

Trade Tax Revenue and Trade Openness in Ghana

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Abstract

The study investigated the relationship between trade openness and trade tax revenue in Ghana. Unrestricted Cointegrating and Vector Error-Correction Models were estimated to examine the static and dynamic long-run effects as well as the short-run dynamics of the system and the speed of adjustment to the long-run equilibrium. The findings indicated that trade openness positively affect trade tax revenue both in the long run and short run. The Granger causality test results revealed a uni-directional relationship between trade openness and trade tax revenue implying that trade openness causes trade tax revenue but trade tax revenue does not cause trade openness. The evidence from the forecast error variance decomposition also suggests that the variables that influenced trade tax revenue significantly were trade openness and official development assistance while the source of least forecast error variance of trade tax revenue is the innovations of real effective exchange rate. Opening up a country to foreign trade has been a key focus of market-oriented policy reforms of almost every country. This paper examines the impact of trade openness on trade tax revenue in Ghana. This paper gives insight to people on the theory of trade openness and trade tax revenue and the factors affecting it in the Ghanaian context. It exposes other areas of trade openness policy on trade tax revenue that needs attention for further research. Ministry of Trade and Industry would be to promote non-traditional exports to increase trade volume. Increase in trade volumes leads to increase in trade openness which increases trade tax revenue.

Keywords: trade openness, trade tax revenue, cointegration, variance decomposition

INTRODUCTION

Opening up a country to foreign trade has been a key focus of market-oriented policy reforms of almost every country. This has taken two dimensions; openness in policy and openness in practice. The former gauges the importance of international transactions relative to domestic activities while the latter is concerned with the existence and extent of measures designed to restrict or enhance trade (McCulloch, Winters & Cirera, 2001). The openness in practice is measured by actual trade volumes in a specified period of time and its indicators include either exports or imports, or both recorded either in absolute terms or as a share of a country's gross domestic product (GDP). On the other hand, indicators of openness in policy include trade-weighted average tariff levels, collected tariffs, the effective rate of protection, non-tariff barriers (NTBs) and various composite indices (McCulloch et al., 2001).

Theoretically, trade openness, combined with other economic and structural reforms is expected to stimulate competition, enhance productivity, and accelerate economic growth through enhanced tax revenue. Ghana has adopted many measures including trade openness to boost international trade

and inflow of foreign exchange required for development. As part of its economic reforms, Ghana adopted trade openness since 1983 but did not necessarily go through the sequential process and normal intermediary stage of translating quantitative restrictions into equivalent tariffs before gradually reducing the tariffs. Most quantitative restrictions, including import licensing, were eliminated at the same time as the country went ahead to reduce the level and range of tariffs (Brafo-Insaidoo & Obeng, 2008). However, a significant concern, as it contemplates further trade openness is the potential impact of trade openness on tax revenues. The open-trade policy endorsed for Ghana under the Economic Recovery Program (ERP) and Structural Adjustment Program (SAP) incorporates reforms towards reduction or elimination of trade taxes, currency devaluation, removal of quantitative restrictions and foreign exchange rationing, exchange rate unification, adoption of pricing formula linked to world market trends and export sales privatization (Adenutsi, 2007).

Ghana's trade policy has involved a blend of the openness in practice and openness in policy with the aim of enhancing international competitiveness and securing greater market access for Ghana's products

and services. This policy is hinged on the objective of making imports less attractive (an import substitution rationale) and promoting exports to increase foreign exchange earnings and to achieve trade balance as an end goal in this respect. Taxes on the export of goods and services therefore have seen appreciable decline as a result of exemptions and rebates, while those on imports have seen substantial surge over the years (Action Aid Report, 2014). While the country's trade openness policy may have achieved some desired outcomes with considerable increases in aggregate exports from about US\$2.0 billion in 2000 to about US\$12 billion annually in 2011, this is however, more than matched by imports which increases from about US\$3.0 billion in 2000 to about US\$16 billion annually in 2011, negating the overall trade balance (Action Aid Report, 2014).

