Trade liberalization and export performance in Tanzanian cashew nuts

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Abstract

This study investigates the impact of trade liberalization on export performance on cashew nuts in Tanzania, employ time series data from 1970 to 2010. This paper employed both econometrics and non parametric techniques to estimate the impact of trade liberalization on export performance on cashew nuts. Under econometrics techniques we applied cointegration technique, error correction modeling approach and trend analysis. Unit root test reveals that, all variables are non stationary at level and stationary at first difference respectively. Also Engle–Granger test for cointegration and Johansen test found that variables are cointegrated. This implies that cashew nuts export earnings; world price and real exchange rate have long run relationship (equilibrium). Empirical results from error correction modeling approach found an error term has a correct sign and statistically significant at 5 percent level. This means that world price and real exchange rate are adjusting towards long run equilibrium. The coefficient of error term of (-0.361547)   indicates that variables are adjusting to long run equilibrium at the speed of 36 percent per annum. The adjustment of variables suggests the existence of long relationship amongst the variables under study. World price found with a positive sign and statistically significant at 5 percent as such world price is an important determinant of cashew nuts export earnings in Tanzania. On other hand real exchange rate found with a correct sign but statistically insignificant. Trend analysis of cashew nuts export earnings found to be positive means that, it is improving over time. Non parametric technique reveals that trade liberalization is a significant strategy in Tanzania since its coefficient is statistically significant at 5 percent level.

Keywords: Trade liberalization, Export performance, Cashew nuts and export growth

1. Introduction

The relation between trade liberalization and export performance in the field of economics of globalization is still a controversial issue. There several studies undertaken to examine the impact of trade liberalization on export performance on liberalized countries and revealed mixed findings. Some studies found positive relationship between trade liberalization and export performance whereas others find opposite results, which are negative relation between trade liberalization and export performance (Ahmed, 2000, Shafaeddin, 1995). The notion of trade liberalization was expounded by neo-liberal economists who were against the inward looking strategy under the name of import substitution industry strategy. Neo-liberals economists such as Heller, Rodrick and Taylor in 1990s as well as Krueger (1978) they asserted that, trade liberalization is an important component for economic performance of the liberalized countries. Krueger (1978) and Jenkins (1997) they pointed out that trade liberalization improves the export performance, increase the import capacity of country concern, relaxing the balance of payments constraints, increasing productivity growth rate and improves the economic growth at large. Other authors like Thirlwall, (2000) and Nishimizu and Robinson, (1984) cited in Jenkins (1997) also stressed that, trade liberalization is a corner stone towards economic development of many developing countries and this can be achieved through increasing the productivity via competition, improves the access to imported inputs which in turn maximizes the resources utilization at optimal level. On top of that, trade liberalization expected to widen the market scope as such attract the economies of scale of liberalized countries.
Again World Development Report of 1987 and Jenkins (1997) expressed that, trade liberalization reduces the problems of black marketing activities in the liberalized countries such as unproductive and illegal economic activities which are under taken by people due to government intervention. Furthermore, trade liberalization creates more employment opportunities in the country undertaking such a path that is trade liberalization strategy. Export performance due to trade liberalization creates spillover effect to other sectors like non exporting sectors as well as stimulates the industrialization process in the country concern. Krueger (1998) affirmed that, trade liberalization also relaxes the import restrictions and import quotas among trading partners as such it enhances

the country's capacity to import the capital inputs which are essential components in the economy.

Developing countries in 1980s Tanzania being among were witnessed a decade of serious economic crisis. In that decade international trade experienced severe declining of terms of trade, recession in the industrial economies as well as heavily debt-servicing burdens. With these incidences international trade performance deteriorated tremendously. For instance, Sub Saharan African countries, export share in the world market decreased dramatically, in 1980s world export share falls from 2.5 percent in 1980 to 1.0 percent in 1990 (Kirkpatrick and Weiss, 1995). Following that economic crisis in 1980s, many developing countries and Tanzania in particular liberalized their domestic trade policy. Tanzania liberalized her trade in 1986 and agricultural products being among under the name of economic recovery programme with aim of influencing significant structural changes in domestic production and external trade at large.   Despite of the weakness mentioned above, Tanzania in particular still continued to depend heavily on agricultural products for export and many people are employed in agricultural sector for livelihoods. Agricultural sector is key sector in alleviating poverty in Tanzania. This sector has significant contributions in economic growth, export share, employments and providing raw materials to other sectors such as industries. Overall this sector contribute large share to Tanzania Gross Domestic Product. Rweyemamu, (2003) pointed out that, agricultural sector currently its contribution to Gross Domestic Product has been declining over time. For instance from 1999 to 2000 the share decreases from 48.9 percent to 48.2 percent respectively. Whereas in 2001 to 2002 decreases from 48.1 percent to 47.5 percent respectively.

