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Determinants of Export Performance in Tanzania

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Abstract. Tanzania has been experiencing a persistent balance of trade deficit since the 1970s. This paper examines factors affecting export performance in Tanzania during the 1966-2015 period by employing Johansen cointegration and Granger causality approach. The Error Correction Modeling is employed to estimate the model. Based on the findings of cointegration approach the paper reveals that there is a stable long-run relationship between the series. Results suggest that economic real per capita GDP, trade liberalization, and exchange rate have a positive impact on export performance in Tanzania. The results also reveal that exports and official development assistance are negatively associated in the economy of Tanzania. Furthermore, the paper establishes the direction of causality between exports and economic growth. The results on this causal relationship suggest that real per capita GDP causes exports and not otherwise. This implies that that policies geared towards real per capita GDP should be given first priority if export trend is to be enhanced over time. Notwithstanding, from a policy point of view the macroeconomic instability is supported by the findings as inflation has a negative impact on exports. Increases inflation in the exporting economy than importing economy causes exports to become more expensive, resulting in a decline in exports.
Keywords. Export, real per capita GDP, macroeconomic stability, trade liberalization.
JEL. F14, F35, F43.

1. Introduction

It is widely accepted that outward looking strategies should be used by poor countries in their transition toward emergence. East Asian tigers have witnessed tremendous and sustainable exports, as have emerging countries like Chile, Tunisia, Botswana and Mauritius (World Bank, 2012). Even fast-growing countries such as Brazil and China have relied on world markets (World Bank, 2012). In fact, exporting allows firms in poor countries to enlarge their markets and benefit from economies of scale. Moreover, through exports a country may generate foreign exchange earnings, increase productivity and increase employment which in turn promote economic growth.

In Tanzania, data shows that export annual growth rate was positive during the 1984-2015 period, mainly due to higher prices on world markets and emergence of gold (Bank of Tanzania, 2011). However, the export annual growth rate of 15 per cent observed between 2000 and 2012 had come from less than 20 percent share in the GDP (Table 2). In Malaysia, Thailand, and Mauritius, for example, percent share of exports in GDP was 60 per cent during the same period (World Bank, 2012). In fact, exports in Tanzania remain concentrated as gold counts for over 40 per cent of total merchandise exports (URT, Economic Survey, 2012). As a result,

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a sudden drop in world gold prices would reduce Tanzania's total merchandise exports by large amount.

Tanzania has been experiencing a persistent balance of trade deficit for many years (Table 1). The unfavorable gap between exports and imports is a result of sluggish export growth compared with a rapid rise in imports. Rising imports and trade deficits have adverse effect on economic growth and employment. The fact that balance of payments deficit is made up by donor assistance and borrowing, this may result into an unsustainable external debt burden (Marandu, 2008). Lack of donor or borrowed foreign exchange would restrict the import capacity of the country which in turn would constrain the productive capacity by denying industrial and agricultural activities the necessary inputs such as raw machinery, fuel and fertilizers. Ultimately, this would cause a low production of consumer goods for exports (Marandu, 2008).

In spite of noticeable increase in export values particularly on extractive industry, the nature of Tanzania's exports raise a number of questions at the core of the theories on using exports as a driver of growth in Tanzania. In 2012 agriculture sector (crop, livestock and fishing), which employed about 70 per cent of the labour force, contributed 24.3 percent to GDP and 24.8 percent to all exports, while mining sector that employed less than 1 percent of the labour force, contributed 49.9 percent to all exports (Table 2).

The shift of Tanzania's exports from traditional commodities such as coffee, cotton, sisal, tea and tobacco towards non-traditional products such as minerals, gold in particular, and persistent high balance of payment deficit as percent of GDP, means that attaining sustainable employment and economic growth and changes in the deficit would have substantial effect on the performance of the whole economy. Indeed, the search for ways to improve the performance of the export sector is a major policy debate issue in Tanzania. Theoretical analysis suggests that traditional commodity prices fall relative to manufactures and service because of relatively inelastic demand and because of the lack of differentiation among producers, which means that the markets are purely competitive. Reducing dependence on commodities by moving to a different type of export manufactures, services, or non-traditional commodities seems the best solution to shelter Tanzania from the negative impact of price instability. However, Tanzania's overreliance on gold exports is exposing the economy to global economic shocks (World Bank, 2013).

This paper provides a framework for policy makers to know the determinants of export performance in Tanzania. Policy makers need to have a basis to formulate a policy of diversifying exports basing on these determinants. This contribution is part of debate and, on the basis of poor countries such as Tanzania; it adds some ideas to the relationship between export performance and a number of its determinants. The paper empirically analyzes the supply and demand determinants of export performance during the 1966-2015 period.

Table 1. *Economic Indicators in Tanzania, 1966-2015*

Indicator	1966-79	1980-89	1990-99	2000-09	2010-15
Export, percent of GDP	18.6	7.0	9.4	10.4	13.3
Import, percent of GDP	25.1	17.6	25.8	18.9	24.6
Net export, percent of GDP	-6.6	-10.5	-16.4	-8.5	-11.4
Real GDP growth rate	3.9	2.3	3.3	6.5	6.8
Inflation rate	11.9	30.1	23.1	6.8	9.1
Net ODA, per Capita, USD	10.9	32.0	35.1	47.1	57.7
Population growth	3.1	3.1	3.0	2.9	3.2
Real exchange rate	712.7	713.5	1430.5	1436.7	1317.7
Real per capita GDP, TZS Mil.	262814	252821	258989	325846	401661

Source: Author's calculations using data from World Bank Development Indicators (2016)

Table 2. *GDP, Export and Employment by Sector*

Sector	Contribution to GDP	Contribution to Export	Contribution to Employment
Crops & Livestock	22.7	16.7	67.9
Minerals	2.4	49.9	0.9
Manufacturing	9.6	19.9	1.4
Fishing	1.6	8.1	1.3
Others	63.9	34.7	28.5
ALL	*100*	*100*	*100*

Source: Computed from Economic Survey, 2012.

