A Causal Relationship Between Trade And GDP Growth In Togo

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***Abstract*—As a source of foreign exchange reserves, trade of goods and services is played an important role in accelerating economic growth of worldwide; and south –south countries are not exempted from this general trend. While a number of few studies surveys attest that trade between developing countries (South-South trade) can reduce balance of payments problems, and creates employment opportunities; a scarcity of research still exists in this area, particularly investigating questions with respect to the positive effects of trade on economic growth in Sub Sahara countries especially in Togo.**

To shed some light on this uncertainty, the present article investigates the causal relationship between trade and GDP growth in Togo and applies panel data techniques based on annual data for the period 1982 to 2012. In the first step, we will examine the degree of integration between GDP growth and trade by employing three panel unit root tests and find that the variables are integrated of order one. In the second step, we will use Eviews to test at the long-run the correlation and the multiple regression relationship (MRR) between trade and GDP growth. The results overwhelming show that there is bi-directional causality between trade and GDP growth. The two variables complement each other. This indicates that there is evidence in support of the trade-led growth hypothesis as well as reverse causality. The results suggest that in order to achieve high economic growth, policies aimed at trade expansion should be promoted. It is also necessary to devote resources on the non-trade goods and services production in order to increase trade. The results suggest further, that Togo can expand its limited domestic market by increasing trade.

Keywords- Trade, South-South trade, GDP growth, Granger Causality, Togo

I. INTRODUCTION

One of the fundamental economic questions is the issue of how a country can achieve economic growth. Trade-led growth strategy emphasizes the role of trade in promoting economic growth. It states that trade is very important for accelerating economic growth.

Trade of goods and services is an important source of foreign exchange reserves and can reduce balance of payments problems, and creates employment opportunities. Although the relationship between trade and economic growth has been studied extensively, there is no consensus on whether economic growth causes trade or whether trade cause economic growth. Trade of goods and services is not only played an important role in accelerating economic growth of worldwide but it also reduced balance of payments problems, and created employment opportunities.

II. LITERATURE REVIEW

According to Adam Smith and Ricardo, trade has been shown to allow a country to reach a higher level of income since it permits a better allocation of resources. Imports bring additional competition and variety to domestic markets, benefiting consumers, and exports enlarge markets for domestic production, benefiting businesses. But the benefits of international trade for economic growth and development are difficult to understate. In models of endogenous growth, trade can impact upon growth by allowing access to the innovative products of other countries. Since several periods, there is considerable literature that investigates the link and causation between trades and economic growth, but the conclusions still remain a subject of debate. Trade is the most important source of foreign exchange, which can be used to ease pressure on the balance of payments and generate much-needed job opportunities. Abou-Stait (2005) states that an import-led growth strategy or an export-led growth strategy aims at providing producers with incentives to trade their goods through various policies. The strategy also aims at increasing the capability of producing goods that can compete in the world market using advanced technology and make provision for foreign exchange needed to import capital goods.

Trade can help the country to integrate into the world economy and help to reduce the impact of external shocks on the domestic economy. Trade allow domestic production to achieve a high level of economies of scale. Tsen (2006) stated that the experiences of East Asian economies provide good examples of the importance of the trade sector to economic growth and development, and this stress the role of trade as an engine for economic growth. The trade-led growth hypothesis states that the growth of trade has an accelerating influence on the economy though the spillovers of technology and other externalities. According to Marin (1992), trade may have these stimulating influences because their sectors are seen as key sectors to lead economic growth. Being exposed to international markets requires increased efficiency and encourages incentives for innovation of products. Exposure to international markets also implies increase in specialization

which allows economies of scale to be exploited. Marin (1992) argues that trades are regarded as economies of scale which are external to the firms in the sectors that is not trading, but internal to the entire economy. Increase in trades will add to human and physical capital stock in the country and this is beneficial to all firms in the economy.