1.1 Cashew nuts status in Tanzania

Cashew nuts production in Tanzania is of great importance to the contribution in the national economy as compared with other cash crops like cotton, sisal, coffee and tea but to mention a few. Jamal (2009) pointed out that; about 280000 households are engaged in the cashew nuts production. Main areas which are involved in cashew nuts production are mostly coastal regions which include Mtwara, Tanga, Pwani and Ruvuma. Generally, Tanzania is among of the large producers of cashew nuts in the world. Tanzania is ranked the fourth in the world cashew nuts production preceded by India, Brazil and Vietnam. FAO (2004) cited in Jamal (2009) pointed out that, India, Nigeria, Brazil and Tanzania are the major four world cashew nuts producers with the 460,000, 186,000, 178,000 and 123,000 metric tons respectively. Tanzania is among of the larger exporters of raw cashew nuts, accounting for an average of 44 percent of export from sub Saharan African countries, and 28 percent of raw cashew nuts exports globally (Jamal, 2009). Cashew nuts have significant contribution to foreign exchange earnings in Tanzanian economy. In 1999 cashew nuts contributed 18 percent of Tanzania's merchandise export earnings. In 2000/2001 cashew nut contributed remarkable foreign exchange earnings in Tanzanian economy and was ranked the second after the mining sector in foreign exchange earnings (Jamal, 2009). However, cashew nut contribution to the economy currently has been declining over time especially from mid 1990s. For instance, in 2005 its contribution declined tremendously as compared to other cash crops like cotton, tobacco and coffee. In 2008 cashew nuts contributed only 1.5 percent of foreign earnings to the economy as compared to 4.3 percent, 4.0 percent and 3.6 percent for cotton, tobacco and coffee respectively (Jamal, 2009).

Concurrently, Economic survey (2002) described agricultural sector as follows: Overall performance of the agricultural sector is rather unimpressive; judging from the sectors, recent performance relative to growth targets for effective poverty eradication is not alarming well. Agriculture gross domestic product has grown at 3.3 percent per year since 1985. The six main food crops have grown at 3.5 percent per year, while export crops have grown at 5.4 percent. It is of interest to note that, cashew nuts export value had different trend in recent years as compared with other cash crops like cotton, coffee and tea. For instance in 2010 cashew nuts experienced an increase in value of its export from USD 68.6 million in 2009 to USD 96.9 million in 2010 which was about 41.3 percent increase in export in that year. Cashew nuts export volume increased from 95,500 tons in 2009 to 125,000 tons in 2010. Together with volume increase, also the unit price of cashew nuts in the world market increased significantly in 2010. The price increased from USD 718.2 per ton in 2009 to USD 775.3 per ton in 2010 respectively, which was equivalent to 7.9 percent increase in price. Generally, changes in productivity in agricultural sector show a stagnant trend over time as such deterred the export performance at large.

Therefore, looking at the importance of agricultural sector in Tanzania, this study intends to examine the impact of trade liberalization on export performance on cashew nuts in Tanzania. This is done purposely in order to know the situations before and after liberalization of agricultural crops particularly cashew nuts. It is expected that if Tanzania will improve export performance it will stimulate the economic growth, import and productivity growth, balance of payments and economy at large.

2. Literature

2.1 Definitions of terms

There are different definitions of terms, for instance Kirkpatric and Weiss (1995) defined trade liberalization as a movement in the relative domestic price of traded goods towards international price levels. Such a movement