2. Literature Review

2.1. Gross Domestic Product, Economic Growth and Export Performance: Causal Relationships

Several studies address the importance of economic growth on export expansion, on one hand, and export expansion on economic growth on the other. Indeed, the higher level of production is one of the main causes of export expansion, because surplus of output can be exhausted in international markets. In empirical literature, Kumar (1998) confirms the positive impact of GDP on exports. In another study, Fugazza (2004) empirically examines the impact of real GDP and other factors on real exports. The results show that GDP has a positive and statistically significant impact on export performance with elasticity of less than 1. Large size of GDP creates environments for investment decisions; however, Majeed & Ahma (2006) argue that, although both GDP and GDP growth have a positive impact on export expansion, growth of the GDP is an indicator of future potential and sustainability of production level. Growth is more valid determinant of exports as compare to GDP because it measures the sustainability of output levels.

Ahdi, *et al*., (2013) analyze the dynamic causal relationship between economic growth and exports using linear and nonlinear Granger causality tests for South Africa for the 1911-2011 period. The linear Granger causality result shows no evidence of significant causality between exports and GDP. For the nonlinear methods that use both Hiemstra & Jones (1994) and Diks & Panchenko (2005) nonlinear Granger causality tests, reveal that, for the Hiemstra & Jones (1994) test, there is a unidirectional causality from GDP to exports, while for the Diks & Panchenko (2005) test, there is an evidence of significant bidirectional causality.

In another study, Sharma & Dhakal (1994) examine the causal relationship between exports and output growth in 30 developing countries over the 1960-1988 period. The results of the paper show that there is feedback causal relationship between exports and output growth in five countries. The paper also reveals that export growth causes output growth in six countries; output growth causes export growth in eight countries; and no causal relationship is observed between export growth and output growth in the remaining 11 countries. A feedback causal relationship between exports and economic growth is also observed by Ghartey (1993) for Japan. Similarly, Kalaitzi (2013) examines the causal relationship between economic growth and exports in the United Arab Emirates over the 1980-2010 period, applying vector autoregression (VAR) model. The Granger causality test for the study reveals unidirectional causality between manufactured exports and economic growth. A unidirectional causation from exports to output also is observed by Abu al-Foul (2006) for Jordan and Awokuse (2003) for Canada. Abdul-Khaliq & Abu Shihab (2014) also find that there is a causal relationship going from the economic growth to export for Jordan. In the same vein, Shan & Sun (1998), while applying a procedure developed by Toda & Yamamoto (1995) in a VAR model find evidence of a one-way Granger causality running from manufacturing growth to exports growth for Australia. The one-way Granger

causality running from GDP to exports also is revealed by Shan & Tian (1998) for Shanghai. Like Shan & Sun (1998)'s study, Shan & Tian (1998) also examine the Granger no-causality procedure developed by Toda & Yamamoto (1995) in a VAR model.

2.2. Trade Liberalization

There are many studies which analyze the impact of trade liberalization on export performance in developing countries. The argument for analyzing the relationship between trade liberalization and exports is that the removal or reduction of barriers to trade such as import tariffs, export duties and quantitative restrictions stimulates the growth of exports and imports. Some of previous studies such as Thomas *et al*, (1991); Weiss (1992); Joshi & Little (1996); Helleiner (1994); and Ahmed (2000) confirm that countries that embark on liberalization programmes improve their export performance. Indeed, the study by Santos-Paulino (2000) on the impact of trade liberalization on export performance for a sample of developing economies concludes that trade liberalization is a fundamental determinant of export growth in all the countries in the sample. In another study, UNCTD (2008), using a liberalization dummy as a proxy for liberalization and applying the Generalised Methods of Moment (GMM) estimator on the post-liberalization export performance for 34 African countries reveals that trade liberalization increases the exports-to-GDP ratio by 0.09 percent point.

Other studies such as UNCTAD (1989), Agosín (1991), Clarke & Kirkpatrick (1992), Greenaway & Sapsford (1994), Shafaeddin (1994), and Jenkins (1996), however, reveal little or no evidence of any favourable impact of trade liberalization on export performance. Babatunde (2009), using average tariff rates as the indicator of trade liberalization and fixed and random effects estimation techniques to examine the impact of trade liberalization on export performance across 20 sub-Sahara African countires during the 1980-2005 period, also, reveals that there is no significant relationship between trade liberalization and export performance. However, lack of evidence on the impact of trade liberalization on export performance may be due to the fact that average tariff rates are not directly related to exports.

The bases of this controversy have been due to a number of factors including the importance of economic reforms, stage of development before opening up to trade, sequence and degree of liberalization as well as methodological and measurement issues among others (Utkulu *et al.*, 2004; UNCTAD, 2005; and Morrissey & Mold, 2006). Utkulu *et al*. (2004) argues that strong influence of liberalization on export performance has remained largely unresolved in the literature. Hence, studies on whether trade liberalization leads to positive or negative export performance can be examined by taking into consideration the effects of trade reform, which consists of measures to reduce anti-export bias in addition to traditional model of export supply with explanatory variables such as export prices, domestic and foreign costs, and productive capacity.

2.3. Real Exchange Rate

Government officials, policy makers and academics across the world are concerned about severe consequences of a currency appreciation on exports and domestic production (Yi Lu, & Zhou, 2013). Rise in real exchange rate means domestic products are more expensive compared to those sold overseas, and are therefore less competitive. Specifically, an appreciation of domestic currency, other things remaining the same, will lift domestic real exchange rate, thereby lowering competitiveness and eventually affect export volumes. In addition, a rise in the exchange rate will affect exporters' returns, making exports less profitable, and this too may affect export volumes if firms cut back on, or even stop, exporting.

