OPENNESS, GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH IN SUB-SAHARAN AFRICA

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OPENNESS, GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH IN SUB-SAHARAN AFRICA

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Abstract

This study investigated the dynamic relationship among government spending, trade openness and economic growth in some selected sub-Saharan African countries; covering a period of 1980 to 2015 with an annual data. The specific objective examined the trend of government spending, trade openness and economic growth in some selected Sub-Saharan African countries. In particular, an attempt was made to test the existence of co-integration and nature of shock transmission processes. It employed descriptive and VAR methodology for the estimation of the model with impulse response function and variance deposition. The result revealed that: economic growth and government spending in Sub-Saharan Africa shows a similar relationship as the economic growth rises and falls, the government expenditure also follow the same pattern, trade openness, government spending and economic growth shows a long-run co-integration relationship. The findings of this research indicate that government expenditure has a significant negative relationship with economic growth in the sub-Saharan countries, the reason being that Governments of the Sub-Saharan countries focused resources on unproductive activities and expenditures on a deadweight project which lead to negative impact on economic growth. We, therefore, recommend that Africa countries should spend their resources on projects that have a direct bearing on growth parameters in order to have a positive impact on economic growth.

Keyword: Sub-Saharan Africa, Openness, Government Expenditure, Economic Growth

1. Introduction

Trade Openness and Government expenditure are Macroeconomic policies used for influencing the level of economic growth. The aim of this study is to model the dynamics of these macroeconomic variables. According to previous works done on the variables interdependencies, it is usually studied on the relation of Trade Openness on Economic Growth, the effect of Government spending on Economic Growth and effect of Government spending on Trade openness.

Hrushikesh (2008) Government expenditure as a tool of fiscal policy can have a profound influence on the stabilization and economic growth depending upon its utilization pattern and management by the government. Contrasts to the standard presumption that public expenditure supports the growth objective, evidence shows that it may have desirable as well as undesirable effects on the economy, the sustained rise in the size of government expenditure in most of the developing economies in the past has frequently engaged the development economists in evaluating the effects of expenditure on economic growth. It is firstly Wagner (1883) in his "The law of an Increasing State Activities", recognized the role of national income as one of the fundamental determinants of public expenditure.

Economists in their subsequent theoretical works consider Wagner (1890)'s Law as the starting point to the analysis of the relationship between government expenditure and economic growth. The hypothesis has become a subject of intensive research motivating the economists as to know the direction of causality - whether causality runs from national income to government expenditure or vice-versa. It is contested that government spending causes expansion of domestic output and income, resulting in home demand for increasing imports. Increased imports leading to an increase in income abroad may, in turn, result in demand for domestic exports and hence growth. Conversely, trade openness could also enhance demand for public goods and simultaneously reducing the ability of the government to collect taxes.

This holds when openness is due to tariff cuts. However, given tariff rates, openness due to the elimination of non-tariff barriers could result in more government revenues and hence expansionary government policies. Thus, there could be an interaction between government spending, the openness of the economy and economic growth (Ram, 1999 &Rodrik, 1998).

Globalization and technological progress are two important forces that have driven major changes in the last two centuries. Interdependence between countries and international trade have helped increased many countries' income and at the same time, widened the gap between Developed and developing countries. The theory of comparative advantage by (David Ricardo), one of the biggest revolution in international trade, has shed light on the great impact international trade can have on economic growth. A country has just to specialize in production and exports of goods in which she is more efficient to capture the benefits of international trade (Carbaugh, 2013). Today, specialization in production and exports has taken an interesting direction: developed countries specialize in and export mainly services and manufactured products while Sub-Sahara Africa countries specialize in and export primary commodities. The two kinds of products have different effects on economies: services and manufactured products since their relative price is steadier, they induce a much stable growth in exports and therefore a faster and consistent economic growth. On the other hand, the relative price of primary commodities in Sub-Sahara Africa countries is more volatile and leads to unstable and lower economic growth rate in the region.

The hypotheses of this paper are as follows: Even though some SSA countries might have experienced positive gains in economic growth in the 1990s, these are short-term at best. Secondly, the mantra for openness cannot be a substitute for economic growth. This trend of equating trade with economic growth and policies is very precarious and give hollow premises: it diverts poor nation's meager resources (human and non-human resources, administrative, health, education, etc.) away from important uses to unrealistic priorities. The emphasis on trade and openness crowds out serious thinking and efforts; using data from previous studies that includes the latter part of the 1990s.the empirical evidence obtained in this paper does not support trade being the sole engine of economic growth for Sub-Saharan Africa but also other factors influences growth. It is against this backdrop that, this study proposes to empirically examine the trend of government spending, Trade openness and economic growth in some selected Sub-Saharan African countries. In particular, an attempt will be made to test the existence of co-integration and nature of shock transmission processes. The next section presents a brief literature review while section four deals with the theoretical framework, the methodology adopted and a comprehensive interpretation of the empirical results. Section five gives the conclusion and summary of the paper.

2. Literature Review

Grikmes (2006) analyzed the reasons for high and stable terms of trade in the beginning of 1990 in New Zealand and investigated if changes in terms of trade explain economic performance since 1960. He found out that improvement in terms of trade was a result of an increase in the real price of agricultural exports. Diversification of exports led to a reduction in terms of trade volatility. Also, the rise in economic growth in New Zealand can be explained inter alia by the stable terms of trade. Moreover, Huchet-Bourdon and et al. (2011) have found out that only countries with high exports diversification see their economic growth rise rapidly. The effect of trade openness on countries with low exports diversification is lower and even negative.Openness to international trade has proven to beneficial to countries. Several persuasive empirical analyses support this affirmation. This is the case of the one done by Edwards (1998) on 93 developed and developing countries from 1960 to 1990 suggests that the more countries are open to international trade, the faster productivity growth they experience. Also, Chen (1999),

Gundlach (1997), and Naveed and Shabbir (2006) in different investigations on both developed and developing countries ended up attesting a robust positive relationship between trade openness and economic growth. However, if in general trade liberalization benefits to countries, some authors have found out that trade openness undermines economic development in developing countries.

This is the case of the study on both developed and developing countries by Dowrick and Golly (2004) who found out that since 1980 the benefits of international trade have increased more for the interpret countries than less developing countries. Using 10 OECD (Organization for Economic Co-operation and Development) countries and multivariate Cointegration techniques, Ghali (1999) conducted a study on the effect of government size on economic growth. In conclusion, government size was found to have an effect on economic growth for all ten (10) countries. It is worthy of note that the study highlighted government spending effect on growth was made possible through an international trade, exports, imports, and investment.

Another study was done on the effect of decentralization on economic growth in Japan for the period 1997 to 2001. Iimi (2004) carried out this study by segmenting decentralization into fiscal decentralization and political devolution   expenditure. A positive significant

relationship was found between fiscal decentralization and economic growth while a negative relationship was found between political devolution and economic growth using both Ordinary Least Squares (OLS) and Instrumental Variables (IV) panel estimation technique. Alfaro et al. (2004) carried out a study for some OECD and non-OECD countries using panel data estimation analysis. The purpose of the study was to assess the impact of FDI on economic growth for the period 1975 to 1995. Empirical results showed that FDI alone may not impact economic growth in a weak financial market. However, once the financial market is well-developed, FDI may significantly influence economic growth.