contributes in the improvement of trade performance by altering existing composition of production in a liberalized country as well as promoting the growth of exports. On other hand, Zulfiqar and Kausar (2012:32) defined trade liberalization as the reduction and gradual elimination of tariff and non tariff trade barriers which may obstruct the free flow of goods and service across national borders. Again trade liberalization understood as the removal or reduction of trade barriers which prevents smooth trade transactions of goods and services among trade partners. Tariff and non tariff are among of the trade barriers which restrict free movement of goods and services across the borders. Non tariffs in particular include export duties, export subsidies and import quotas but to mention a few. Having seen the concept of trade liberalization, it is worthwhile to know about export performance as well. Export performance described into two main parts which are export and performance. The term export is defined as international marketing related decisions and activities of the internationally active firms whereas the term performance defined as the act of carrying out or accomplishing something like task or action in a particular area (Cavugil and Neviv, 1981 cited in Allaro , 2010:4). Combining these two words brings into export performance, in recent studies in economics, the term export performance has been defined in various ways and no clear concession about its unifying principle regarding to its common definition. However, the term export performance in recent context is defined as the success or failure of the efforts of a nation to sell domestically produced goods and services in other nations markets (Zou and stan, 1998 cited in Allaro 2010:4) or the composite outcome of a nation's international sales (Shoham, 1996 cited in Allaro 2010:4), and the third definition of export performance is the three sub-dimensions which encompasses sales, profit and growth (Madsen, 1987 cited in Allaro 2010:4). It is important to stress that, export performance also is described in form of objective terms like sales, profits popularly known as marketing measures and subjective measures like distributor or customer satisfaction (Allaro, 2010).

2.2 Empirical review

In this research topic so far there a lot of literatures regarding trade liberalization and export performance. These studies have been conducted both in developed and developing countries to ascertain the argument that trade liberalization improve export performance of the liberalized countries (Jenkins, 1997, Hadas et al. 2001 and Mold and Prizzon 2010). Many literatures have shown that, trade liberalization in liberalized countries increased the export performance. For instance a study by Thrilwall (2000) pointed out that, country which liberalized trade, normally resources are shifted from non traded sector to export sector. Furthermore, export performances of country are influenced by economies of scale attained from trade partners in which cost of production tend to fall as more products are produced. Other studies like Kirkpatrick and Weiss (1995), McKay et al. (1997), Ahmed (2000), Were et al. (2002) Santos-Paulino (2003), Malik, (2007), Yeboah (2008), and Tamini et al. (2012) but to mention a few have employed a range of techniques like cointagration analysis using autoregressive distributed lag (ARDL), residual analysis or vector error correction model (VECM), cross section data analysis, analytical studies and panel data but all these techniques they came out with different results depending on the country under study. For instance, Cherkaoui and Reza (2001) Santos-Paulino (2003) and Pacheco-López (2005) used Cointegration analysis using Auto Regressive Distribute Lag technique to examine the long run and short run relationship between trade liberalization and export performance in developing countries whereas Ahmed (2000) employed vector autoregressive (VAR) model, their empirical results reveal that, there were long run equilibrium relationship between trade liberalization and export performance in countries understudy which includes North African countries particularly Tunisia, Morocco and Algeria, Dominican Republic, Mexico and Bangladesh respectively.

Looking separately, Ahmed (2000) employed cointegration technique in Bangladesh and vector autoregressive (VAR) and Error Correction Model (ECM) to estimate the impact of trade liberalization on export performance in Bangladesh from 1974 to 1995. In that study, real quantity of aggregated merchandise export was used as dependent variable against relative prices of export, real effective exchange rate and real gross domestic product and dummy was instituted to capture the changes before and after trade liberalization. The findings revealed that, trade liberalization in Bangladesh had improved export performance tremendously. Albert, dummy's coefficient was found to be very small with the value of (0.10). This signified that impact of trade liberalization on export performance in Bangladesh was still very small under the period studied form 1974 to 1995. Error correction term found with the coefficient of (-0.33), means that variables adjusting towards the long run equilibrium at the speed of 33 percent per annum. These results implies that trade liberalization theory in Bangladesh was affirmed.

Again a study by Mouna and Reza (2001) conducted in Africa countries particularly in Algeria, Morocco and Tunisia from 1980s to 1990s using Auto Regressive Distributed Lag approach examined the impact of trade liberalization on export growth. Main variables studied were volume of exports being dependent variable and independent variables were the real exchange rate and export diversification. The study revealed that, trade liberalization had increased the export performance in Morocco and Tunisia significantly from 53 percent in 1984 to 86 percent in 1990. On other hand, Algeria was appreciating her currency as such deterred export performance. In the same vein Were et al. (2002) examined Kenya's export performance in agricultural sector in selected cash crops that is tea and coffee. Similarly, that study employed a cointegration technique to explore the

short run and long run relationship amongst the variables. Studied variables were real exchange rate, real foreign income and investment as a proportion of gross domestic product. Empirical results revealed that, tea was not cointegrated as such there were no long run relationship amongst the variables whereas coffee found to be cointegrated means that there were long run relationship amongst the variables. Real exchange rate and investment as a proportion of gross domestic product were significant. Albeit, real foreign income was not significant for coffee, it was of interest to note that real foreign income was significant in other crop.