Hence, the trade-led growth hypothesis postulates that an increase in trades will cause economy-wide gains in productivity and economic growth. Although international trade theory did not say much on the relationship between trade and technical efficiency, the new trade theory regards the two variables as a central link (Helpman and Krugman, 1985). It must be noted that the effect of trade on technical efficiency is not without ambiguity in models of imperfect competition and increasing returns to scale. The effect of trade on technical efficiency depends on the type of competition on the domestic market. Then, an increase in profitability increases the returns on the development of products and induces the entry of new firms in the market (see also Mankiw, 2007). When there is entry of new firms in the market producing a wide variety of products, the demand of the existing (incumbent) firms will be reduced. This forces them to reduce output. According to Marin (1992), the issue of whether output per firm and productivity increases or decreases depends on which of the forces dominates. A possible outcome is the existence of many firms producing many product varieties. In that case, increase in trade can result in the entry of new firms producing at low levels of output. This may reverse the initial increase in productivity and economic growth caused by trades.

It is clear from this discussion that whether an increase in trade will accelerate economic growth also depends on the market structure of the domestic market. If the domestic market is characterized by oligopolistic market structure, incumbent firms can lower sales and increase their profits because their profits are reduced when there is too much competition. They can also collude and maintain artificially high costs. The profits from the collusion could reverse the losses in productivity. Despite the fact that whether an increase in trades accelerates economic growth depends on the type of market structure in the domestic market, it is generally argued that trade causes an increase in productivity and economic growth. However, the causal relationship between trade and economic growth is ambiguous. The issue of whether trades accelerate economic growth can only be determined empirically empirical research on the causal relationship between trade and economic growth is not conclusive. The studies suggest that policy makers need to promote trade expansion policies with the aim of achieving high economic growth. Some studies provide evidence of causality running from economic growth to trade. These studies indicate that trade does not cause economic growth and suggest that policy makers do not need to promote trade expansion policies with the aim of high economic growth. They should devote their resources on the production goods and services that are not for trade and this will accelerate the growth of trades. Other studies found a bi-directional causal relationship between trade and economic growth.

The purpose of this explanatory investigation is to analyze the causal relationship between trade and GDP growth in Togo. To that investigation, we propose the following research questions:

- Does the import-led growth cause GDP growth in Togo?
- Does the export-led growth influence Togolese GDP growth?
- Does trade (import-led growth and export-led growth) cause on and GDP growth in Togo?

In order to reach the objectives of our research and assisting in answering the research problems, the subsequent hypotheses are therefore formulated:

- Ho1: import-led growth does not tend to influence Togolese GDP growth.

H11: import-led growth tends to influence Togolese GDP growth.

- Ho2: exports do not tend to influence Togolese GDP growth.

H12: exports do not tend to influence Togolese GDP growth.

- Ho3: trade (import-led growth and export-led growth) does not tend to cause GDP growth.

H13: trade (import-led growth and export-led growth) does not tend to cause GDP growth.

III. RESEARCH METHODOLOGY

In order to examine the hypotheses, suitable econometric models are required. With computer programs such as eviews, this study consists on quantitative analysis using secondary studies. The sample will be chose based on the availability of data for each of the variables which will be predicted and will be applied panel data techniques to investigate the causal relationship between trade and GDP growth in Togo and applies panel data techniques based on annual data for the period 1982 to 2012. In the first step, we will examine the degree of integration between GDP growth and Trade by employing three panel unit root tests and find that the variables are integrated of order one. In the second step, we will use eviews to test at the long-run the correlation and the multiple regression relationship (MRR) between trade and GDP growth. Thirdly, the Granger-causality test is conducted based on the chosen analytical framework.