Loizides and Vamvoukas (2005) conducted a trivariate causality testing on government expenditure and economic growth for Greece, UK, and Ireland based on cointegration analysis, error-correction model, and Granger causality tests. The period for the an was from the early 1950s to mid-1990s. The authors introduced a bivariate error correction model within a Granger causality framework, as well as adding unemployment and inflation (separately) as explanatory variables, creating a simple 'trivariate' analysis for each of these two variables.

By contrast, for Ireland and the UK, regression estimates showed one-way causality running from G to Y. These results are consistent with the Keynesian notion suggesting that the causal linkage flows from DG to DY both in the long run and the short-run. Thus, there is a high degree of support for this Wagner type phenomenon in the data for Greece. Government size Granger causes economic growth in all countries of the sample in the short run and in the long run for Ireland and the UK; ii) economic growth   Granger causes increases in the relative size of government in Greece, when inflation is included, in the UK. Bobba and Powell (2007) also empirically tested the effect of aid on economic growth for 22 OECD countries from 1980-2003. Generalized methods of moments estimation procedure were adopted for the study. The study concluded that aid allocated to political allies does not promote growth whereas aid allocated to non-political allies promotes growth.

Arpaia and Turrini (2008) assessed the impact of government expenditure on potential output for fifteen (15) European Union countries using pooled mean group estimation technique from 1970-2003. The regression results showed the existence of a long-run positive relationship between government expenditure and economic growth for all countries. However, in the United Kingdom, though a positive effect , on the other hand, , government expenditure was noted to be growing at a less than proportionate rate relative to economic growth in the 1980s.was was attributed to the restructuring of the government sector at the

time. The same pattern was also realized in Belgium, Greece, Austria, Denmark, Ireland, Spain, Italy, Germany, Netherlands, Finland, France, and Portugal in terms of government expenditure growth and potential output in the 1980s. The study explained that, the reason for the lower pace in expenditure growth for Belgium, Denmark, and Ireland was the stabilization of debt-GDP ratios. The study was also quick to add that, government expenditures relative to output picked up in countries such as Luxembourg, Sweden, and UK from 2000. Alexiou (2009) empirically conducted a study on the relationship between economic growth and government spending in some countries in southern Europe for the period 1995 to 2005. Applying pooled OLS and GLS estimation techniques, empirical results obtained revealed that government spending had a positive and significant effect on economic growth. Introduction of control variables like capital formation, development assistance, private investment and trade-openness to the model also revealed a positive and significant effect on economic growth. The study however revealed that though population had a positive effect on growth, the effect was statistically insignificant.

Antonis (2013) empirically tested the relationship between economic growth and government spending in Greece from 1833 to 1938. Employing an Autoregressive Distributed Lag (ARDL) Co-integration method of analysis, Antonis (2013) established has a positive and statistically significant effect of economic growth on government expenditure in the long run. This result buttress Wagner's hypothesis. Huang (2006) conducted a study for China and Taiwan and found no relationship between economic growth and government spending using Bounds Test estimation technique. The period for his study was 1979-2002.

Moreover, the impact of the terms of trade on economies also depends on the exchange rate regime. Broda (2004) in his analysis on 75 developing countries from 1973 to1996 explored how the terms of trade shocks can explain the changes in output and prices in developing countries depending on flexible or fixed exchange rate regimes. He concluded that in the short run, any shock in the terms of trade affects countries with flexible or fixed exchange rates. In fact, countries with flexible exchange rate observe smaller effect on the real GDP than those with fixed exchange rate. These ones observe greater impact of the terms trade shocks on the Real GDP and consumer price.Also interested in the matter, Ghirmay, Sharma and Grabowski (1999) investigated the causal relationship between export instability, income terms of trade instability, investment and economic growth in 14 developing countries from 1960 to 1990. The concept of income terms of trade, introduced first by Graeme S. Dorrance in 1948, is the index of the value 18 of exports divided by the price index for imports. In

other words, an increase in the income terms of trade means a rise in the potential of a country's exports of buying imports (Chauhan, 2009). They concluded that instability in exports can affect an economy via two channels: first, it directly affects a country's income and capital formation. Second, it impacts income and capital indirectly by influencing the income terms of trade. Moreover, the study shows a negative long-run relationship between income terms of trade instability and GDP. Bleaney and Greenaway (2001) also examined the impact of terms of trade and real exchange on investment and economic growth in 14 sub-Saharan African countries. Their empirical analysis from 1980 to 1995 implied a negative relationship between specialization in primary products and GDP. Moreover, the study indicated that real exchange rate volatility has a negative effect on investment. Also, terms of trade volatility have a significant negative influence on economic growth. They concluded that when the terms of trade improve and are more favorable, economic growth is stable and high and so is Investment.

Mendoza (1996) explored the effects of terms of trade uncertainty on saving and economic growth in a stochastic endogenous growth model for 40 industrial and developing countries from 1971 to 1991. The model predicted that higher variability in terms of trade leads to lower economic growth, therefore lessens social welfare. The main finding of the study is a significant negative relationship between the terms of trade variability (or volatility) and economic growth. In the case of Basu and McLeod (1992), the impact of terms of trade has been investigated on capital accumulation in 20 developing countries from 1950 to 1987. They concluded that volatility in export prices has a direct impact on the steady-state growth rate (economic growth). They also indicated that higher variability in terms of trade decreases economic growth rate and that both the trend and the variability have large effects on the level of GDP and investment in small open economies.

Devarajan et al. (1996) conducted a study on disaggregated spending effect on economic growth for 43 developing countries for the period 1970 to 1990. Ordinary Least Squares (OLS) estimation procedure was adopted for this study. Empirical results showed that while current expenditure had a positive and statistically significant effect on growth, capital expenditure had a negative effect on growth.

Al-Yousif (2002) carried out a study on defense expenditure on economic growth using Granger-causality test for six Arab Gulf sub-region countries. The period of the study was 1975-1998. Empirical results obtained were however mixed for the six countries. Whereas Bahrain, UAE, Iran and Saudi Arabia exhibited that defense expenditure had a positive effect

on economic growth, Kuwait showed a negative effect while Oman revealed no relationship between the two variables.

Using Generalized Method of Moments panel estimation on 48 developing countries for the period 1970-1998, Moreira (2005) established a positive relationship between foreign aid and economic growth. Empirical estimates concluded that the effect of foreign aid on economic growth through positive was very high in the long run than in the short run. In the study, domestic savings and physical capital formation were used as controlled variables and similarly, a positive impact was established between these variables and economic growth. Interestingly, population growth rate was found to have a negative effect on growth rate of real per capita GDP.

Another study consistent with Wagner's law was done by Akitoby et al. (2005) in which economic growth had a positive impact on government expenditure for some developing countries using Co-integration method of analysis. Henrekson (1993) carried out a study in Sweden and no evidence of a long-run positive relationship was found to exist between economic growth and government spending using Co-integration method of analysis.

In the same perspective, Sundaram and Arnim (2008) concluded after an investigation that premature trade liberalization in sub-Saharan Africa has weakened her economic development since technology in most of her sectors is not competitive enough compared to the one in developed countries. We find that openness to international trade increases economic growth in sub-Saharan Africa. The instrumental-variable estimates suggest that, on average, a one percentage point increase in trade openness is associated with a short-run increase in GDP per capita growth of about 0.5% per year. The long-run effect is larger, reaching about 0.8% after ten years. Importantly, these results are robust to controlling for year effects and other growth correlates related to political institutions and intra-national conflict. They are quantitatively in line with the cross-sectional growth estimates reported in, for example, the seminal paper by Frankel and Romer (1999) and more recently by Feyrer (2009).