Using similar techniques, Vector autoregressive (VAR) and vector error correction model (VECM) as well as Johansen's test for cointegration, Bashir (2003) investigated the impact of trade liberalization on export performance on agricultural sector in Pakistan from 1961 to 2000. The study used the volume of agricultural export as dependent variable and explanatory variables were world demand, export competitiveness, export diversification and openness to trade. The findings revealed that, trade liberalization in Pakistan had improved the agricultural export performance. Albert, the external variables such as world demand and export competitiveness found had little contributions in improving the agricultural exports performance in Pakistan. Internal variables like export diversification and openness to trade found to be very important factors in agricultural export performance. Furthermore, the study provided the evidences that, better performance for domestic variables were stimulated by the government through shifting from exporting primary commodities to processed agricultural commodities. On top of that, the government increased the degree of openness to domestic trade. Also Rweyemamu (2003) examined the reforms in the agricultural sector in Tanzania on the impact of reforms on both commercial and smallholder sub sectors. It was basically a review of micro-level studies looking at the performance of the sector and rural livelihoods in general under reforms. Findings revealed the reforms had little to do with the improvement of commercial and smallholders sub sector in rural areas.

On other hand, Santos-Paulino (2003) conducted the study in Dominican Republic for the period from 1960 to 2000. The study employed autoregressive distributed lag model (ARDL) to estimate the long run relationship amongst the variables. Variables included in the study were real export as dependent variable and explanatory variables were real exchange rate and United State income. In order to capture the impact of trade liberalization, study employed dummy variables in subsequent years that dummy one for first year effect and the two dummies for subsequent year's effects. Findings showed that, devaluation of currency increased the export performance significantly. However, United State income found to be negatively related with export performance, signified that Dominican Republic do not rely much on the United State income for export performance. Dummy variables revealed negative sign for the first two years and eventually pick up a positive sign in the preceding year. Those results implied that, at the beginning trade liberalization was not effective but as time goes on it gained the momentum. Generally, dummy variables in the Dominican Republic had a 'J-curve' structure (Santos-Paulino 2003:934). Therefore, trade liberalization theory was affirmed by that study. In tandem to Dominican Republic study, Pacheco-López (2005) studied the effect of trade liberalization on export performance in Mexico from 1980s to 1990s. The study replicated the similar techniques and variables as it was used by Santos-Paulino (2003) in Domican Republic. The findings revealed that, trade liberalization in Mexico had improved the export performance significantly. The dummy variable in Mexico provided remarkable result with the coefficient of 0.77; this means that trade liberalization increased export performance by 77 percent and was statistically significant. As such the results of trade liberalization were in line with study carried out in Dominican Republic.

Again Yeboah (2008) used similar techniques as Tamini et al. (2012) to examine the determinants of agricultural products in sixteen West African countries on cocoa following the trade liberalization from 1989 to 2003. Study showed that, resource endowment, relative size of economies and sum of bilateral gross domestic product of US and exporting countries are the major determinants of export performance on cocoa. Generally, trade liberalization increased the world price of cocoa and export share of West African countries. Kazungu (2009) examined Trade Liberalization and the Structure of Production in Tanzania, employed both cointegation and panel technique on selected cash crops which were cotton, tea, cashew nuts, coffee and tobacco. Study revealed that, the selected cash crops had little contributions on structure of production in Tanzania as such deterred even export performance.

On other hand Babatunde, (2009) employed the panel least squares technique to estimate the impact of trade liberalization on export performance in Sub Saharan Africa between 1980 and 2005. Empirical results revealed that, trade liberalization stimulated the export performance of the Sub Saharan African countries though marginally and indirectly. It was observed that trade liberalization influenced the export performance indirectly through importation path rather than directly one. Also it was revealed that, presence of competitive environment and stable real effective exchange rate stimulated export performance in Sub Saharan Africa countries. In the same vein, other studies particularly in Tanzania were conducted by Rollo (2012) and Tamini et al (2012). Their findings revealed that, presence of aggressive trade liberalization has little trade gains amongst the trading partners. So for this scenario trade liberalization in Tanzania had little evidence that had improved export sector as it is expected.