Balogun (2007) analyzes the impact of exchange rate policies of the West African Monetary Zone (WAMZ) countries on export supply. The model uses nominal exports as dependent variable while nominal exchange rate, and other factors including real domestic income as explanatory variables. The study findings from the total export function of WAMZ countries show that exchange rates have a positive and statistically significant impact on export performance. Similar to the panel regression results, for Gambia and Nigeria, exchange rate is found to have a positive and significant effect on export performance. Contrary to the aggregate pooled results, the results show that export performance of Ghana and Guinea is unaffected by exchange rate changes. Furthermore, contrary to the theory, results from Sierra Leone regression show that exchange rate devaluations have a negative and significant impact on export performance. In a similar study, Mohamad *et al*. (2009) use panel data to examine the role of the real exchange rate and other macroeconomic variables on the export performance of Indonesia, Singapore, Malaysia and Thailand. They point out that appreciation of real exchange rate has a strong negative impact on export performance.

Studies that find positive and significant effect of real exchange rate on export performance, their argument has been that real undervaluation or depreciation increases the profitability of the tradables sector, and leads to an expansion of the share of tradables in domestic value added (Rodrik, 2009), while real appreciation or overvaluation hampers exports and leads to a fall in economic growth (Easterly 2005; Johnson, Ostry, & Subramanian 2007). However, Rodrik (2009) argues that the positive effect of real undervaluation on export expansion is significant only for countries with low per capita income. Rodrik (2009) finds that in developing countries with per capita incomes below $2,500, an increase of 50 percent in real undervaluation is associated with an annual 1.8 percent increase in exports over GDP in the corresponding five-year period. In developing countries with per capita incomes lower than $6,000 and higher than $2,500, real undervaluation has an insignificant contemporaneous effect (Rodrik, 2009).

Other studies, for example, Eichengreen (2008); Haddad & Pancaro (2010) and Eichengreen & Gupta (2013) caution that exchange rate depreciation can be deployed as a policy instrument to spur export and economic growth only in the short term, because a country cannot maintain a depreciated real exchange rate indefinitely. In the same vein, Eichengreen & Gupta (2013) argue that potential costs such as tensions with other countries, accumulation of foreign-exchange reserves on which capital losses occur may come in the form of inflation. Indeed, Rodrik (2009)'s study reveals that, in the long run, the effect of a real exchange rate undervaluation on exports is insignificant. This also implies that for a competitive real exchange rate to succeed in boosting exports it will have to be accompanied by strong institutions, sound macroeconomic policies, and high savings rates, among others (Eichengreen & Gupta, 2013).

2.4. Official Development Assistance

The effectiveness of official development aid (ODA) is the subject of debate although it is a major source of external finance for some developing countries, when measured as a percent of GNI, on a per capita basis or as a proportion of the government budget. Munemo *et al*., (2007) examine the effect of aid-to-GDP ratio and covariates variables on export-to-GDP ratio for developing countries during the 1980-2003 period. They apply FE-IV estimation techniques and reveal mixed empirical findings. Specifically, in unbalanced panel of 84 developing countries, results show a positive, significant but no-linear relationship between exports and aid. However, in a balanced panel of 72 recipient countries this relationship becomes statistically insignificant. Furthermore, running regressions on the 32 low developing countries, they find a positive, significant, and linear relationship

between aid and exports; while for 33 low income African economies the relationship is significant, positive but non-linear. In a similar study, Kang *et al*., (2010) investigate the relationship between exports and aid applying the heterogenous panel vector-autoregression for 30 aid recipient countries for the 1966-2002 period. They find a positive relationship between aid and exports for 13 countries and a negative relationship for 17 countries. When studying the relationship between exports to the world-to-GDP ratio and aid-to-GDP ratio, for the 1979-2004 period and in a sample of 28 countries, Kang *et al*. (2010) find that on average, there is negative and significant but linear relationship between exports and aid.

Easterly (2014) and Moyo (2010) view official aid as creating dependency, fostering corruption, and encouraging currency overvaluation. It also prevents countries from taking advantage of the opportunities provided by the global economy. In this case official assistance is ineffective, and harms poor countries. Studies show that where aid is volatile or unpredictable, recipient governments are less able to plan expenditures effectively. This raises the costs of financial management and can worsen the composition of government spending.

Furthermore, previous studies, including Van Wijnbergen (1986); Younger (1992); White & Wignaraja (1992); and Elbadawi (1999) show that foreign aid can harm export performance of an economy through real exchange rate appreciation. This is due to the fact that; because foreign aid raises the domestic demand for goods and services, it drives up prices in the non-traded sector and causes the real exchange rate to appreciate. Thus, aid inflows indirectly erode the export competitiveness of developing countries by causing real exchange rate appreciation. However, World Bank (2005) argues that the relationship between export performance and foreign aid of a country depends upon several factors such as investment and improvements in trade facilitating infrastructure such as roads, ports, and telecommunications.

Other studies investigate the roles a number of factors such as of policy and institutional quality (Collier & Dollar, 2002); civil conflict and war (Collier & Hoeffler, 2002; Collier, 2006); the nature of the regime in place such as totalitarian and democratic) (Islam, 2003); geographical characteristics of the economy (Collier, 2006); degree of economic openness of the economy (Burnside & Dollar, 2000); degree of vulnerability to external shocks, such as export price shocks and/or extreme weather events (Collier & Dehn, 2001; Guillaumont & Chauvet, 2001; 2002); the degree to which aid is fungible (Petersson, 2004); and the extent to which the scaling-up of aid leads to 'Dutch Disease' (Rajan & Subramaniam, 2005) on export performance. This implies that the effect of ODA on export performance in a recipient country depends on other factors. Indeed, previous research finds that aid is most effective in those countries with strong policies and institutions.

