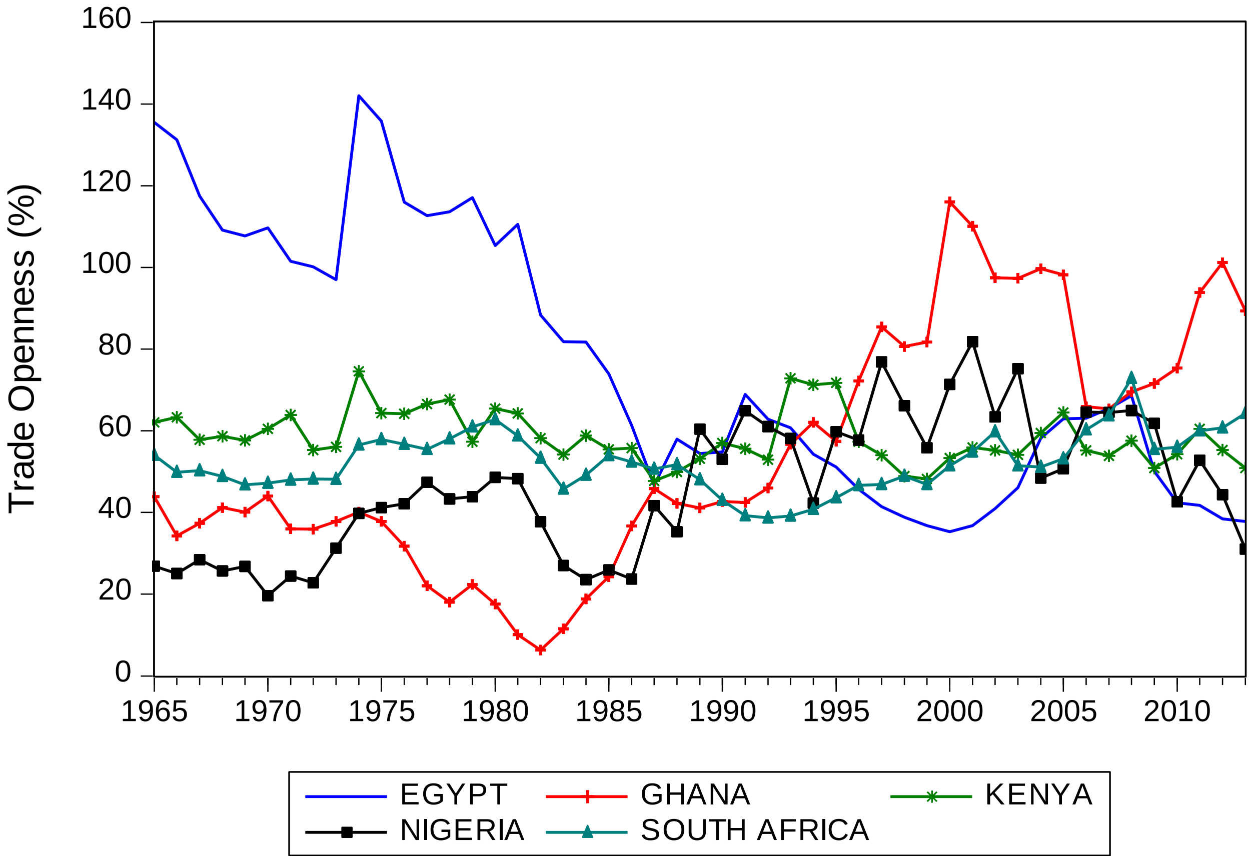

Figure 1: **Ratio of imports and Export to GDP for various countries**

TABLE 1

Table 1: Ratio of Final Government Consumption as a ratio of RGDP (Averages (%))

YEARS	EGYPT	GHANA	KENYA	SA
1965-1970	88.85	90.25	80.16	71.27
1971-1980	87.84	87.84	80.33	70.59
1981-1990	84.41	84.41	86.16	74.98
1991-2013	86.26	86.26	92.81	80.76

Source: Own Calculations; data retrieved from World Bank Development Indicators 2013(WDI)

TABLE 2

Table 2: Bounds test

	Lags	Original Data	Lags	MV data
Egypt	3	9.01***	4	5.60***
Ghana	5	2.97	5	1.06
Kenya	6	0.69	4	5.12***
Nigeria	5	0.54	5	1.82
South Africa	5	1.71	6	5.77***

Note: *, **, *** Reject the null hypothesis (H_0) that $\gamma = 0$ at 90%, 95% and 99% respectively
Critical values: 90%: (2.45, 3.52); 95%: (2.86, 4.01); 99%: (3.74, 5.06).