3.0 Methodology

The study employed the cointagration technique to examine the impact of trade liberalization on export performance on cashew nuts in Tanzania similar to Allaro (2010), Kingu (2014a) and Kingu (2014b). The study finds it is important to use the similar technique since this technique found to be superior to other techniques like panel and gravity modeling. Cointegration technique and error correction model are able to establish the short run and long run relationship amongst variables. Adopting these techniques necessitated the study to estimate the unit root and cointegration test which are essential conditions in time series data so as to avoid spurious regression. It should be clear that Granger (1986) cited in Gujarati, (2004) pointed out that, is important to test for cointegration of the regression residual before estimating the coefficients of the variables so as is to avoid the possibility of producing spurious regression output. Therefore, this study finds it necessary to take into consideration the suggestion propounded by Granger, (1986) that is why the study adopted the similar technique.

In order to estimate the impact of trade liberalization on export performance on cashew nuts, this study signifies the cashew nuts export earnings as function of world price and real exchange rate as measure of export competitiveness. The study adopted the analysis of imperfect substitute model as expressed by Goldstein and Khan (1985) cited in Allaro (2010) and Kingu (2014) as follows

Export values of cashew nuts

$$(X\text{cashew nuts}) = f(WP, RER) \qquad (1)$$

Where Xcashew nuts are export earnings of cashew nuts, WP is world price and RER is real exchange rate as measure of export competitiveness from 1970 to 2010. The study employed secondary data from different sources such as Food and Agricultural Organization data base (FAO STAT), World Economic Indicators data base and Ivan Kushnir's Research Center.

The study instituted the natural logarithms in equation (1) so as to make the variables linear as such they can suit the time series behaviors properly. After instituting the natural logarithms in equation (1) it appears as follows:

$$LnX_t = \alpha_0 + \alpha_1 LnWP_t + \alpha_2 LnRER_t + u_t \qquad (2)$$

The main variables included in this model are cashew nuts export earnings (X_t) as dependent variable and independent variables are world price and real exchange rate. World price (WP) and Real Exchange Rate (RER) are key variables which determine the export performance of many agricultural products. It is should be clear that, as world price increases then export performance of a country will increase under ceteris peribus conditions. Similarly as we depreciate the domestic currency the export performance will increase and vice versa is true other factors remain constant. In this study real exchange rate is computed by multiplying the Tanzanian nominal exchange rate with the ratio of Tanzanian consumer price index (CPI) and USA consumer price index (CPI). This study uses real exchange rate as a measure of export competitiveness.

It is important to note that, this study has employed only two main independent variables but there are other variables which are essential too like agricultural earnings as measure of agricultural productivity. These variables have been chosen after detecting the problem of multicollinearity with other variable like agricultural earnings as a measure of agricultural productivity. Therefore, export performance can be determined by many factors apart from only world price and real exchange rate. U_t is random disturbance term with its normal classical assumptions whereas Ln is natural logarithm.

Having established equation (2) this study estimated the coefficients of long run relationship amongst the variables using equation (2) after the regression residual found to be stationary as such variables are cointegrated. Regression residual is done using Augmented Dickey Fuller (ADF) test. It is of interest to note that, Engle – Granger (1987) and Gujarati, (2004) pointed out that, the regression residuals of equation (2) above if are stationary then coefficients are not spurious and hence representing long run relationship amongst the variables which are export earnings of cashew nuts, world price and real exchange rate. Engle –Granger (1987) and Gujarati, (2004) insisted that, if the regression residuals are non stationary then regression coefficients obtained in equation (2) will be spurious.

Again the study estimated the time series variables of Lnxt, LnWPt and LnRERt if have unit roots, and thereafter the variables examined at the first difference (as in equation (3)) in order to obtain a stationary series:

$$\Delta LnX_t = \alpha_0 + \alpha_1 \Delta LnWP_t + \alpha_2 \Delta LnRER_t + u_t \qquad (3)$$

Ahmed, (2000) and Kingu (2014) pointed out that, equation (3) represents the short run information due to the fact that differencing equation (2) results into loss of valuable long run information in the data set. Dealing with this problem the theory of cointegration introduces an error correction term in the model. The use of error

correction (EC_t) term helped to tie the short run information (behaviors) of variables to its long run. The error correction model (ECM) expounded by Sargan and later on was popularized by Engle –Granger under name of "corrects for disequilibrium". Engle-Granger (1987) under "Granger representation theorem" instituted Error Correction term in the Model. Granger representation theorem pointed out that, if two variables are cointegrated, then the relationship between the two can be expressed as error correction model or mechanism (ECM) (Gujarati, 2004: 825) and Kingu, (2014:95). Therefore, error- correction term (EC_t) lagged one period (EC_{t-1}) so as to capture short run dynamics in the long run equilibrium. The study specified a general error correction model (ECM) as follows:

$$\Delta LnX_t = \beta_0 + \sum_{i=1}^{n} \beta 1i \, \Delta LnWP_{t-i} + \sum_{i=0}^{n} \beta 2i \, \Delta LnRER_{t-i} + \beta_3 EC_{t-1} + \varepsilon_t \qquad (4)$$