The panel regressions also allow us to explore how the growth effects of openness to international trade vary across countries. In the context of sub-Saharan Africa, we are particularly interested in the role that ethnic divisions play in shaping the impact of international trade openness on economic growth. This is motivated by the theoretical literature on the "voracity effect" (Lane and Tornell 1998, Tornell and Lane 1999). The

voracity literature predicts that trade windfalls can have adverse effects on economic growth in polarised countries with weak legal-politico institutions. Consistent with the theoretical literature, we find that the positive effect of trade openness on economic growth significantly declines with ethnic polarisation.[3] Hence, while for sub-Saharan Africa as whole increases in international trade openness were, on average, good for growth, our findings call for some caution in expecting large growth benefits associated with international trade openness in countries that are characterized by strong ethnic divisions. In that regard, our results echo Easterly and Levin (1997) who document that strong ethnic division are associated with growth-prohibiting policies. Calderón and Servén (2008) conducted a study on the effect of infrastructure expenditure on economic growth using infrastructure supply as a proxy for public spending in Sub–Saharan African countries. The study estimated growth and inequality equations as well as a standard set of control variables augmented by infrastructure quantity and quality indicators and controlled for potential endogeneity of the latter.

Empirical results reported that infrastructure development and a better quality of infrastructure services affected growth positively in the long-run but has a negative impact on income inequality.

A study on public spending effect on economic growth for Sub-Saharan Africa for the period 1987 to 1997 Fixed and Random effects estimation techniques were employed in the study. Empirical results obtained showed that government spending has a positive and significant effect on economic growth. Control variables like trade-openness, foreign development assistance, the growth the rate in population and private investment included in the model all had a positive and significant effect on economic growth. Sobhee (2010) empirically estimated the effect of globalization on public spending in Sub – Saharan Africa after controlling for idiosyncrasies. The study sought to fill the gap by providing a more robust econometric estimate using Kaufmann et al. (2005) six measures of institutional quality. The study revealed that globalization has an impact on public spending, hence making it susceptible to external risks like a fall in investment and export prices. Furthermore, economic growth was found to influence public expenditure to buttress Wagner's hypothesis. The study also indicated that institutional quality, Political Instability (PI) and Regulatory Quality (RQ), significantly affect public spending. From his findings, it was found that state control enhancement over market imperfections would expand public sector spending base.

Another study inconsistent with Moreira's findings in 2005 was carried out in 19 Sub-Saharan African countries by Ndambiri et al. (2012) from 1982-2000. Generalized Methods

of Moments panel estimation technique was adopted for the study. The study found that foreign aid had a negative impact on economic growth. However, control variables such as physical capital formation and exports were also found to have a positive impact on economic growth. This study is consistent with Keynes assertion that exports have a positive effect on economic growth. Kweka et al. (1999) investigated the impact of government spending on economic growth in Tanzania from 1965-1996. Engle-Granger Cointegration and Error Correction Model methods of analysis were employed in the study. Total government expenditure does not have a significant impact on growth. Total government expenditure was thus disaggregated into expenditure on (physical) investment, consumer spending and human capital investment. Increased productive expenditure (physical investment) appears to have a negative impact on growth. Consumption expenditure relates positively to growth, largely because it contributes to private incomes and consumption, and in particular appears to be associated with increased private consumption whereas public investment impacts negatively on growth. Expenditure on human capital investment was insignificant in the regressions, probably because any effects would have very long-lags. The results confirm the view that public investment in Tanzania has not been productive, but counter the widely held view that government consumption spending is growth reducing. We also find evidence that aid and export appears to have had a positive impact on growth, especially allowing for the reforms in the mid-1980s.

Ketema (2006) conducted a research in Ethiopia on the impact of government spending on economic growth. Components of government spending included human capital,

Investment and consumption in the analysis, it was concluded that human capital expenditure was found to have a positive and significant impact on economic growth in the long run while expenditure on consumption and investment showed a negative and insignificant effect on economic growth for the period 1960/61-2003/04. The estimation technique employed was Johanson maximum procedure. Nketiah-Amponsah (2009) carried out a study in Ghana by looking at the impact of government spending on economic growth for the period 1970-2004 using time series estimation technique. The study found out that aggregated government expenditure had a negative effect on economic growth.

Nurudeen and Usman (2010) also carried out a similar study in Nigeria using a disaggregated approach to determine the components (total capital expenditure, total recurrent expenditure, transport and communication, education and health) of government expenditure that enhances growth. The period for the analysis was 1970-2008 and the authors used co-

integration and error correction methods to analyse the study. The econometric results indicated a negative impact of both total capital and recurrent expenditures on economic growth in the long run. Contrary to this view is a study by Aladejare (2013). Expenditure on education was also found to have a decline on economic growth. The authors explained that, these key components had a negative impact on growth due to improper utilization of allocated funds to the sectors.

Surprisingly, allocated funds were embezzled in most cases. However, government expenditure on transport, health, and communication had a positive effect on economic growth in the long run. Muritala et al. (2011) investigated on the theme for Nigeria from 1970-2008 using Ordinary Least Square (OLS) technique. Empirical evidence from the analysis suggests a positive relationship between real GDP as against the recurrent and capital expenditure. It could, therefore, be recommended that government should promote efficiency in the allocation of development resources through emphasis on private sector participation and privatization\commercialization.

Twumasi, (2012) also carried out a study in Ghana on fiscal policy impact on economic growth for the period 1981-2008. Stationarity of variables were checked using the DF-GLS test and the bounds. Empirical results showed a positive effect of fiscal policy on economic growth. Control variables like terms of trade, private investments and labour force were also found to have a positive impact on economic growth. Tax revenue on the other hand was found to have a negative effect on economic growth. This is also consistent with the Armey curve theory. In line with Twumasi's findings on tax revenue impact on economic growth are studies done by Romer and Romer (2007) and Afonso and Alegre (2008). Aladejare (2013) empirically investigated the relationship between government expenditure and economic growth in Nigeria from 1961 to 2010 using a Vector Error Correction Model and Granger Causality approach. In the study, government expenditure was disaggregated into government capital expenditure and government recurrent expenditure. The econometric findings revealed that government capital expenditure impacted more significantly on economic growth than government recurrent expenditure. In addition, a unidirectional causality from economic growth to government expenditure was also observed by the author, thus supporting the Wagnerian hypothesis for Nigeria. The empirical literature has not fully explored the relationship amongst Trade openness, Government spending, and Economic Growth. Despite several studies in this area few studies have considered the use of trivariate-VAR introducing Government spending component as endogenous in such a VAR model.

3. Theoretical framework and Methodology and Empirical Results

3.1Theoretical framework and Methodology

Keynes (1936) postulated a growth theory where public spending and net export are seen as an exogenous factor in determining economic growth through its multiplier effect on aggregate demand. Keynes analysis is made using a conceptual AD-AS (Aggregate Demand and Aggregate Supply) framework in an open economy.

$$Y = C + I + G + NX \qquad\qquad 1$$

Where Y is Aggregate Output, I is Investment, G is Autonomous Government expenditure, NX is Net Exports (exports minus imports) and C is Consumption. .From the above-stated equation, all the variables are positively related to Output. This means that any change in Government Spending or Net Export will affect Output and shift the Aggregate Demand curve depending on the strength of the multiplier. Accordingly, we specify the following equation for determining the rate of economic growth in some selected Sub-Sahara Africa countries.