2.5. Inflation

Increases inflation in the exporting economy than importing economy may cause exports to become more expensive, resulting in a decline in exports. Higher domestic inflation leads to higher prices for exported commodities and a decrease in exports as foreign consumers substitute in favour of lower-priced alternatives produced within their own country or imported from elsewhere. Contrary, inflation may result in an increase in imports due to the fact that it makes commodities produced abroad relatively cheaper resulting in increased consumption of imported commodities. In addition, unpredictable inflation may lead to an increased instability in currency exchange prices which in turn has a negative impact on trade. Indeed, current account deficits resulting from a decrease in exports and an increase in imports, may eventually lead to currency depreciation.

2.6. Indirect Taxes

The impact of indirect taxes on exports has recently been considered. Desai & Hines (2005) examine the impact of VAT on exports. The study findings for high income countries however suggest, somewhat mixed conclusions. On one hand, in the presence of fixed effects, a simple dummy representing the presence or absence of a VAT has no impact on export. On the other hand, the share of VAT in total tax revenue has a significant and negative effect on export. In another study, Slemrod (2004) finds a significant positive association between corporate tax revenues relative to GDP and trade intensity for about 100 countries at different levels of income.

Generally, the potential impact of indirect domestic taxes on export performance has become more controversial. Studies show that a fully anticipated increase in the rate of VAT, for example, has effects akin to those of an increase in the rate of residence-based taxation, since it lowers the real return to saving. Consumers would be expected to bring consumption forward to avoid the higher tax in the second period, so that net exports decrease in the first period and increase in the second.

Studies by Feldstein & Krugman (1990), and Keen & Syed (2006) point out that VAT tends to reduce the size of the tradable sector and hence export intensity. This is due to the fact that nontradables such as foodstuffs are subject to a relatively low tax rate or are exempted on equity grounds. As a result production and consumption shift from tradable products to nontradable products.

2.7. Summary of the Literature Survey and Gaps from the Studies

Despite the attention that export performance has attracted in the literature, it has remained one of the least understood areas of the world economy. In particular, the bases of the controversy have been on the importance of complementary reforms, stage of development before opening up to trade, sequence and degree of liberalization. It is evident from these studies that in order to enhance export capacity, countries have to put in place appropriate policies and good strategies that will address the supply side constraints. Most studies undertaken so far to analyze determinants of export performance have dealt with either supply side or demand side factors independently applying across country regression analysis methodology. Unfortunately, cross country studies in this context have heterogeneous results which lack generality. They fail to explain the reasons for a number of exceptional cases. These can be well explained using a country specific study. This study intends to close methodological gap evident in previous studies.

3. Methodology

3.1. Estimation Model and Data

A framework of analysis to determine the effects of various factors on export performance in Tanzania is formulated by considering all those factors that can potentially play a meaningful role in the determination of exports in Tanzania. Export growth is basically determined by external factors, for this real exchange rate and official development assistance are included in the regression model. However, exports are also affected by domestic factors. In this respect, real per capita GDP, trade liberalization or degree of openness, VAT dummy, and inflation rate are also explicitly included in the estimation model. Specified equation for export performance is as follows

$$EX = f\left(pGDP, \pi, TL, RER, ODA, VAT\right) \quad (1)$$

The variables appearing in the equation (1) are defined as follows

EX	=	Total exports, percent of GDP.
$pGDP$	=	Real GDP divided by the population.
π	=	Inflation rate, measured as the growth rate of consumer price index as a proxy of macroeconomic stability.
TL	=	Trade Liberalization, measured as trade-to-GDP ratio.
RER	=	Real exchange rate. It is obtained by multiplying the nominal exchange rate by US CPI and divided by domestic CPI,
ODA	=	Official development assistance, percent of GDP.
VAT	=	$\begin{cases} 0 \ for \ t = 1966-1997 \\ 1 \ for \ t = 1998-2015 \end{cases}$

From equation (1), a log-linear functional form is adopted to reduce the possibility or severity of heterogeneity and directly obtain export elasticities with respect to regressors. The regression model is thus of the form

$$\ln EX_t = \xi_0 + \xi_1 \ln pGDP_t + \xi_2 \pi_t + \xi_3 \ln TL_t + \xi_4 \ln RER_t + \xi_5 \ln ODA_t + \xi_6 VAT + \varepsilon_t \quad (2)$$

where

$\xi_0, \xi_1, .., \xi_6$	=	Parameters to be estimated
$t = 1, ...T$	=	The period of time, years
ε	=	Error term

The rationale for including different variables in the savings function is summarized as follows. Export performance *(EX)* may be affected by the producers' production capacity. Increase in the per capita GDP *(pGDP)* is an indicator of future potential and sustainability of production level. Majeed & Ahmad (2006) argue that growth is more valid determinant of exports as compare to GDP because it measures the sustainability of output levels. *pGDP* is expected to have a positive impact on exports performance. The share of trade in GDP is used as a proxy for trade liberalization *(TL).* Theoretically trade liberalization is expected to have a positive impact on export performance. More openness may result into less distorted prices and less protectionism which reduces anti-export bias and results in a strong supply response of the export sector.