Where EC_{t-1} is error-correction term lagged one period. It is expected a coefficient to have a negative sign. While ε_t is an error term with all classical assumptions.

3.1 Trend Analysis

Trend analysis is an important component in the time series analysis so as determine the status of the variable under study if it is improving or not. This study evaluated the trend of export earnings of cashew nuts from 1970 to 2010. In order to estimate the trend coefficient, we formulated linear trend analysis model in which we regress cashew nuts export earnings (X) in natural log on time. Furthermore, trend analysis is a vital tool for policy implications. Gurajati, (2004:180-181) provided decision criteria as follows: if the slope coefficient in the model is positive, then there is an upward trend on export earnings, where as if it is negative, it implies that there is a downward trend on export earnings on the variable under study, that is cashew nuts export earnings.

Trend analysis model formulated as follows:

$LnX_t = \beta_0 + \beta_1 T + U_t$ (5)

Where X_t is cashew nuts export earnings, β_0 is a constant, T is trending variable and U_t is error term. β_1 is a trend coefficient and it is expected to have a positive or negative sign.

3.2 Non-parametric test

Having established that variables are cointegrated and are adjusting towards long run equilibrium, we employ median test instead of dummy variable to examine the significance of trade liberalization policy in cashew nuts export earnings. Median test is important in this study so as see if there are any changes before and after liberalization in Tanzania. This test assumes that the population in which two samples are drawn have same median as well as the test does not require the two samples to be equal after being divided. Therefore, our sample of 41 observation suits this test and sample one represents the observations before trade liberalization and sample two represents the observations after trade liberalization. Samples are 16 observations and 25 observations respectively. We estimated median values of both samples being combined together, and thereafter we determined for each group the sample the frequencies of scores above or below the median. Our median scores were presented in 2X2 contingency table. Thereafter, we computed the chi-squared of the contingency table and conclusion reached based on given decision criteria that is, if the computed chi-squared value is greater than the chi-squared critical table value, we reject null hypothesis of the sample having same median and we favor the alternative that sample have different median (Prakash, 2013).

We employed the following formula:

$\chi^2 = \Sigma \, (Fo-Fe)^2 / Fe$ (6)

Where Fo is observed frequencies, Fe is expected frequencies, Σ is summation of and χ^2 is chi-squared.

4.0 Empirical Analysis

4.1 Unit root test

We performed unit root tests at levels for all three variables which are cashew nuts export earnings, world price and real exchange rate. All these variables instituted natural logarithms. Again variables were estimated at the first difference testing for stationarity. The study employed the Augumented Dickey-Fuller (ADF) tests and the results revealed that; there existence of unit roots for all the variables mentioned above means that variables are non stationary at level. The computed absolute value of tau statistic does not exceed the critical tau value. Insert table one to three in appendix below. On other hand, all the variables found stationary at first difference since the computed absolute value of tau statistic exceeds the critical ADF tau value, and then we conclude that variables at first difference are stationary. Similarly insert table four to six in the appendix below.

4.2 Cointegration Test

This study after established that all the variables are non-stationary at level and stationary at first difference, we estimated the cointegration tests, using Engle-Granger (EG) and Johansen test. In Johansen test we specified the relevant order of lags (*p*) of the VAR model similar to Ahmed (2000) and Kingu, (2014). Engle-Granger test employed in our study followed the similar procedure as in unit root test. It should be noted that, under cointegration test we estimated cointegrating regression residual obtained in equation (2) and we employed Augumented Dickey-Fuller tests. Decision criteria were stipulated by Gujarati, (2004) as follows, if the computed absolute value of the tau statistic exceeds the Engle-Granger or Augumented Engle-Granger critical tau values, then we reject the null hypothesis of non stationary and accept alternative hypothesis that is variables are stationary. From our computation the empirical result reveal that, computed absolute value of the tau statistic (-0.030456) exceeds the Engle –Granger critical tau values (-2.5899) at 1percent level, then we rejected the null hypothesis, this implies that residual is stationary and variables are cointegrated, see table 8 in appendix. Cointegration test under Johansen Maximum Eigenvalue test indicates that there two cointegrating variables at the 5 percent level amongst three variables in the study. Insert table 9 for Johansen test in appendix below.