The study begins by specifying the model showing a functional relationship between GDDPC, GFCEPC, and OPENNESS. This implies change in GDDPC might be as a result of changes in GFCEPC and OPENNESS, this model captures change in economic growth as a result of changes government spending and trade openness, this study would further look into the change in government spending as result to changes in economic growth and trade openness changes in trade openness as a result to changes in economic growth and government spending using the VAR specification.

$$lnGDPP = f\ (lnGDPPC,\ lnGFCEPC,\ OP) \qquad\qquad 2$$

$$lnGDPPC_{it}\ =\ \sum_{j=1}^{p}\beta_j lnGDPPC_{it-j}\ +\ \sum_{j=1}^{p}\beta_j lnGFCEPC_{it-j}\ +\ \sum_{j=1}^{p}\beta_j OP_{it-j}\ +\ \epsilon_{it}$$

(4.1)

$$lnGFCEPC_{it}\ =\ \sum_{j=1}^{p}\beta_j lnGFCEPC_{it-j}\ +\ \sum_{j=1}^{p}\beta_j lnGDPPC_{it-j}\ +\ \sum_{j=1}^{p}\beta_j OP_{it-j}\ +\ \epsilon_{it}$$

(4.2)

$$OP_{it}\ =\ \sum_{j=1}^{p}\beta_j lnGFCEPC_{it-j}\ +\ \sum_{j=1}^{p}\beta_j lnGDPPC_{it-j}\ +\ \sum_{j=1}^{p}\beta_j OP_{it-j}\ +\ \epsilon_{it}$$

(4.3)

Where

i = denotes countries or cross sections

t =time period

$t - j$ = lag time period

GDPPC= Gross Domestic Product Per Capita

GFCEPC= Government Final Consumption Expenditure Per Capita

OP= Trade openness

ε = white noise error term

GDP per capita (GDPPC) – GDP per capita is GDP which divided by midyear population. GDP is total amount of the gross value added amount by the entire resident producers in the economy plus all taxes of the products and any subsidies deduction which are excluded in the products value. GDP calculation is exclusive of fabricated assets depreciation and natural resources depletion. GDP per capita is prepared in current USD. (WDI, 2015).Government Final Consumption Expenditure per Capita (GFCEPC) GFCE per capita is GFCE divided by midyear population. This takes into consideration all government spending and tries to see the average amount spent on each person of a population. Trade Openness (OP) – Trade openness for this research is calculated by total trade over GDP ratio. In other words, an openness of trade is the total amount of imports and exports of products divided by GDP. (WDI, 2015). Using annual data obtained from the World Development Index and the VAR methodology, we obtain the following econometric results:

3.2 Empirical Results and Interpretation

Table 1: Descriptive Analysis on GDPPC, GFCEPC, and OPENNESS

	LOG(GDPPC)	LOG(GFCEPC)	OPENNESS
Mean	6.704473	4.818474	0.691466
Median	6.538318	4.722419	0.650000
Maximum	9.352721	7.380543	1.410000
Minimum	4.799997	1.902108	0.060000
Std. Dev.	1.020373	1.168803	0.241326
Skewness	0.549046	0.386318	0.386897
Kurtosis	2.509312	2.356052	2.663933

Jarque-Bera	39.05763	27.31416	19.21582
Probability	0.000000	0.000001	0.000067
Sum	4344.498	3122.371	448.0700
Sum Sq. Dev.	673.6312	883.8671	37.68011
Observations	648	648	648

Table1 presents the result of the descriptive analysis. All the variables have 648 observations which are from the year 1980 to 2015. This also explains that there is no data missing for the four variables. Firstly, the mean for LOG (GDPPC) is 6.704473 with the maximum of 9.352721 and minimum of 4.799997 and the standard deviation is 1.020373. The skewness of LOG (GDPPC) is 0.549046 which demonstrates that the curve is skewed to the right. The Jarque-Bera statistic is 39.05763 with the p-value of 0.000 which means the null hypothesis of normality is rejected.   This implies that LOG (GDPPC) is not normally distributed. Secondly, the mean for LOG (GFCEPC) is 4.818474 with the maximum of 7.380543 and minimum of 1.902108 and the standard deviation is 1.168803. The skewness of LOG (GFCEPC) is 0.386318 which demonstrates that the curve is skewed to right. The Jarque-Bera statistic is 27.31416 with the p-value of 0.000001 which means that the null hypothesis of normality is rejected which implies that LOG (GDPPC) is not normally distributed. Thirdly, the mean for OPENNESS is 0.691466 with the maximum of 1.410000 and minimum of 0.060000 and the standard deviation is 0.241326. The skewness of OPENNESS is 0.386897 which demonstrates that the curve is skewed to the right. The Jarque-Bera statistic is   19.21582 with the p-value of 0.000067 which means that the null hypothesis of normality is rejected which implies that OPENNESS is not normally distributed.

In conclusion, all the three variables have 648 observations without data missing and they are not normally distributed as all the Jarque-Bera p-values are below 0.05 level of significance. The analysis shows that LOG (GDPPC), LOG (GFCEPC) and OPENNESS are skewed to right. On the other hand, OPENNESS also has smallest standard deviation compared to other variables while LOG (GFCEPC) has the largest standard deviation. This means that OPENNESS has smaller volatility compared to other variables while LOG (GFCEPC) is the variable that has the greatest volatility.

3.3 Trend of GDPPC, GFCEPC and TRADE OPENNESS

Fig.1: Trend of GDPPC
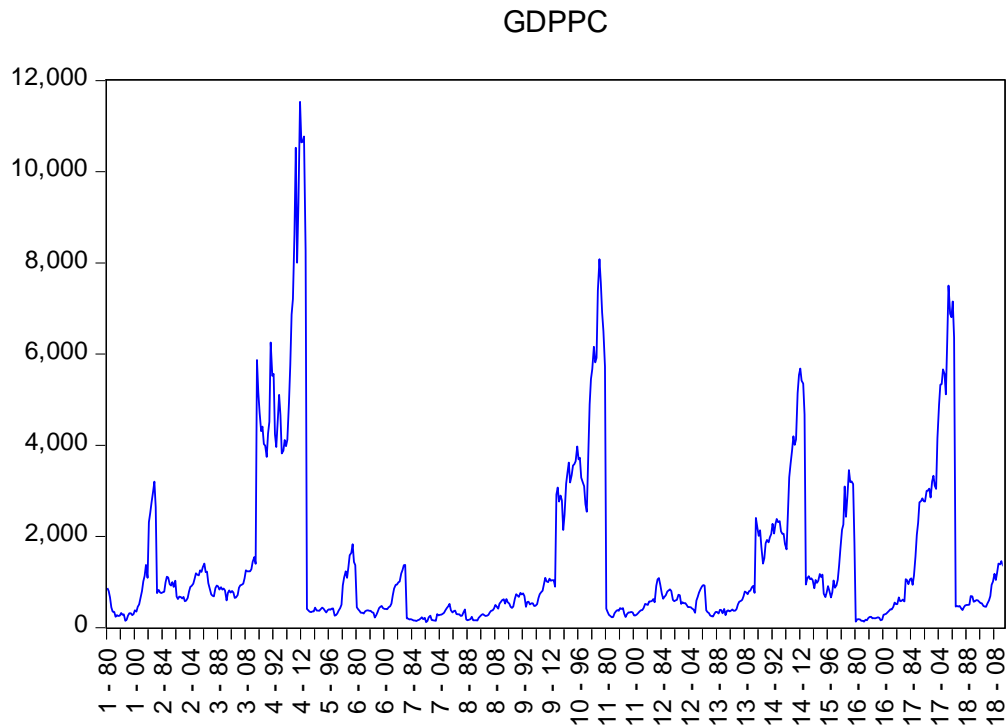
GDPPC

According to this graphical result above it seen that the country with highest GDPPC is in the fourth range which is Gabon and closely followed by South Africa, although Gabon GDP is not the highest but introducing population, it shows that hypothetically the GDP is well distributed in term of the population size and according to Wikipedia is also seen that Gabon economy is four times greater than some economy in sub Saharan Africa, while Guinea-Bissau has the lowest GDPPC is because it generates a low GDP to its increasing population which results to the low GDPPC