Statement of Problem

Economic theory does not provide a definite conclusion about effect of trade openness on trade tax revenue. Openness to trade in the form of converting quantitative restrictions to tariffs may initially lead to an increase in revenue from the trade tax. Further openness in the form of tariff cuts can cause loss of trade tax revenue on one hand, but can also amount to an increase in the volume of imports, and thus increase the tax base and revenue. Even though a substantial volume of empirical research has been

directed towards identifying the exact relationship between trade openness and trade tax revenue, there has been mixed findings. For instance, Khattry and Rao (2002) found a negative relationship while Pupongsak (2009) and Nwosa, Saibu and Fakunle (2012) found a positive relationship.

In Ghana, a study by Immurana, Rahman and Iddrisu (2013) examined the relationship between trade liberalization and tax revenue. However, the authors fail to decompose the components of total tax revenue to analyse the impact on each component of trade openness.

Another study Armah, Brafo-Insaidoo and Akapare (2014) looked at the effect of trade liberalization on import revenue in Ghana which means that revenue from export taxes was ignored in the analysis. Although the export sector contributes less to trade tax revenue in recent years compared to the import sector, but still adds to Ghana government's tax revenue. Moreover, the focus of Ghana's trade recently has been on the promotion of export sector. Expansion in Ghana's exports implies an increase in export taxes and therefore it would be prudent to include export taxes to get the general view on international trade taxes when considering revenue implications of trade liberalization. Figure 2 shows the performance of export taxes in Ghana since 1986.



Figure 1: Percentage Import and Export Taxes of Trade Tax Revenue
Source: Ministry of Finance and Economic Planning (2012) and WDI (2014)

It is observed from Figure 2 that, from 1986 to 1992 both taxes on imports and exports decreased but export tax decreased sharply as compared to import tax. Export tax performed better than import tax between 1993 and 1998 and since 1999 export tax has shown a decline even though it went up marginally between 2004 and 2006.

The study by Armah et al. (2014) did not include export taxes in their analysis to capture international trade tax holistically and also the study by Immurana et al. (2013) did not decompose tax revenue to specifically look at trade tax revenue. Therefore, this study intends to bridge this gap by looking at the

“effect of trade openness” on trade tax revenue in Ghana. The next section is the literature review, the third section provides a brief discussion on the methodology and the fourth section reports the empirical results and the conclusion and recommendations are presented in the last section.

LITERATURE REVIEW

Several studies have been directed to decide the relationship between trade liberalization (trade openness) and trade tax revenue. However empirical research findings have produced conflicting results. Some studies have shown that trade liberalization has a strong positive relationship with trade tax revenue

while others have found a strong negative relationship.

Khattry and Rao (2002) found that the effect of trade liberalization on revenue is significantly negative. Total sample of 80 developed and developing countries covering the periods 1978-1999 were used to examine the impact of trade liberalization on tax revenue. By applying a number of regressors on tax revenue regression and trade tax revenue regression, Khattry and Rao found that domestic indirect tax revenue-to-GDP and the trade-to-GDP ratios are significantly and negatively correlated demonstrating that custom duties on tradables are particularly replaced by domestic indirect taxes on tradables. Pupongsak (2009) used a traditional tax effort model with a panel data of 134 countries covering the period of 1980-2003 and employed the two way fixed-effect approach. The study found that trade liberalization has positive effect on both international trade tax and domestic taxes for 30 low income countries. The result is not consistent with the findings of Khattry and Rao (2002) on low income countries.

By exploring how trade liberalisation policy agenda is consistent with meeting the revenue objective of developing countries, Immurana et al., (2013) find the effect on total tax revenue of trade liberalisation in Ghana. The study made use of Autoregressive distributed lag (ARDL) model and found that the two indices of trade liberalisation are in no conflict with fiscal objectives of the country. The study concluded that the result is due to high elasticity of import demand as well successful tax reforms. However, the study did not decompose tax revenue into various components to look at the effect of trade liberalization on each component.