Since nontradables are often subject to a relatively low tax rate, indirect taxes *(VAT)* tend to decrease the size of the tradable sector and hence export intensity, with production and consumption shifting to nontradables (Feldstein & Krugman, 1990). Thus, the effect of indirect taxes on exports is expected to be negative because it has an adverse impact on production decisions and may reduce tradable sector. However, it also has the possibility of positive effect on exports due to fiscal incentives by government. Specifically, if government provides tax exemptions for the expansion of exports sector, higher rate of indirect taxes can have the negative effect on domestic demand resulting in exportable surplus (Majeed & Ahmad, 2006). VAT was introduced in Tanzania in 1998. Like indirect taxes, inflation rate (π) is expected to have a negative effect on export expansion. One of the alleged costs of inflation is said to be the loss of competitiveness in international markets if the rate of prices is higher in the domestic country than in the rest of the world (Prachowny, 1970). In other words, inflation makes goods produced domestically relatively more expensive, resulting in a decrease in exports.

Other factors such as official development assistance (*ODA*) and real exchange rate (*RER*) may also affect export performance. Official development assistance is expected to have a positive effect on export performance when it is focused on

reducing the costs of trading through improvements in infrastructure, trade facilitation, trade-related public institutions (such as customs, standards administration, and export promotion), and polices (including eliminating policy barriers to competition). However, countries receiving substantial aid in less well-managed contexts suffer the negative effects of lower trade through the exchange rate channel (OECD, WTO, 2013). Indeed, Munemo *et al*. (2007)'s study for developing countries reveals that large amount of foreign aid adversely affects export performance of developing countries but the effect is not clear for smaller amounts. The importance of real exchange rate in explaining export performance is also discussed in the literature, and the argument has been that a fall in the relative domestic prices due to exchange rate depreciation makes exports cheaper in international markets resulting in increased demand for exports. Therefore real exchange rate and export performance are expected to have a positive correlation.

The data for the variables which are included the estimation model (real economic growth, real exchange rate, trade as a percent of GDP (trade liberalization), official development assistance, indirect taxes and inflation rate) are obtained from World Development Indicators, World Bank, World Trade Organization (WTO), and Bank of Tanzania.

3.2. Estimation Techniques

The ordinary least squares method (OLS) is used for estimation. OLS is simple and widely used in empirical work. If the model's error term is normally, independently and identically distributed (n.i.i.d.), OLS yields the most efficient unbiased estimators for the model's coefficients, i.e. no other technique can produce unbiased slope parameter estimators with lower standard errors (Ramírez et al., 2002). The co-integration and error-correction methodology (ECM) is employed. The ECM helps minimizing the possibility of estimating spurious relations, while at the same time retaining long-run information in the data.

3.3. Granger Causality Test

Granger Causality test is one of the methods that are used to test a lagged relationship between two variables. This test also gives information about the short-term relationship between the variables. The test is used to determine the direction of causality between variables in the short-run using the F-statistic and in the long-run using the t-statistic. The optimal lag length for the VAR model is determined by using the Akaike Information Criterion (AIC) and the Schwartz Bayesian Information Criterion (SBIC). Basing on these criteria, VAR (3) is selected. According to this test, a variable (economic growth) is said to Granger cause another variable (exports) if past and present values of economic growth help to predict exports. The VAR (3) model is estimated basing on the following pair of regression equations (3) and (4) with stationary variables.

$$\Delta EX_t = \alpha + \sum_{j=1}^{3} \lambda_j \Delta EX_{t-j} + \sum_{j=1}^{3} \delta_j \Delta pGDP_{t-j} + \varepsilon_{1t} \quad (3)$$

$$\Delta GR_t = \beta + \sum_{j=1}^{3} \gamma_j \Delta EX_{t-j} + \sum_{j=1}^{3} \varphi_j \Delta pGDP_{t-j} + \varepsilon_{2t} \quad (4)$$

where

α and β = Intercepts

$\lambda_j, \delta_j, \gamma_j$ and φ_j Show the contributions of each lagged observation to the predicted values of exports-to-GDP ratio *(EX)* and real per capita GDP *(pGDP)*.

ε_{1t} and ε_{2t} = Residuals (predicted errors) for each series

Assuming that ε_{1t} and ε_{2t} are serially uncorrelated, then, to test for the causality, the joint hypotheses $\delta_j = 0 \; for \; j = 1,\ldots,m$ and $\gamma_j = 0 \; for \; j = 1,\ldots,m$ is simply tested. The test statistics follow a Chi-squared distribution with $(k-m)$ degrees of freedom. The variable $pGDP$ is said not to Granger-cause the variable EX if all the coefficients of lagged $pGDP$ in equation (3) are not significantly different from zero, because it implies that the history of $pGDP$ does not improve the prediction of EX . If none of the null hypotheses is rejected, it means we accept the claims that $pGDP$ does not Granger cause EX and EX also does not Granger cause $pGDP$. This indicates that the two variables are independent of each other. If all hypotheses are rejected, there is bi-directional causality between $pGDP$ and EX

3.4. Time Series Characteristics of the Data

3.4.1. Unit Root Test

The use of time series variables in estimating econometric models requires that a stochastic process generating the data series be stationary. The distinction between whether the levels or differences of a series is stationary leads to substantially different conclusions and hence, in principle, it is important to test the order of integration of each variable in a model, to establish whether it is non-stationary and how many times the variable needs to be differenced to derive stationary series (Johansein *et a.l,* 2010). Engle & Granger (1987), define a non-stationary time series to be integrated of order *d* if it achieves stationarity after being differentiated *d* times. This notion is usually denoted by X_t ~*I(d).* The null hypothesis of the unit root implies non-stationarity, such that if the null hypothesis is rejected then the series is stationary. Therefore no differencing in the series is necessary to induce stationarity.

There are several ways of testing for the presence of unit root. For the case of this study, all the series will be tested for the probable order of difference stationarity by using the augmented Dickey-Fuller (ADF). The idea behind the ADF unit root tests is that it makes a parametric correlation for higher-order correlation by assuming that the series follows autoregressive process and adjusting the test methodology. In addition, the ADF test controls for higher-order correlation by adding lagged difference terms of the dependent variable to the right-hand side of the regression.