Fig. 2: Trend of GFCEPC
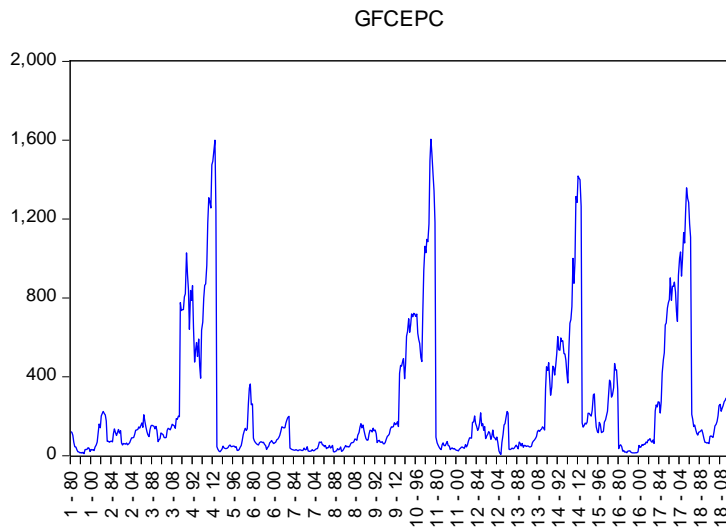
GFCEPC

According to the graphical result, it can interpreted that the country with the highest GFCEPC is in the 4th range which is Gabon and closely followed by South Africa which is in the 10[th]While the country with the lowest GFCEPC is Guinea-Bissau also due to its low resource for government spending to its population

Fig. 3: Trend of OPENNESS
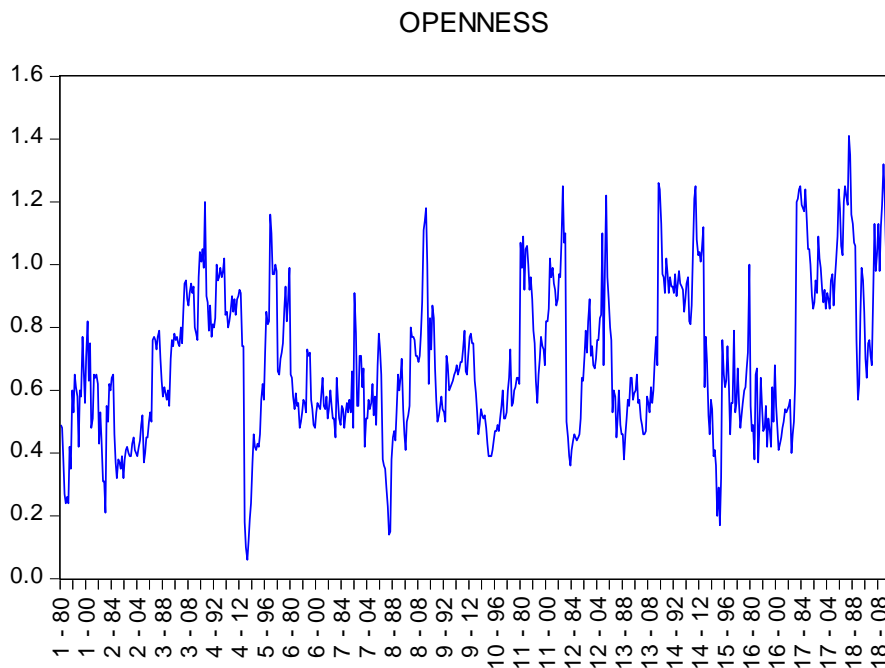
OPENNESS

According to the graphical result, it is seen that the 17 range which Botswana has the highest trade openness according to the 2017 index of economic freedom Botswana is ranked 34th in the world whereas the lowest Trade openness is Cameroon the 2017 index of economic freedom of Cameroon is ranked 150[th.] From the graph above that shows the trend of GDPPC,

GFCEPC, and OPENNESS over the time period from 1980 to 2015 years, GDPPC and GFCEPC are closely related in their trend while OPENNESS shows a different trend.

Table 2: Panel Unit Root Tests

Variables	Levin, Lin and Chu statistics at level	Levin, Lin and Chu at first difference	Order of integration
LOG(GDPPC)	1.57716*	16.7953	I(1)
LOG(GFCEPC)	-2.00981	-	I(0)
OPENNESS	-2.81819	-	I(0)
Variable	**Im, Pesaran and Shin statistics at level**	**Im, Pesaran and Shin At first difference**	**Order of integration**
LOG(GDPPC)	-0.15396*	-14.6768	I(1)
LOG(GFCEPC)	-0.96446*	-16.3873	I(1)
OPENNESS	-2.82870	-	I(0)
Variable	**Breitung t-stat statistics at level**	**Breitung t-stat statistics at first difference**	**Order of integration**
LOG(GDPPC)	0.66409*	-8.51951	I(1)
LOG(GFCEPC)	1.09118*	-8.51951	I(1)
OPENNESS	-1.91729	-	I(0)

(*) denotes rejection of the hypothesis of no unit root at the level of the variables at 5% significance level.

According to Levin, Lin and Chu statistics unit root test for stationarity it revealed that in Table 2 indicate that log(gdppc) cannot reject the null hypothesis at level because the probability level is more than 0.05 level of significance but openness and log(gfcepc) can reject the null hypothesis and accept the alternative hypothesis at level because the probability level is less than 0.05 level of significance. At first differential log(gdppc) probability level is less than 0.05 level of significant meaning there is no unit root implying that the variable is stationary. For the Im, Pesaran and Shin statistics unit root test for stationarity it is revealed that in Table 1 indicates that log(gdppc) and log(gfcepc) cannot reject the null hypothesis at level because the probability level is more than 0.05 level of significance but openness can reject the null hypothesis and accept the alternative hypothesis at level because the probability level is less than 0.05 level of significance. At first differential log(gdppc) and log(gfcepc) probability level is less than 0.05 level of

significance. At first differential log(gdppc) probability level is less than 0.05 level of significant meaning there is no unit root implying that the variable is stationary.

While Breitung t-stat statistics unit root test for stationarity it is revealed that in Table 1 indicates that log(gdppc) and log(gfcepc) cannot reject the null hypothesis at level because the probability level is more than 0.05 level of significance but openness can reject the null hypothesis and accept the alternative hypothesis at level because the probability level is less than 0.05 level of significance. At first differential log(gdppc) and log(gfcepc) probability level is less than 0.05 level of significance. At first differential log(gdppc) probability level is less than 0.05 level of significant meaning there is no unit root implying that the variable is stationary.