4.3 Estimation of long run relationship

After the residual of the regression in equation two (2) found to be stationary, we concluded that variables are cointegrated as such the regression outputs obtained in equation (2) at level are not spurious (Engle and Granger, 1987, Gujarati, 2004:822 and Utkulu, 2012 and Kingu, 2014). Equation (2) regression output is representing long run relationship amongst the variables since the regression residual is cointegrted. The empirical results reveal that world price and real exchange rate positively determined the cashew nuts export earnings in Tanzania though real exchange rate is statistically insignificant. All these results are well shown in table 7 in appendix below.

In this study, real exchange rate found with a positive sign (0.114834) but statistically insignificant at 5 percent level. This implies that real exchange rate does not influence the cashew nuts export earnings significantly though it has a positive sign. This implies that depreciation of domestic currency by one percent increases cashew nuts export earnings by 11.48 percent. Insignificant real exchange rate result is similar with other studies like Diakosavvas and Kirkpatric (1990), Mackay et al. (1997) and Kingu, (2014). World price found with positive sign as expected which is (0.867959) and it is statistically significant at 5 per cent level. This implies that increasing world price by one percent cashew nuts export earnings increases by 86.8 percent. This is a tremendously increase of foreign earnings in Tanzania via cashew nuts. This result is in line with Abolagba, et al. (2010), Amoro, and Shen, (2012) and Kingu (2014). They found world price has significant impact on export performance in Nigeria, Cote d'Ivoire and Tanzania respectively. We obtained the adjusted R^2 of (0.810632). This implies that world price and real exchange rate as a measure of export competitiveness explained the cashew nuts export earnings in Tanzania by 81 per cent. This signifies that the rest of percentage of cashew nuts export earnings that is 19 percent can be explained by other variables which are not included in this model like agricultural productivity, domestic consumption but to mention a few.

4.4 Estimation of an error-correction model (ECM)

Having established that, there long run relationship amongst the variables means cashew nuts export earnings, world price and real exchange rate. We estimated an error-correction model (ECM) in order to determine short run behaviors of the variables. Normally variables adjusted to the long run equilibrium. Error correction model provides the speed of adjustment of the variables in short run dynamics behavior to the long run equilibrium. The empirical result obtained in the error-correcting model is significant. We obtain an expected sign of error term coefficient (-0.361547) and it is statistically significant at 5% level and this result is in line with Ahmed, (2000), kingu, (2014a) and Kingu (2014b). This signifies that the variables in the model are adjusting faster from the short run to the long run equilibrium at the speed of 36 percent per annum as such this result suggests a high speed of convergence to long run relationship (equilibrium) amongst the variables. Real exchange rate in short runs found with a negative sign (-0.085686) but it is statistically insignificant and this finding is in line with Diakosavvas and Kirkpatric (1990) and Kingu (2014a) result which found in some Sub Saharan Africa countries and Tanzania being among. However, it should be clear that, a negative sign in real exchange rate reveal a competitiveness of export on cashew nuts. World price in short run remain a significant determinant of cashew nut export earnings though it has a negative sign but statistically significant at 5 per level. A negative sign in short run signifies that world price does not trickle down to farmers directly since all the cashew nuts are collected by cashew nut board and farmers are given a receipt for confirmation that their cashew nuts have been collected by the board. See table 10 in appendix below.

4.5 Trend analysis

This study also estimated the trend analysis so as see if the trade shift has significant impact on cashew nuts export earnings in Tanzania. Since the variables are cointegrated this implies that variables have long run relationship. Having established that variables are cointegrated, we estimated the trend analysis of cashew nuts export earnings on time from 1970 to 2010. The empirical results reveal that, cashew nuts export earnings are improving over the period of time since the trend coefficient found to be positive (0.219013) and it is statistically significant at 5 percent level. This implies that trade liberalization has increased trade by 21.9 percent. Insert table 11. This result is essential for Tanzanian government in trade policy formulation or trade policy improvement.