3.4.2 Testing Cointegration

Co-integration test provides the basis for tracing the long-term relationship between the variables. Two or more variables are said to be co-integrated if their linear combination is integrated to any order less than '*d*'. There are two procedures that are popularly used to identify and estimate the cointegrating vectors and the short run adjustment parameters. These are Granger and Engle two-step estimation procedure and the Johansen procedure. The former procedure involves normalizing the cointerating vector on one of the variables, which makes the assumption that the corresponding element of the cointegrating vector is non-zero. The Johansen procedure is a multivariate approach, the estimation of which would consume a lot of degree of freedom. In this study long run relationship among the variables will be tested using the Johansen and Juselius cointegration technique. The theory of co-integration put forward by Johansen & Juselius (1990) indicates that the maximum likelihood method is more appropriate in a multivariate system.

4. Empirical Results and Discussion

4.1. Descriptive Statistics

Descriptive analysis is conducted to ascertain the statistical properties of the variables. Table 3 presents descriptive statistics of the variables of the estimation model. The descriptive statistics suggest that, the rate of inflation, official development assistance, trade liberalization or degree of openness, and real exchange rate are approximately normally distributed because their respective skewness is less than 0.5 in absolute values. In the same line, the probabilities of these variables and the regressand, export, fail to reject the null hypothesis of normal distribution at 5 percent level of significance. However, both skewness and probabilities of GDP reject the null hypothesis of normal distribution. The failure of the normality test is addressed by transforming all variables, except the inflation rate, by using a natural logarithm operator (Stock & Watson, 2003; Murkhejee, White & Wuyts, 2003). The Jarque-Bera (JB) statistics test is used to test for normality of the residuals and the results are reported in the empirical findings section.

Table 4 presents the correlation matrix of the variables of the regression model. It suggests that trade liberalization, real per capita GDP, and real exchange rate are positively correlated with export, but negatively correlated with inflation, official development assistance and VAT dummy. The correlation matrix also shows that the pair-wise correlations between regressors are not quite high (i.e. less than 0.8), indicating that multicollinearity is not a serious problem. Generally, as reported in section 4.3, the regression model passed all specification tests including heteroskedasticity, Ramsey's omitted variable tests and serial correlation or autocorrelationas.

Table 3. *Descriptive Data Analysis*

	EX	*pGDP*	π	*ODA*	*TL*	*RER*	*VAT*
Mean	12.142	289318.6	16.414	32.984	34.568	1073.827	0.360
Median	11.404	264798.5	12.750	33.387	35.658	1183.810	0.000
Maximum	24.733	401822.8	36.100	68.328	51.262	1838.130	1.000
Minimum	3.801	240247.0	3.500	2.859	17.224	331.780	0.000
Std. Dev.	5.166	53369.74	10.408	18.225	9.409	420.518	0.484
Skewness	0.696	1.272	0.469	-0.017	-0.242	-0.120	0.583
Kurtosis	2.696	3.053	1.755	2.398	1.941	1.720	1.340
Jarque-Bera	4.230	13.502	5.065	0.755	2.824	3.528	8.574
Probability	0.120	0.001	0.079	0.685	0.243	0.171	0.013
Sum	607.119	14465929	820.700	1649.222	1728.430	53691.36	18.000
Sum Sq. Dev.	1307.842	1.40E+11	5308.540	16276.00	4338.209	8664933.	11.520
Observations	*50*	*50*	*50*	*50*	*50*	*50*	*50*

Sample 1966-2015

Source: Computed Using Data from WDI, Bank of Tanzania, Quarterly Report and Annual Report (Various Issues)

Table 4. *Correlation Matrix of the Variables*

	Ln(EX)	*Ln(pGDP)*	π	*Ln(ODA)*	*Ln(TL)*	*Ln(RER)*	*VAT*
Ln(EX)	1.000	0.169	-0.477	-0.615	0.848	0.011	-0.085
Ln(pGDP)	0.169	1.000	-0.504	0.519	0.159	0.450	0.788
π	-0.477	-0.504	1.000	0.120	-0.193	-0.258	-0.615
Ln(ODA)	-0.615	0.519	0.120	1.000	-0.407	0.424	0.522
Ln(TL)	0.848	0.159	-0.193	-0.407	1.000	0.177	-0.219
Ln(RER)	0.011	0.450	-0.258	0.424	0.177	1.000	0.540
VAT	-0.085	0.788	-0.615	0.522	-0.219	0.540037	1.000

Source: Computed Using Data from WDI, Bank of Tanzania, Quarterly Report and Annual Report (Various Issues)

4.2. Time Series Properties of the Data

4.2.1. Stationarity Tests

The Augmented Dickey-Fuller (ADF) method is conducted to check for a unit root for all variables in both levels and first differences. Unit root test results are reported in Table 5, which indicate that the hypothesis of a unit root cannot be rejected in all variables in levels. It is therefore concluded that all variables are non-stationary at their levels. However, the hypothesis of a unit root is rejected in first differences. The unit root test results for the first difference are also reported in Table 5. This also suggests that, further estimations could be carried while in first difference in order to avoid spurious correlation.

4.2.2. Cointegration Test Results

Having established that the variables are non-stationary at level but when integrated of the same order (i.e. first difference) they become stationary, the next procedure is to test the possibility of long run relationship among the variables used in the regression model. Trace statistic is used to determine the presence of co-integration between variables. Table 6 reports the results of the Johansen test for cointegration. On the basis of the trace statistic value test, the null hypothesis of no cointegration $(r = 0)$ is rejected at the 5 percent level of significance in favour of the specific alternative, namely that there is at most three cointegrating vector $(r = 3)$[1]. The implication is that a linear combination of all the seven series is found to be stationary and that there is a stable long-run relationship between the series.