Nwosa, Saibu and Fakunle (2012) examined the relative contribution of trade liberalization on trade tax revenue in Nigeria for the period 1970 to 2009. The findings of the study showed that trade liberalization, public debt, trade openness, gross domestic product and labor force impacted positively on trade tax revenue while exchange rate had negative effect.

RESEARCH METHODOLOGY

Various studies examining the short and long run relationship between two or more time series variables are mainly based on cointegration, the standard Granger –causality tests and variance decomposition analysis. The study utilizes the Johansen and Juselius (1990) cointegration procedure. Before testing for causality, the unit root test was carried out to determine the order of integration of the individual variables and cointegration tests to control for long run relationship. When cointegration exists, the relationships between the variables are transformed

into an error correction model to take care of the short run dynamics and the parameters associated with the causality identified (Johansen and Juselius). A justifiable reason for using Johansen and Julius methodology is the fact that all the researched variables are integrated of the same order, I (1) after investigating their stationarity properties. Also, the granger causality test was performed to examine the direction of causality between trade openness and trade tax revenue. Finally, variance decomposition analysis was conducted using Bayesian Vector Autoregression model to determine the relative importance of the variables in the model in explaining the dependent variable.

Analysis of existing literature by Stotsky and WoldeMariam (1997) and Khattry and Rao (2002) revealed that the studies looking at tax performance have used different methods to estimate tax revenue performance. The most commonly used approach is the behavioral approach or to regress the tax performance on variables that serve as proxies for a country's tax performance. Therefore, for this analysis, the study estimates the following long run model:

$$TTR_t = \beta_0 + \beta_1 OPNX_t + \beta_2 \ln REER_t + \beta_3 ODA_t + \beta_4 \ln PCGDP_t + \beta_5 SEV_t + \varepsilon_t \quad (1)$$

Where; TTR is trade tax revenue ratio to GDP, OPNX is trade openness, SEV is service sector share to GDP, REER is the real effective exchange rate, ODA is the official development assistance, PCGDP is per capita GDP and ε is the error term. Based on economic theory, the expected signs of the coefficients are;

$$\beta_1 > 0, \beta_2 < 0, \beta_3 < 0, \beta_4 < 0 \text{ or } > 0, \beta_5 > 0.$$

The study used secondary data. Quarterly time series data were generated from the annual time series collected from 1986 to 2012 using Gandolfo (1981) algorithm. Data on trade tax revenue was taken from Ministry of Finance and Economic Planning (MoFEP) and the rest of the data (official development assistance, real effective exchange rate, the share of service sector to GDP, per capita GDP and trade openness) were taken from the WDI (World Bank, 2014).

ANALYSIS AND FINDINGS

The results of both ADF and PP unit root tests show that all the variables in the model are not stationary at the level but become stationary after first differencing at least at the 5 per cent level of significance. This means that all the variables are integrated of order one, that is, I (1). This situation satisfies the Johansen and Juselius (1990) precondition that all the variables in the model must be I (1).

JOHANSEN COINTEGRATION TEST RESULTS

After determining that all the variables are stationary in the first difference, we can check for the presence of any cointegration or long-run relationship among the variables based on the Johansen cointegration test. But before running the cointegration test, we need to run the VAR model first to determine the optimal lag length, based on the minimum Akaike information criterion (AIC). The optimal lag length used in this study is 6 lags.

The study then proceeds with the cointegration test for the model. It can be seen from Tables 1 and 2 that both the trace statistic and the maximum-Eigen value statistic indicate the presence of cointegration among the variables. This confirms the existence of a stable long-run or cointegration relationship between the variables in the model.