TABLE 3

Table 3: Estimates of level relationship for **Egypt**

	ARDL	FM-OLS	MV ARDL	MV FM-OLS
Lags	3	3	4	4
Order	1,0,3,1,0	1,0,3,1,0	2,1,2,1,1,0	
Intercept	2.0093 ***	9.0332 ***		9.6587 ***
	(0.3260)	(0.2155)		(0.3590)
OPEN	0.0073	0.0037 **	-0.0017 **	-0.0036
	(0.0051)	(0.0017)	(0.0073)	(0.0029)
IRISK	-0.0029 *	-0.0011 **	0.0066 ***	0.0036
	(0.0016)	(0.0047)	(0.0022)	(0.0079)
LVOL	0.0127 *	0.0694 ***	-0.0292 ***	-0.0063
	(0.007)	0.0239	(0.0090)	(0.0382)
LGDPC	0.7515 ***	0.0298	1.0581***	-0.0541
	(0.0701)	(0.0488)	(0.0748)	(0.0630)
D	-0.0954 ***	-0.4039 ***	-0.0271 ***	-0.2696***
	(0.0152)	(0.0320)	(0.0055)	(0.0491)

Note: *, **, *** represents significant coefficients at 90%, 95% and 99% respectively

TABLE 4

Table 4: Estimates of level relationship for **Ghana**

	ARDL	FM-OLS	MV ARDL	MV FM-OLS
Lags	5	5	5	5
Order	3,0,1,0,1	3,0,1,0,1	5,1,0,3,1	5,1,0,3,1
Intercept	5.9431 ***	7.2706 ***	4.1073 ***	7.3217 ***
	(0.9304)	(0.0715)	(0.7087)	(0.0645)
OPEN	0.0025 ***	0.0046 ***	0.0013 *	0.0028 **
	(0.0079)	(0.0013)	(0.0068)	(0.0014)
IRISK	-0.0065 ***	-0.0011 ***	-0.0031**	-0.0072 **
	(0.0017)	(0.0026)	(0.0014)	(0.0028)
LVOL	0.0094 **	0.0274 ***	0.0067 **	0.0235 ***
	(0.0044)	(0.0064)	(0.0028)	(0.0063)
LGDPC	0.9741 ***	0.8737 ***	0.9415 ***	0.8712 ***
	(0.0293)	(0.0063)	(0.0301)	(0.0043)
D	-0.0351 ***	-0.0455 **	-0.0082	-0.0523***
	(0.0113)	(0.0174)	(0.0062)	(0.0105)

Note: *, **, *** represents significant coefficients at 90%, 95% and 99% respectively

TABLE 5

Table 5: Estimate of level relationship for **Kenya**

	ARDL	FM-OLS	MV ARDL	MV FM-OLS
Lags	6	6	4	4
Order	1,1,0,1,0	1,1,0,1,0	2,2,0,0,0	2,2,0,0,0
Intercept	-0.0350	10.0288 ***	0.4003 *	16.1654***
	(0.4061)	(1.2570)	(0.2318)	(1.4737)
OPEN	0.0014	-0.0403 *	-0.0045 **	-0.1408 ***
	(0.0031)	(0.0206)	(0.0021)	(.0245)
IRISK	-0.0033	0.0083 *	0.0096 **	0.0296 ***
	(0.0065)	(0.0043)	(0.0044)	(0.0051)
LVOL	0.0068	-0.2382 *	-0.0269 **	-0.8463 ***
	(0.0186)	(0.1259)	(0.0126)	(0.1499)
LGDPC	1.1075 ***	0.6267 ***	1.0942 ***	0.4088 ***
	(0.0575)	(0.1148)	(0.0487)	(0.0690)
D	0.0257 *	0.1138	0.0042	-0.0987
	(0.0140)	(0.0973)	(0.0041)	(0.0624)

Note: *, **, *** represents significant coefficients at 90%, 95% and 99% respectively