Table 5. *ADF Unit Root Tests for Stationarity: Level Variables an First Difference,* Δ

	Levels		First Difference, Δ	
Optimal Lag = 1	Constant $\alpha_1 = 0$	Constant and Trend $\alpha_1 = \alpha_2 = 0$	Constant $\alpha_1 = 0$	Constant and Trend $\alpha_1 = \alpha_2 = 0$
Ln(*EX*)	-2.219	-1.905	-8.050	-8.205
Ln(*pGDP*)	-0.082	-1.002	-3.315	-3.509
π_t	-2.014	-2.217	-7.897	-7.889
Ln(*ODA*)	-2532	-1.722	-6.435	-6.795
Ln(*TL*)	-2.018	-1.893	-5.645	-5.611
Ln(*RER*)	-1.136	-1.765	-6.059	-5.998
5% Critical Value	-2.922	-3.504	-2.924	-3.506

Sample: 1966-2015

Source: Computed Using Data from WDI, Bank of Tanzania, Quarterly Report and Annual Report (Various Issues)

Table 6. *Johansen Test for Cointegration*

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.619759	131.0244	95.75366	0.0000
At most 1 *	0.499550	84.61079	69.81889	0.0021
At most 2 *	0.437332	51.38288	47.85613	0.0225
At most 3	0.299883	23.77977	29.79707	0.2099
At most 4	0.127362	6.667422	15.49471	0.6166
At most 5	0.002667	0.128164	3.841466	0.7203

Notes: Trace test indicates 3 cointegrating eqn(s) at the 0.05 level; * denotes rejection of the hypothesis at the 0.05 level; **MacKinnon-Haug-Michelis (1999) p-values

[1] 10 This is because the first significant value, where trace statistic is less than critical value at 5% level, was found at maximum rank of three.

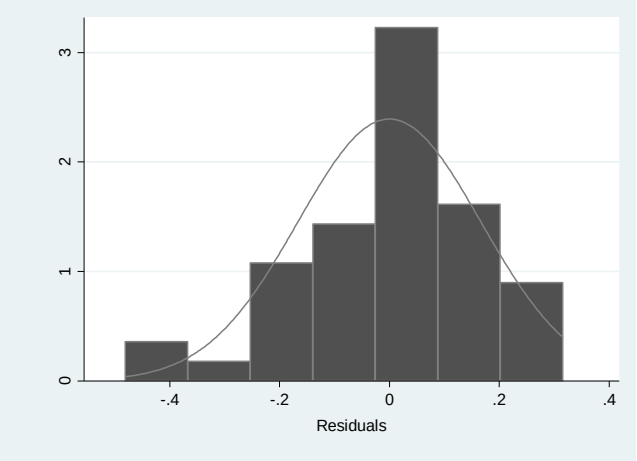
4.3. Estimation Results

Estimation results presented in Table 7 indicates that the F-statistic is significant at 1 percent, rejecting the null hypothesis that all the explanatory variables have coefficients not different from zero. In other words, F-statistic of 37.8 suggests that explanatory variables jointly affect exports. The Durbin-Watson statistic *(DW)* of 2.0 fails to reject the null hypothesis of no serial correlation in the regression model. Moreover, adjusted R-squared, which measures the goodness of fit of the variables, is sufficiently large; suggesting that about 82 percent of the variations in export is jointly explained by the explanatory variables. The diagnostic tests show that the error correction model does not suffer from non-normality. The histogram and Jarque-Bera normality test (Figure 1) suggest that the residuals of the model are normally distributed. Also, in the diagnostic tests, the Breusch-Godfrey serial correlation Lagrange Multiplier (LM) and Correlogram Tests confirm that the residual terms in the model are serially independent (Tables 8 & 9). In the same vein, the ARCH LM test strongly suggests that there exists no heteroscedasticity in the residual terms of the model (Table 8). Moreover, Ramsey RESET test suggests that the model is specified correctly (Table 8). The fact that the error correction model passes all the diagnostic tests, the findings are reliable.

Table 7. *Estimation Results, Dependent Variable, ΔLn(EX)*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.013	0.014	0.914	0.365
ΔLn(pGDP)	2.081***	0.259	8.031	0.000
$\Delta \pi_t$	-0.012***	0.004	-2.702	0.010
ΔLn(ODA)	-0.364***	0.049	-7.487	0.000
ΔLn *(TL)*	0.942***	0.091	10.403	0.000
ΔLn(RER)	0.285***	0.071	4.030	0.000
VAT	-0.580***	0.115	-5.022	0.000
ECM_{t-1}	-0.474***	0.144	-3.283	0.002
R-squared	0.844	F-statistic		37.815
Adjusted R-squared	0.821	Prob(F-statistic)		0.000
Durbin-Watson stat	2.058			

***Significant at 1percent.



Series: Residuals
Sample: 1968 201

Median	0.013
Maximum	0.382
Minimum	-0.541
Std. Dev.	0.186
Skewness	-0.509
Kurtosis	3.526
Jarque-Bera	2.737
Probability	0.254

Figure 1. *Normality Test of the Residuals: Histogram*

Notes: The Normality test indicates that residuals are normally distributed as we unable to reject the null hypothesis of normality using Jacque-Bera at 5 percent.