According to the results performed by the various unit root tests we could see that the log(gdppc) was non stationary at level but stationary at first difference, log(gfcepc) was stationary at level for the Levin, Lin and Chu statistics unit root test but for Im, Pesaran and Shin statistics unit root test and Breitung t-stat statistics unit root test it was not stationary at level instead stationary at first difference, which implies that since 2 out 3 unit root tests treat log(gfcepc) as stationary at first difference, we shall go with it. Openness shows that the results of the unit root tests agree that there is no unit root at level meaning that the variable is stationary at level and since the variable is stationary at the level there is no need for the first difference.

3.4 Pedroni and Kao Residual Co-integration Test

The finding that much macro time series may contain a unit root has spurred the development of the theory of non-stationary time series analysis. Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. If such a stationary linear combination exists, the non-stationary time series is said to be co-integrated. The stationary linear combination is called the co-integrating equation and may be interpreted as a long-run equilibrium relationship among the variables. This section describes several tools for testing for the presence of co-integrating relationships among non-stationary variables in non-panel and panel settings. The first two parts of this discussion focus on co-integration tests employing the Johansen (1991, 1995) system framework or Engle-Granger (1987) or Phillips-Ouliaris (1990) residual-based test statistics. The final section describes co-integration tests in panel settings where you may compute the Pedroni (1999), Pedroni

(2004), and Kao (1999) tests as well as a Fisher-type test using an underlying Johansen methodology (Maddala and Wu, 1999).

The Johansen tests may be performed using a Group object or an estimated VAR object. The residual tests may be computed using a Group object or an Equation object estimated using nonstationary regression methods. The panel tests may be conducted using a Pool object or a Group object in a panel work file setting. Note that additional co-integration tests are offered as part of the diagnostics for an equation estimated using nonstationary methods.

Table 3: Pedroni Co-integration Test

	Statistics	Probability	Weighted statistics	Probability
Panel v-Statistic	0.398587	0.3451	0.321431	0.3739
Panel rho-Statistic	-0.161199	0.4360	-0.311001	0.3779
Panel PP-Statistic	-2.332199	0.0098	-2.907136	0.0018
Panel ADF-Statistic	-2.639079	0.0042	-3.694215	0.0001
Group rho-Statistic	1.179746	0.8809		
Group PP-Statistic	-2.198876	0.0139		
Group ADF-Statistic	-2.796284	0.0026		

According to the result in Table 3, out of the (11) probability stated above (6) of them are less than 0.05 significant level meaning that since majority reject H(0), we can then accept H(1) that there is cointegration, implying that in the long run, these variables would be stationary.

Table 4: kao Residual Cointegration test				t-Statistic	Prob.
ADF				-6.203416	0.0000
Residual variance				0.014192	
HAC variance				0.013383	

The Kao residual cointegration test also supports Pedroni cointegration test that log(gdppc) and log(gfcepc) cointegrate, implying, in the long run, these variables would be stationary.

Before conducting the VAR estimation we have to firstly, ensure that some conditions are satisfied.

3.5 Results of Vector Auto Regressive Estimate

The vector autoregression (VAR) is commonly used for forecasting systems of interrelated variables and for analyzing the dynamic impact of random disturbances on the system of variables. The reduced form VAR approach sidesteps the need for structural modeling by treating every endogenous variable in the system as a function of p-lagged values of all of the endogenous variables in the system.

Table 7: Vector Autoregression Estimates			
	LOG(GDPPC)	LOG(GFCEPC)	OPENNESS
LOG(GDPPC(-1))	0.995810	0.198295	-0.003895
	(0.02156)	(0.03072)	(0.01323)
	[46.1911]	[6.45419]	[-0.29433]
LOG(GFCEPC(-1))	-0.017978	0.807386	0.012027
	(0.01872)	(0.02668)	(0.01149)
	[-0.96020]	[30.2592]	[1.04638]
OPENNESS(-1)	0.121882	0.201681	0.900479
	(0.02827)	(0.04029)	(0.01736)
	[4.31097]	[5.00551]	[51.8816]
C	0.038836	-0.518175	0.044212
	(0.06670)	(0.09505)	(0.04095)
	[0.58226]	[-5.45142]	[1.07976]
DUMMY	0.037092	-0.006680	-0.014441
	(0.01473)	(0.02099)	(0.00904)
	[2.51854]	[-0.31825]	[-1.59726]
R-squared	0.977784	0.965843	0.847985
Adj. R-squared	0.977642	0.965625	0.847012
Sum sq. resids	14.61858	29.68971	5.509293
S.E. equation	0.152937	0.217953	0.093888
F-statistic	6876.942	4418.232	871.6065

Fig. 5 Impulse Response Function

Response to Cholesky One S.D. Innovations ± 2 S.E.
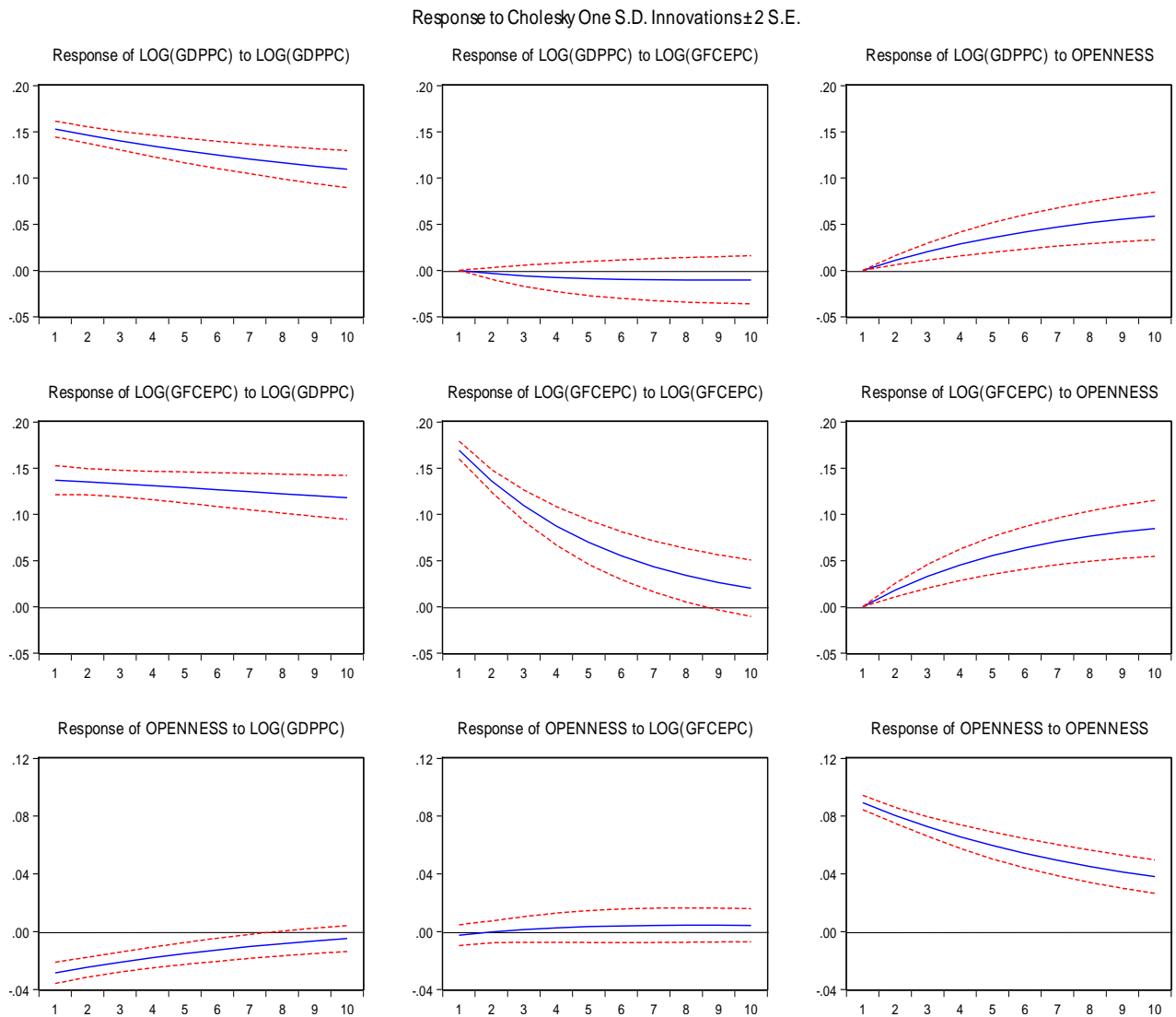
Response of LOG(GDPPC) to LOG(GDPPC)

According to the graphical result of the response function of log(gdppc) to log(gdppc), it shows a steady decline in the trend over the periods but still retains its positive response.