TABLE 6

Table 6: Estimates of level relationship for **Nigeria**

	ARDL	FM-OLS	MV ARDL	MV FM-OLS
Lags	5	5	5	5
Order	1,0,0,0,0	1,0,0,0,0	2,1,0,0,0	
Intercept	-0.9286	-0.5467	-0.0698	3.5780***
	(1.5878)	(1.5439)	(0.2850)	(0.9057)
OPEN	1.9619 *	3.4816 ***	0.0194 **	0.0158
	(1.1484)	(1.1375)	(0.0078)	(0.0284)
IRISK	-0.0025	-0.0053 ***	-0.0024 **	-0.5E-3
	(0.0015)	(.0015)	(0.0010)	(0.004)
LVOL	0.1524 **	0.2851 ***	0.0713 ***	0.1303*
	(0.0641)	(0.0381)	(0.0245)	(0.0758)
LGDPC	0.2794 *	0.8403 ***	0.4481***	1.2913***
	(0.1395)	(0.1258)	(0.1774)	(0.1078)
D	-0.3245	-0.1446	-0.0748	0.3659***
	(0.2129)	(0.2375)	(0.0503)	(0.1389)

Note: *, **, *** represents significant coefficients at 90%, 95% and 99% respectively

TABLE 7

Table 7: Estimates of level relationship for **South Africa**

	ARDL	FM-OLS	MV ARDL	MV FM-OLS
Lags	5	5	6	5
Order	2,1,1,0,0	2,1,1,0,0	5,2,0,1,0	5,2,0,1,0
Intercept	4.2254 ***	7.9486 ***	2.4045 ***	7.2995 ***
	(1.1480)	(0.2354)	(0.6818)	(0.2654)
OPEN	0.0019	0.0023	0.0052 ***	0.0124 ***
	(0.0022)	(0.0034)	(0.0015)	(0.0040)
IRISK	-0.0087 *	-0.0076	-0.0015 ***	-0.0026 ***
	(0.0049)	(0.0078)	(0.0034)	(0.0085)
LVOL	0.0289 *	0.0218	0.0308 ***	0.0833 ***
	(0.0149)	(0.0218)	(0.0091)	(0.0249)
LGDPC	0.7733 ***	0.7462 ***	0.7581 ***	0.7403 ***
	(0.0498)	(0.0296)	(0.0552)	(0.0234)
D	0.0028	-0.0171	0.0075	0.0068
	(0.0142)	(0.0244)	(0.0060)	(0.0191)

Note: *, **, *** represents significant coefficients at 90%, 95% and 99% respectively

TABLE 8

Table 8: Estimates of Long-run model for EGYPT and GHANA

	EGYPT	GHANA
Lags	5	5
Order	1,0,3,1,0	3,0,1,0,1
Intercept	9.390*** (0.527)	7.378*** (0.522)
OPEN	0.0035 (0.7E-3)	0.3E-2*** (0.9E-3)
IRISK	-0.2E-2 0.7E-3	-0.8E-3*** (0.2E-3)
LVOL	0.059* (0.032)	0.0203*** (0.005)
LGDPC	-0.016 (0.076)	0.8750 (0.9E-3)
D	-0.446 (0.053)	-0.044*** (0.013)

Note: * and *** represents statistical significance at 90% and 99% respectively.

TABLE 9

Table 9: ARDL Diagnostic tests result for all the selected countries.

LM test Statistics	EG.	GH.	KE.	NG.	SA.
Serial Correlation: CHSQ (1)_original data	0.489 [0.484]	0.573 [0.449]	2.064 [0.151]	0.002 0.961]	0.005 [0.940]
Serial Correlation: CHSQ (1)_MV data	0.115 [0.915]	0.741 [0.389]	3.820 [0.051]	3.845 [0.053]	0.003 [0.952]
Functional: CHSQ (1)_original data	3.355 [0.067]	0.832 [0.362]	0.286 [0.593]	1.341 [0.247]	10.571 [0.001]
Functional: CHSQ (1)_MV data	3.813 [0.003]	0.177 [0.894]	0.455 [0.500]	10.947 [0.001]	16.870 [0.000]
Normality: CHSQ (2)_original data	1.644 [0.440]	0.269 [0.874]	0.506 [0.776]	9.922 [0.100]	1.554 [0.460]
Normality: CHSQ (2)_MV data	1.658 [0.436]	1.148 [0.563]	2.391 [0.303]	2.432 [0.296]	0.997 [0.607]
Heteroscedasticity: CHSQ (1)_original data	0.757 [0.384]	2.654 [0.103]	9.908 [0.200]	1.545 [0.214]	1.219 [0.270]
Heteroscedasticity: CHSQ (1)_MV data	0.010 [0.918]	0.9E-4 [0.992]	2.497 [0.114]	1.818 [0.178]	0.317 [0.574]

Note: EG, GH, KE, NG and SA represents Egypt, Ghana, Kenya, Nigerian and South Africa.

FIGURE 2

Figure 2: CUSUM plots for parameter stability

EGYPT GHANA