Table 8. *Heteroskedasticity, Serial Correlation and Ramsey RESET Tests*

Heteroskedasticity test: ARCH			
F-statistic	2.031	Prob.	0.143
Obs*R-squared	3.973	Prob. Chi-Square	0.137
Breusch-Godfrey serial correlation LM test:			
F-statistic	0.406	Prob.	0.668
Obs*R-squared	0.976	Prob. Chi-Square	0.613
Ramsey RESET test			
t-statistic	0.356	Probability	0.723
F-statistic	0.126	Probability	0.724

Sample: 1966-2015

Table 9. *Correlogram Test for Export Model*

	AC	PAC	Q-Stat	Prob
1	-0.031	-0.031	0.0506	0.822
2	0.109	0.108	0.6782	0.712
3	0.079	0.086	1.0136	0.798
4	-0.001	-0.008	1.0137	0.908
5	-0.145	-0.166	2.2035	0.820
6	0.100	0.087	2.7865	0.835
7	-0.140	-0.102	3.9520	0.785
8	-0.152	-0.162	5.3520	0.719
9	0.026	0.030	5.3939	0.799
10	-0.186	-0.163	7.6223	0.666
11	-0.277	-0.274	12.674	0.315
12	-0.015	-0.061	12.690	0.392

Notes: The test for serial correlation using Correlogram indicates that there is no serial correlation in the model since none of the lag is found to be significant at 5 percent level.

The empirical results show that the coefficient of the error- correction term, ECT_{t-1}, for the estimated export equation is both statistically significant and negative, implying that, it will rightly act to correct past deviations from the long-run equilibrium. The coefficient of -0.47 denotes that 47 percent of any past deviations will be corrected in the current period.

Results for export function indicate that trade liberalization proxied by share of trade in GDP is found to have a positive and significant impact on exports. A 1 percent increase in trade liberalization may lead a 0.94 percent increase in exports, other factors being equal. The positive impact of trade liberalization on export may be due to the fact that increased trade results in more access to imported capital, knowledge, avoids distortions in the economy and makes capital available to export sector. This result is consistent with the studies by Thomas *et al*, (1991), Weiss (1992), Joshi & Little (1996), Helleiner (1994), and Ahmed (2000) which confirm that countries that embark on liberalization programmes improve their export performance.

The sign of the coefficient of per capita GDP is positive, as expected, and statistically significant at 1 percent level. This supports the argument that, increase in per capita GDP is an indicator of future potential and sustainability of production level. In contrast, the coefficient of VAT dummy is found to be negative and statistically significant at 1 percent level implying that reliance on VAT is associated with few exports. In theory, VAT is thought to encourage exports since exports are exempted from tax, however, VAT tend to be imposed more on traded goods that on non traded goods. This finding is similar to that of Keen & Syed (2006) and Desai & Hines (2005). Indeed, Desai & Hines (2005) reveal that countries using VATs have one-third fewer exports than do countries not using VATs. However, it is contrary to Majeed & Ahmad (2006) for Pakistan.

As it was expected, the coefficient of real exchange rate is positive and statistically significant at 1 percent level. In fact, real exchange rate and trade liberalization turn out to be the most significant variables affecting export performance in Tanzania. These empirical estimates are consistent with theory as well as empirical evidence found in other studies such as Majeed & Ahmad (2006) and Sharma (2001). Contrary to expectations, however, the coefficient of official development assistance is found to be negative and significant at 1 percent level. However, these result is consistent with Munemo *et al*. (2007)'s study for developing countries which reveals that large amount of foreign aid adversely affects export performance of developing countries but the effect is not clear for smaller amounts. The coefficient of inflation is negative and statistically significant at 1 percent level. High inflation can affect export through its influence on interest rate and exchange rate and by having direct impact on inputs cost. This high cost of production can have a substantial impact on competitiveness of exports on the world market.

4.3 Causality between Export and Economic growth

It is important to determine the direction of causality between export and per capita GDP for policy purposes due to the fact that literature review has a contradicting result on the relationship between export and economic growth. The VAR (3) model is used to determine the direction of causality. The results are presented in Table 9. From Table 10, we fail to reject the null hypothesis that export does not Granger cause real per capita GDP at 5 percent level of significance but we reject the null hypothesis that real per capita GDP does not Granger cause export. That means real per capita GDP growth causes export performance but export performance does not cause real GDP growth rate.

Table 10. *Pairwise Granger Causality Tests (Lags: 3)*

Null Hypothesis:	Obs	F-Statistic	Prob.	Results
EX does not Granger Cause *pGDP*	47	0.83867	0.5317	Do not reject H_0
pGDP does not Granger Cause *EX*		2.49053	0.0502	Reject H_0

Sample 1966-2015

Notes: For F-statistics, probabilities that are less than 5% level null hypotheses are rejected at that level.

5. Conclusions

This study aimed at examining the determinants of export performance in Tanzania. Analysis of the determinants of export performance has been made using time series data for the 1966-2015 period. The impact of real per capita GDP, inflation rate, measured as the growth rate of consumer price index as a proxy of macroeconomic stability, VAT dummy, trade liberalization, proxied by share of trade in GDP, real exchange rate, and official development assistance on total export as a percent of GDP has been analyzed.

The model estimated was found to have high adjusted R-squared, significant F-values, free from collinearity and serial correlation. The residuals from the model were also found to follow normal distribution which signifies the use of OLS in the estimation. The cointegration test confirmed the existence of long run equilibrium relationship between exports and its determinants. The Granger causality test gives evidence that there exists causality running from real GDP growth rate to exports. The results showed that all the variables considered in the regression were found to be significant at 1 percent level.

Some major recommendations for policy can be drawn from the analysis. Policies geared towards improvement in real per capita GDP, trade liberalization

and economic stability would improve export performance. That can be achieved by improving the economic base by focusing on key sectors such as agriculture in which a large part of labour force is involved. Other key sectors such as tourism and natural resource could act as the key stimuli to the growth of the economy. Furthermore, a stable exchange rate policy has to be ensured in order to avoid the exchange rate risks associated with the assets, import prices and profit considerations of direct investor in Tanzania.

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