Response of LOG(GDPPC) to LOG(GFCEPC)

According to the graphical result of the response function of log(gdppc) to log(gfcepc), it shows a negative decline below zero meaning the response of log(gdppc) to log(gfcepc) is negative one which continues decline steadily over the periods .

Response of LOG(GDPPC) to OPENNESS

According to the graphical result of the response function of log(gdppc) to openness shows a positive inclining trend that is over the periods the response of log(gdppc) to openness is on the increase meaning that economic growth responds well to openness.

Response of LOG(GFCEPC) to LOG(GDPPC)

According to the graphical result of the response function of log(gfcepc) to log(gdppc), it shows a decline in the trend over the periods but still retains its positive response.

Response of LOG(GFCEPC) to LOG(GFCEPC)

According to the graphical result of the response function of log(gfcepc) to log(gfcepc) it shows a sloppy decline in the trend over the period's butt still retains its positive response.

Response of LOG(GFCEPC) to OPENNESS

According to the graphical result of response function of log

to openness shows a positive inclining trend that is over the periods the response of log(gfcepc) to openness is on the increase meaning that economic growth responds well to openness.

Response of OPENNESS to LOG(GDPPC)

According to the graphical result of the response function of openness to log(gdppc) shows a negative inclining trend over the period the response of openness to log(gdppc) is negative meaning it has an inverse relationship.

### Response of OPENNESS to LOG(GFCEPC)

According to the graphical result of the response function of openness to log(gdppc) shows a weak positive trend meaning over the period the response of openness to log(gfcepc) has a very low impact.

Response of OPENNESS to OPENNESS

According to the graphical result of the response function of openness to openness, it shows a sloppy decline in the trend over the period's butt still retains its positive response.

Variance Decomposition
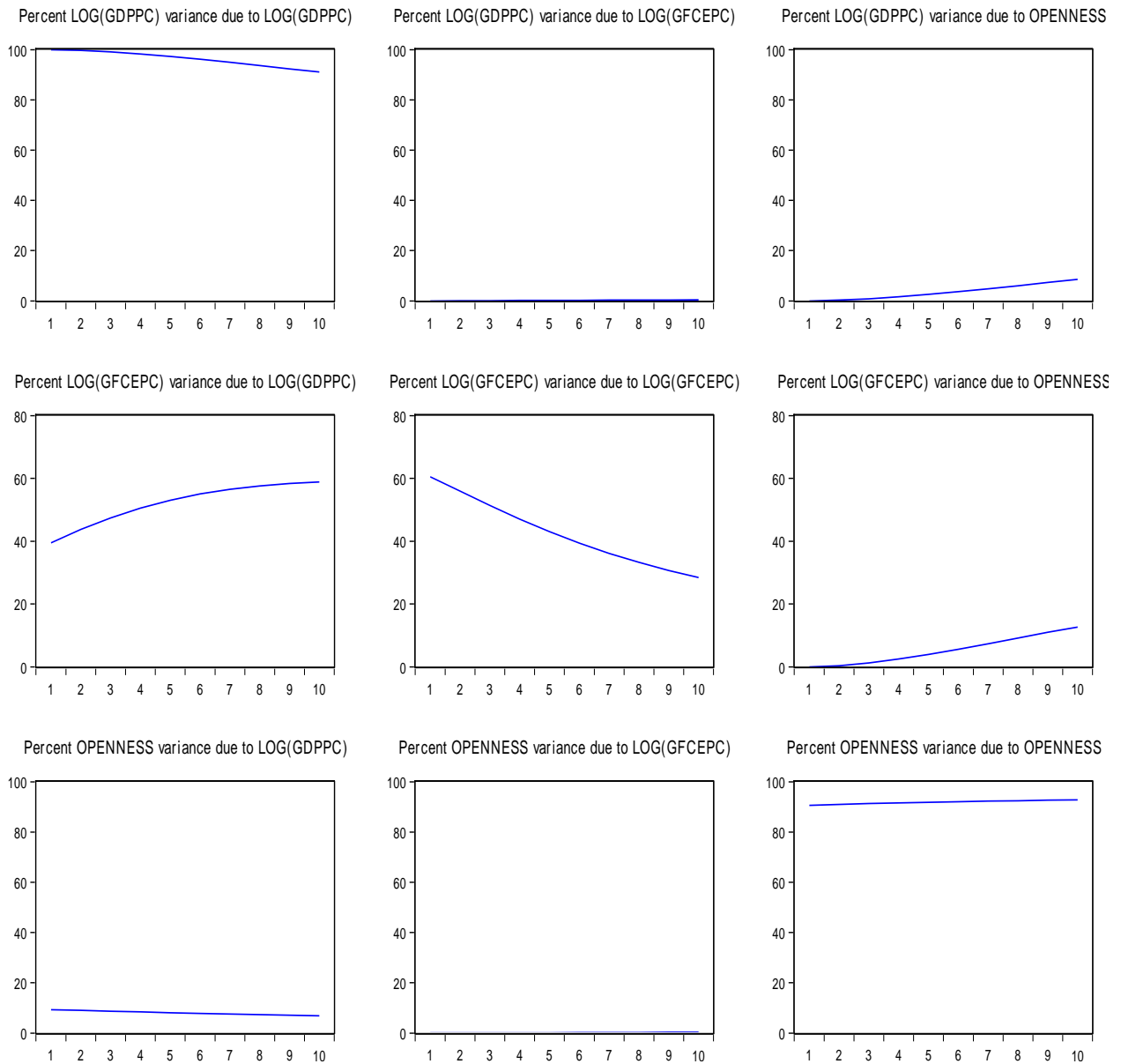
Percent LOG(GDPPC) variance due to LOG(GDPPC)

This implies that a shock or fluctuation to LOG(GDPPC) causes 99.1per cent fluctuation in the short-run using the 3rd period and 91per cent variance in the long-run using the 10th period of LOG(GDPPC), this still means that in short run and long run the variance still remain positive

Percent LOG(GDPPC) variance due to LOG(GFCEPC)

This implies that a shock or fluctuation to LOG(GFCEPC) causes 0.07per cent fluctuation in the short-run using the 3rd period and 0.37per cent variance in the long-run using the 10th

period of LOG(GDPPC), this still means that in short run and long run the variance still remain zero showing no significant relationship.