Table 1: Johansen's Cointegration Test (Trace) Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Probability
None*	0.363980	140.6164	95.75366	0.0000
At most 1*	0.308766	94.91134	96.81889	0.0002
At most 2*	0.258834	57.61441	47.85613	0.0047
At most 3	0.188219	27.36182	29.79707	0.0931
At most 4	0.060478	6.300808	15.49471	0.6600
At most 5	2.94E-07	2.97E-05	3.841466	0.9979

Trace test indicates 3 cointegrating equation(s) at 5% level of significance

Note: * denotes rejection of the hypothesis at the 5% significance level

Source: Computed Using Eviews 9.0 Package.

Table 2: Johansen's Cointegration Test (Maximum Eigen value) Results

Trace test indicates 3 cointegrating equation(s) at 5% level of significance

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Probability
None *	0.363980	45.70509	40.07757	0.0105
At most 1 *	0.308766	37.29693	33.87687	0.0188
At most 2 *	0.258834	30.25259	27.58434	0.0222
At most 3	0.188219	21.06102	21.13162	0.0511
At most 4	0.060478	6.300778	14.26460	0.5749
At most 5	2.94E-07	2.97E-05	3.841466	0.9979

Note: * denotes rejection of the hypothesis at the 5% significance level

Source: Computed Using Eviews 9.0 Package

Based on the fact that there are cointegrating vectors among the variables, the estimated long-run equilibrium relationship for trade tax revenue is therefore specified as:

$$TTR = 22.98 + 0.110PNX - 0.72lnREER - 0.33ODA - 16.08lnPCGDP + 0.25SEV \quad (2)$$

The model above represents the long run effects on trade tax revenue. Trade openness has a positive and significant effect on trade tax revenue. The coefficient of 0.1105 implies that in the long run, a 100 percent increase in trade openness will lead to approximately 11 percent increase in trade tax revenue. The result could suggest a high elasticity of demand for imports where the increase in the volume of imports resulting from openness exceed the magnitude of tariff cuts resulting in positive fiscal impact. This positive effect is an indication that trade openness has led to an upward shift in the time path of imports and exports in the long run. This is because, as countries liberalize their trade, trading with the rest of the world becomes relatively easier making it possible for trade to effectively take place. This in the long run has the tendency of increasing

import and exports in the country, hence making trade tax revenue to relatively increase.

This finding is in line with the study by Pupongsak (2009) who found a positive effect of trade openness on trade tax revenue in Thailand. Nwosa et al., (2012) also found a positive relationship between trade openness and trade tax revenue. This result contradicts the study of Khattry and Rao (2002) who found negative relationship between trade openness and trade tax revenue. The result also confirms the a-prior expectation that official development assistance and per capita GDP contribute negatively to the trade tax revenue. The share of service sector has a positive and significant effect on trade tax revenue as argued in literature.

GRANGER CAUSALITY TEST

This part of the analysis examines the direction of causality between trade openness and trade tax revenue. The result for the granger causality test is presented in Table 3.

Table 3: *Paiwise Granger Causality Tests*

Null hypothesis:	F-Statistic	Prob.
OPNX does not Granger Cause TTR	2.07839	0.0411**
TTR does not Granger Cause OPNX	0.46307	0.8951

Source: Estimated from WDI (2014) data using Eviews 9.0 package

Note: ** and ***denote significance at 5% and 1% respectively

As can be seen from the p-values of the F-statistic in Table 3, there is evidence of causality between trade openness and trade tax revenue and no causality between trade tax revenue and trade openness. There

is a positive unidirectional causality running from trade openness to trade tax revenue without feedback, implying that past values of trade openness have a predictive ability in determining the present values of trade tax revenue in Ghana. This suggests that policies concerning imports and exports can be boosted by opening up trade in the economy.

Variance Decomposition Analysis

The result of the forecast error variance decomposition of the trade tax revenue is shown in Table 4.