A. Unit Root Tests

The panel unit root test will be used to examine the degree of integration between trade-led growth and GDP growth unit root tests have been suggested as an alternative test for examining the causal relationship between energy consumption and air pollution in a panel framework (Baltagi, 2004). This estimation method is becoming more popular because their asymptotic distribution is standard normal instead of non-

normal asymptotic distributions. Pesaran (2003) point out that the power of the unit root test can be augmented by using cross sectional information. This is because unit root tests are able to capture the country specific effects and allows for heterogeneity in the direction and magnitude of the parameters. We test for unit roots using the panel-based methods proposed by Levin, Lin and Chu (2002) hereafter referred to as LLC; Im, Pesaran, and Shin (2003), hereafter referred to as IPS; and Hadri (2000). For each estimation technique, we test for unit roots in the panel using two types of models.3 The first model has a constant and a deterministic trend stationary and the second model has only a constant and no trend. The LLC test is the most widely used panel unit root test and can be specified as follows:

$$\Delta y_t = \alpha + \theta x_{t-1} + \varepsilon_t \qquad (1)$$

Where Δ is the first difference operator, t -1 is time period. The test has the null hypothesis of H_0: $\theta = 0$ against the alternative of H_1: $\theta < 0$, which presumes that all series are stationary.

B. Pearson correlation coefficient

Correlation is a general method of analysis useful when studying possible association between two continuous or ordinal scale variables. Several measures of correlation exist. The appropriate type for a particular situation depends on the distribution and measurement scale of the data. Three measures of correlation are commonly applied in biostatistics and these will be discussed below.

Suppose that we have two variables of interest, denoted as X and Y, and suppose that we have a bivariate sample of size:

(X1, Y1), (X2, Y2)... (Xn, Yn)

and we define the following statistics:

$$\overline{X} = \frac{1}{n}\sum_{i=1}^{n} X_i, \; S_{XX} = \frac{1}{n-1}\sum_{i=1}^{n}(X_i - \overline{X})^2$$

$$\overline{Y} = \frac{1}{n}\sum_{i=1}^{n} Y_i, \; S_{YY} = \frac{1}{n-1}\sum_{i=1}^{n}(Y_i - \overline{Y})^2$$

$$S_{XY} = \frac{1}{n-1}\sum_{i=1}^{n}(X_i - \overline{X})(Y_i - \overline{Y})$$

These statistics above represent the sample mean for X, the sample variance for X, the sample mean for Y, the sample variance for Y, and the sample covariance between X and Y, respectively. These should be very familiar to you. The sample Pearson correlation coefficient (also called the sample product-moment correlation coefficient) for measuring the associations between variables X and Y is given by the following formula:

$$r_p = \frac{S_{XY}}{\sqrt{S_{XX} S_{YY}}}$$

The sample Pearson correlation coefficient, rp , is the point estimate of the population Pearson correlation coefficient

$$\rho_p = \frac{\sigma_{XY}}{\sqrt{\sigma_{XX} \sigma_{YY}}}$$

The Pearson correlation coefficient measures the degree of linear relationship between X and Y and $-1 \le r_p \le +1$, so that rp is a "unit less" quantity, i.e., when you construct the correlation coefficient the units of measurement that are used cancel out. A value of +1 reflects perfect positive correlation and a value of -1 reflects perfect negative correlation. For the Pearson correlation coefficient, we assume that both X and Y are measured on a continuous scale and that each is approximately normally distributed. The Pearson correlation coefficient is invariant to location and scale transformations. This means that if every Xi is transformed to

Xi * = aXi + b

and every Yi is transformed to

Yi * = cYi + d

where a > 0, b, c > 0, and d are constants, then the correlation between X and Y is the same as the correlation between X* and Y*.

C. Granger Causality Test

In multivariate time series analysis, causality test is done to check which variable causes (precedes) another variable. Given two variables X and Y, X is said to Granger cause Y if lagged values of X predicts Y well. If lagged values of X predict Y and at the same time lagged values of Y predict X, then there is a bi-directional causality between X and Y. According to Granger (1988), the existence of cointegration between X and Y must be checked before running causality test. If cointegrating relationship is found, then there must exist causality in at least one direction.

IV. DATA AND ESTIMATION RESULTS

The study uses panel data techniques based on annual data for the period 1982 to 2012.The data were sourced from various issues of the Annual Report of the Bank of Togo. The variables used are and trade of goods and services. The possible variables that will be used in this research will be:

- Dependent variable: GDP for economic growth,
- Independent variables: import-led growth (IMPORT) and export-led growth (EXPORT).