Percent LOG(GDPPC) variance due to OPENNESS

This implies that a shock or fluctuation to OPENNESS causes 0.81per cent fluctuation in the short-run using the 3rdperiod and 8.5per cent variance in the long-run using the 10th period of LOG(GDPPC), this implies that in the short run there is no significant effect but in the long run there is a positive significant relationship.

Percent LOG(GFCEPC) variance due to LOG(GDPPC)

This implies that a shock or fluctuation to LOG(GDPPC) causes 47.4per cent fluctuation in the short-run using the 3rdperiod and 58.8per cent variance in the long-run using the 10th period of LOG(GFCEPC), implying that in the short run and long run there is a positive significant relationship.

Percent LOG(GFCEPC) variance due to LOG(GFCEPC)

This implies that a shock or fluctuation to LOG(GFCEPC) causes 51.36per cent fluctuation in the short-run using the 3rdperiod and 28.44per cent variance in the long-run using the 10th period of LOG(GFCEPC), implying that in the short run and long run there is still a positive relationship but in a reducing form. Percent LOG(GFCEPC) variance due to OPENNESS

This implies that a shock or fluctuation to OPENNESS causes 0.81per cent fluctuation in the short-run using the 3rdperiod and 8.5per cent variance in the long-run using the 10th period of LOG(GFCEPC), implying that in the short run it shows a zero relationship but in the long run it shows an increased significant positive relationship.

Percent OPENNESS variance due to LOG (GDPPC)

This implies that a shock or fluctuation to LOG (GDPPC) causes 8.7per cent fluctuation in the short-run using the 3rdperiod and 6.9per cent variance in the long-run using the 10th period of OPENNESS, implying that in the short run and long run both shows a positive relationship though it is a declining positive relationship in the long run.

Percent OPENNESS variance due to LOG(GFCEPC)

This implies that a shock or fluctuation to LOG(GFCEPC) causes 0.03per cent fluctuation in the short-run using the 3rdperiod and 0.29per cent variance in the long-run using the 10th period of OPENNESS, implying that in the short run there is zero influence of government spending on trade openness

Percent OPENNESS variance due to OPENNESS

This implies that a shock or fluctuation to OPENNESS causes 91.29per cent fluctuation in the short-run using the 3rdperiod and 92.83per cent variance in the long-run using the 10th period of OPENNESS, implying that in both the short run and long run both shows a positive relationship.

3.10 Discussion of Findings

Economic growth and government spending in Sub Saharan Africa shows a similar relationship as the economic growth rises and falls, the government expenditure also follows the same pattern. According to Wagner's model which assumes that as a nation grows, there will be pressure on the government to provide more goods and services to meet the growing economy. The government may also need to provide certain commercial services like banking facilities which comes at a cost. Also, as an economy grows, there is the need for government to come up with regulations and legislation to ensure law and order.

In the case of trade openness in Sub Saharan Africa, the trends move in a sharp rise and fall, different from that of government spending and economic growth meaning there is no similar movement.

Trade openness, government spending, and economic growth shows a long-run co-integration relationship (Lane and Tornell 1998, Tornell and Lane 1999) and Martin (1997) also spoke on the long-run relationship between trade openness and economic growth, Devarajan et al. (1996), Arpaia and Turrini (2008)showed the existence of a long-run positive relationship between government expenditure and economic growth.

In estimating the variables in VAR specification, for economic growth in Sub Saharan countries, economic growth of the previous year had a positive impact on economic growth, government spending of the previous year has a negative impact on economic growth. Awan et al (2011) and Pham (2009) suggested the implication with their findings that government may focus on productive government expenditure or economic expenditure in order to have positive impact on economic growth. Besides, government should also reduce the expenditure on unproductive activities, social and general development. As an implication of this research the government of the Sub Saharan countries should reduce current expenditure and increase capital expenditure, that is African countries should re-channel resources from unproductive expenditure to returns expenditure or using fiscal policy to regulate the economy so as to eradicate negative effect of public spending on economic growth, openness of the previous year has a positive impact on economic growth, previous researchers such as

Ellahi*et al.*,(2011), Paudel and Perera (2009), Soukhakian (2007), Choong*et al.* (2005) and Dritsaki and Dritsaki (2013) found similar result that trade openness has significant positive relationsh;ip with economic growth. As an implication to this research government in the Sub Saharan region should further enhance the degree of the trade openness to further stimulate high and sustainable economic growth, according to economic growth theory, increase in export increases GDP whereas an increase in import reduces GDP in Sub Saharan Africa.

Economic growth the previous year has a positive impact on economic growth meaning that economic growth of the previous year influences and explains economic growth, but the previous year government spending has a negative influence or effect on economic growth.

Economic growth of the previous year has a positive impact on government spending meaning that the economic growth of the previous year in Sub Saharan Africa explains government spending, so does the previous year of government spending has a positive relationship with government spending, also openness of the previous year explains government expenditure which is positive

Economic growth of the previous year has zero impact on openness meaning that the economic growth of the previous year does not explain, influence or affect trade openness so also the same for government spending of the previous year which has a 1% influence on trade openness only the previous findings of trade openness influences or affect trade openness.

In summary this result can be seen that openness of the previous year in the selected Sub Saharan countries influences or explain the economic growth and government spending but the previous year economic growth and government spending does not explain or influences trade openness this because trade openness moves in a different pattern it moves are been determine by export plus import divided by GDP meaning the result may show a strong openness or weak openness depending on the international trade policies in line with. Charles and Oliver (2005) the vast majority of Sub Saharan Africa (SSA) countries have had restrictive and distortionary trade policies since independence until the 1980s (at least), typically motivated by some desire to protect domestic industries. Irrespective of the merits of supporting domestic producers, most economists would agree that trade restrictions are not the best way of achieving this objective. For one reason or another, many SSA policy-makers have become persuaded that trade restrictions are not the best way to support domestic producers.

This policy as therefore left a fluctuation as seen in figure 4.3 in trade openness among sub Saharan countries, also can be seen that government spending has negative impact economic growth in Sub Saharan Africa Nurudeen and Usman (2010), Aladejare (2013), Devarajan et al. (1996) according to these research work they all spoke on the negative impact of government spending on economic growth this is due to poor spending policies carried out in developing countries.

3.11 Conclusion and Recommendation

Research works on government spending, trade openness and economic growth in Sub Saharan Africa has been carried out by various researchers in the field of economics and according to previous works carried out, trade openness and government spending has shown relationship in determining economic growth, although some research shows a positive relationship, while others indicate a negative relationship in the sub Saharan countries.

In this study, an empirical work was carried out in seeing the influence of government spending on economic growth which was a negative relationship and trade openness which had a positive relationship on economic growth, economic growth which had a positive relationship with government spending and trade openness which also had a positive influence on government spending and economic growth which had no influence on trade openness and government spending having a slight influence on trade openness.

This, therefore, conclude that economic growth response negatively to the shock innovation by government spending while economic growth response positively to the shock innovation by trade openness, Evidence that if government spending should be properly channeled in Sub Saharan Africa it would have a positive relationship on economic growth, also the increase in trade openness should be largely influence by increase in export than import this in implication would mean that openness would have a positive influence on economic growth.

The findings of this research indicate that government expenditure has a significant negative relationship with economic growth in the sub-Saharan countries, the reason being that Governments of the Sub-Saharan countries focused resources on unproductive activities and expenditures on a deadweight project which lead to negative impact on economic growth. We, therefore, recommend that Africa countries should spend their resources on projects that have a direct bearing on growth parameters in order to have a positive impact on economic growth.

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