Table 4: Result of Variance Decomposition of Trade Tax Revenue

Period	TTR	OPNX	LNRRER	ODA	LNPCGD	SEV
2	99.51767		0.436707	2.25E-06	0.017888	0.008916
3	97.88035		1.322599	0.099165	0.421339	0.052719
4	95.23507		2.557318	0.288896	1.184132	0.210154
5	92.01201		4.072012	0.506509	2.135471	0.465977
6	88.65216		5.760891	0.703110	3.095579	0.783252
7	85.46179		7.518412	0.854027	3.939897	1.125052
8	82.59368		9.259660	0.955071	4.609429	1.464050
9	80.08610		10.92635	1.013658	5.095603	1.784157
10	77.91320		12.48373	1.041185	5.418988	2.078325
11	76.02385		13.91458	1.048491	5.612025	2.345455
12	74.36432		15.21358	1.043992	5.708273	2.587791
13	72.88835		16.38313	1.033409	5.737041	2.809149
14	71.55982		17.43029	1.020253	5.721521	3.013857
15	70.35182		18.36480	1.006482	5.678818	3.206186
16	69.24453		19.19764	0.993112	5.620844	3.390064
17	68.22307		19.94004	0.980653	5.555466	3.568973
18	67.27581		20.60281	0.969387	5.487600	3.745919
19	66.39323		21.19593	0.959521	5.420120	3.923446
20	65.56721		21.72833	0.951244	5.354556	4.103683
21	64.79061		22.20782	0.944749	5.291592	4.288379
22	64.05707		22.64111	0.940218	5.231412	4.478957
23	63.36092		23.03387	0.937811	5.173917	4.676560
24	62.69712		23.39087	0.937654	5.118871	4.882095

Source: Computed Using Eviews 9 Package

Table 4 shows that the largest source of variations in trade tax revenue forecast error is attributed to its own shocks. The innovations of trade openness, real effective exchange rate, official development assistance, per capita GDP and share of services sector to GDP are important sources of the forecast error variance of trade tax revenue. Real effective exchange rate contributed least to the forecast error variance of trade tax revenue. This suggests that all the variables play important part in trade tax revenue with the most effective variable being trade openness (OPNX).

CONCLUSION AND POLICY RECOMMENDATIONS

The main objective of the study was to examine the relationship between trade openness and trade tax revenue in Ghana. The study concentrated on the effect of trade openness on trade tax revenue, the direction of causality between trade openness and trade tax revenue and variance decomposition analysis

Trade openness had positive effect on trade tax revenue. The evidence from the forecast error variance decomposition suggests that the variables

that influenced trade tax revenue significantly were trade openness and official development assistance while the source of least forecast error variance of trade tax revenue is the innovations of real effective exchange rate throughout the short-term, medium-term and long-term horizons.

Trade openness had positive relationship with trade tax and was also relatively more important in explaining the forecast error variance of trade tax revenue. This implies that, in order to increase trade tax revenue, trade openness needs to be shocked to stimulate trade tax revenue. Ministry of Trade and Industry should promote non-traditional exports to increase trade volume. Increase in trade volumes leads to increase in trade openness which increases trade tax revenue.

Limitations of the Study

This study employed the Johansen approach to Cointegration. One major limitation with the Johansson's approach to cointegration is that it is based on VAR methodology which is inherently over parameterized and sensitive to both model specification and lag length selection. The selected lag length has implications for the outcome of the cointegration and causality test. Nevertheless, the cointegration and causality test produced consistent results.

Another limitation of the study typical of such studies in developing nations had to do with the quality and limited availability of annual data on some key variables used in the study. To produce highly reliable estimates especially with cointegration analysis, long span of annual time series data of all the variables was needed. As a result of the inadequate annual series, quarterly series were generated through interpolation for the purpose of estimation. The use of interpolated quarterly series did not, however, pose danger to the reliability of the results because other authors including Armah, Brafo-Insaidoo and Akapare (2014) have employed similar approach and arrived at reliable results.

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