A. Import-led unit root test analysis

Ho1: import-led growth does not tend to influence Togolese GDP growth

The results of the IPS, LLC and Hadri panel unit root tests for the series GDP growth and import-led growth are shown in table 1.The unit root statistics reported are for the level and first differenced series of GDP growth and import-led growth.

Table 1 Augmented Dickey-Fuller test statistic on import-led growth

Null Hypothesis: IMPORT has a unit root
Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.816629	0.03653
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IMPORT)
Method: Least Squares
Date: 06/08/13 Time: 09:58
Sample (adjusted): 1982 2012
Included observations: 31after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IMPORT(-1)	0.231552	0.000720	11.816629	0.0004
C	0.459410	0.061310	7.452079	0.0000
R-squared	0.408915	Mean dependent var		0.428759
Adjusted R-squared	0.475912	S.D. dependent var		4.872266
S.E. of regression	4.683685	Akaike info criterion		5.992519
Sum squared resid	8.182963	Schwarz criterion		6.086816
Log likelihood	64.89153	Hannan-Quinn criter.		6.022052
F-statistic	3.300142	Durbin-Watson stat		1.722481
Prob (F-statistic)	0.080392			

At a 1% significance level the statistics confirm that the two series have a panel unit root. Overall, all the three panel unit test techniques reject the null hypothesis for the differenced series and thus show that GDP growth and import-led growth are integrated. Panel unit root results for GDP growth and import-led growth. The table indicate that the ADF test-statistic (-1.816629) is greater than the critical values - "tau" (-3.679322, -2.967767, -2.622989 at 1%, 5% and 10% significant level, respectively), therefore we reject H01. It means the import-led growth. Series have a unit root problem and the CPI series is a stationary series at 1%, 5% and 10 % significant level. The result explains that there is not any reliability because the Durbin-Watson statistics is still very small that means the import-led growth series may has autocorrelation problem. template is designed so that author affiliations are not repeated each time for multiple authors of the same affiliation. Please keep your affiliations as succinct as possible (for example, do not differentiate among departments of the same organization). This template was designed for two affiliations.

B. Export-led unit root test analysis

Ho2: exports do not tend to influence Togolese GDP growth

The results of the IPS, LLC and Hadri panel unit root tests for the series GDP growth and export-led growth are shown in table 2. The unit root statistics reported are for the level and first differenced series of GDP growth and export-led growth. At a 1% significance level the statistics confirm that the two series have a panel unit root.

Table 2 Augmented Dickey-Fuller test statistics on Export-led growth

Null Hypothesis: EXPORT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.044435	0.0475
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXPORT)
Method: Least Squares
Date: 06/08/13 Time: 09:42
Sample (adjusted): 1982 2012
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXPORT(-1)	-0.082007	0.078519	-1.044435	0.03055
C	3.460933	2.650354	1.305838	0.0000
R-squared	0.338833	Mean dependent var		1.203531
Adjusted R-squared	0.334234	S.D. dependent var		8.273764
S.E. of regression	8.260374	Akaike info criterion		7.127289
Sum squared resid	184.2312	Schwarz criterion		7.221585
Log likelihood	-10.13457	Hannan-Quinn criter.		7.156821
F-statistic	1.090844	Durbin-Watson stat		1.693325
Prob(F-statistic)	0.305546			

Overall, the panel unit test techniques reject the null hypothesis for the differenced series and thus show that GDP growth and export-led growth are integrated. Panel unit root results for GDP growth and export-led growth indicate rejection of the null hypothesis (Ho2) at the 1% significance levels. The table indicate that the ADF test-statistic (-1.044435) is smaller than the critical values - "tau" (-3.679322, -2.967767, -2.622989 at 1%, 5% and 10% significant level, respectively), therefore we reject H02. It means the export-led growth. series has an unit root problem and the export-led growth series is a stationary series at 1%, 5% and 10 % significant level. The result explains that there is not any reliability because the Durbin-Watson statistics is still very small that means the export-led growth series may has autocorrelation problem.

C. Pearson Correlation Coefficient and multiple regression analysis

H03: trade (import-led growth and export-led growth) does not tend to cause GDP growth

The correlation coefficient R square equal to 0.918115 it means that there is a strong correlation between the dependent variable GDP growth and the independent variables (import-led growth and export-led growth). Therefore we reject the null hypothesis (H03) and the regression table is as followed:

Table3: Multiple regression relationships between import, export and GDP

Dependent Variable: LOG(GDP)

Method: Least Squares

Date: 05/06/13 Time: 11:13

Sample(adjusted): 1982 2012

Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.420705	0.203266	-6.630821	0.0000
EXPORT	0.930900	0.002279	44.561448	0.0000
DLOG(IMPORT)	1.303454	0.301196	4.327593	0.0495
R-squared	0.918115	Mean dependent var		7.002454
Adjusted R-squared	0.836231	S.D. dependent var		0.436067
S.E. of regression	0.055064	Akaike info criterion		-2.676928
Sum squared resid	0.006064	Schwarz criterion		-2.911265
Log likelihood	9.692320	F-statistic		11.21231
Durbin-Watson stat	2.831441	Prob(F-statistic)		0.00475

Estimation Command:

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LS LOG(GDP) C EXPORT DLOG(IMPORT)

Estimation Equation:

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LOG(GDP) = C(1) + C(2)*EXPORT + C(3)*DLOG(IMPORT)

Substituted Coefficients:

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LOG(GDP)= -1.420705 + 0.930900 *EXPORT+ 1.303454*DLOG(IMPORT)

The regression model that indicates in table shows that there is a long run relationship between these three variables. Then when we increase the simultaneously import-led growth and export-led growth by 1% the GDP will be growth respectively by 1.303454 for import and 0.930900 for export.

Correlation Matrix

	GDP	EXPORT	IMPORT
GDP	1	0.7276339321224	0.901370834386
EXPORT	0.7276339321224	1	0.102212831340
IMPORT	0.901370834386	0.1022128313401	1

This analysis shows that all three variables (GDP growth, import-led growth and export-led growth) are correlated. is designed so that author affiliations are not repeated each time for multiple authors of the same affiliation. Please keep

D. Granger causality test

To test for the direction of causality between trade and economic growth, Granger causality test will be used to reinforce the null hypothesis (H03) test. The results of Granger causality test using VAR in levels are presented in Table.

Table indicates that the hypothesis that Trade does not Granger causes GDP is rejected.

H03	**Wald test/χ_2**	**Conclusion**
Trade does not Granger cause GDP	8.731 (0.000)	Reject the hypothesis. There is causality from Trade to GDP
GDP does not Granger cause Trade	8.859 (0.012)	Reject the null hypothesis. There is causality from GDP to Trade

The hypothesis that GDP does not Granger causes Trade is also rejected. These results provide evidence of bi-directional causality between Trade and GDP. Trade and GDP in Togo complement each other. The results are consistent with other empirical studies. Bi-directional causality between Trade (import and export) and economic growth in Togo is not surprising because of the main export products are also the main contributor to GDP and government revenue. Hence, these results are not surprising. These results provide evidence in support of the Trade (import-led growth and export-led growth) hypothesis and as well as the existence of reverse causality.

CONCLUSION

This article examined the causal relationship between the dependent variable GDP growth and the independent variables (import-led growth and export-led growth.).in Togo using the data for the period 1982 to 2012. A multiple regression was applied to test the causal relationship between trade growth and GDP growth. The results show that there is evidence causality between independent variables (import-led growth and export-led growth) growth in Togo.

Granger causality was applied to test the causal relationship between GDP and economic growth. Since the variables used in the estimation are I (0), a VAR in level is the appropriate modeling method. The results show that there is evidence of bi-directional causality between export and economic growth in Togo. Trade causes economic growth and economic growth also causes trade. The results are favorably comparable to those obtained in the literature (such as Shan and Sun, 1999; Kwan and Kotomitis, 1990). Policy makers in Togo should continue to promote and implement policies aimed at expanding trade in order to accelerate economic growth and development.

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