4.6 Median test

Median test reveal that, trade liberalization policy has a significant impact on cashew nuts export earnings in Tanzania because the computed chi-squared value (21.02) is greater than chi-squared critical table values of (3.84) at 5 percent level in one degree of freedom. This implies that, trade policy has great impact on cashew nuts export earnings in Tanzania. Our null hypothesis was rejected which state that population in which two samples have drawn have the same median and we favored the alternative hypothesis, that is the samples have different median as such the trade policy is significant in Tanzania. Insert table 12. If null hypothesis would have been accepted this means that trade policy has no influence on cashew nuts export earnings in Tanzania.

5. Concluding remarks

This paper examined the impact of trade liberalization on export performance in Tanzanian cashew nut from 1970 to 2010. This study investigates empirically the impact of trade liberalization by analyzing the world price and real exchange rate as measure of export competitiveness. Our empirical results suggest that, world price and real exchange rate are significant determinants of cashew nuts export earnings in Tanzania. However, real exchange rate as measure of export competitiveness found to be insignificant both in long run and short run. This signifies that Tanzanian government should not rely much on real exchange rate per see in promoting cashew nuts export performance, other factor should be taken into account like agricultural export credit and improve the infrastructure at large. Long run coefficients reveal that, world price is significant determinant of cashew nuts export earnings in Tanzania since it has a positive sign as expected (0.867959) and statistically significant at 5 percent level. This implies that world price has big influence on Tanzanian cashew nuts export earnings than domestic price since it contributes about 87 percent of cashew nuts earnings. Contrary to world price, real exchange rate in long run found to be statistically insignificant in cashew nut export earnings. This implies that, real exchange rate as measure of export competitiveness is not trickled down to farmers directly due to fact that, perennial crops does not respond quickly as the exchange rate change as compared to manufacturing goods. Similarly, in short run as well world price remain important determinant of cashew nuts export earnings in Tanzania whereas real exchange rate still statistically insignificant, signifies that real exchange rate should not be over looked by the government when they want to promote perennial crops like cashew nuts and others. Depreciating domestic currency without exporting more this becomes a burden to the economy of a country.

Error correction modeling in our paper finds a unique equilibrium relationship amongst the variables which are cashew nuts export earnings, world price (WP) and real exchange rate (RER). The error correction term in our model found with an expected negative sign (-0.361547) and it is statistically significant at 5 percent level. This implies that variables adjusting to long run equilibrium at the speed of 36 percent per annum as such confirming the validity of the long run equilibrium amongst the variables. 36 percent indicates a high speed of adjustment of variables to equilibrium. On other hand, median test which is a measure of trade shift from controlled trade environment to liberalized trade environment shows that, trade shift is significant on cashew nuts export earnings in Tanzania. Furthermore, trend analysis in our study reveals that, cashew nuts export earnings have a positive trend (0.219013) and it is statistically significant at 5 percent level. This empirical result tells that, trade liberalization has improved cashew nuts export earnings tremendously to about 22 per cent. The policy implications of our study in Tanzanian cashew nut are vivid. In order to promote cashew nuts export earnings in Tanzania, Tanzanian government should not rely much on depreciating domestic currency per see particularly in perennial crops without considering other determinants like production capacity, agricultural export credit and improving institutional infrastructure for agricultural sector at large.

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Appendices

Unit root test at level

Table 1

Ln export

ADF Test Statistic	-0.814092	1%	Critical Value*	-3.6067
		5%	Critical Value	-2.9378
		10%	Critical Value	-2.6069

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(SER01)

Method: Least Squares

Date: 01/31/14   Time: 12:32

Sample(adjusted): 1972 2010

Included observations: 39 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SER01(-1)	-0.037351	0.045881	-0.814092	0.4209
D(SER01(-1))	-0.599628	0.141615	-4.234196	0.0002
C	1.107041	1.050453	1.053870	0.2990
R-squared	0.352131	Mean dependent var		0.176193
Adjusted R-squared	0.316138	S.D. dependent var		0.960385
S.E. of regression	0.794199	Akaike info criterion		2.450838
Sum squared resid	22.70707	Schwarz criterion		2.578804
Log likelihood	-44.79134	F-statistic		9.783400
Durbin-Watson stat	1.694021	Prob(F-statistic)		0.000404

Table 2

Ln wp

ADF Test Statistic	-0.530797	1%	Critical Value*	-3.6067
		5%	Critical Value	-2.9378
		10%	Critical Value	-2.6069

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(SER02)

Method: Least Squares

Date: 01/31/14   Time: 12:33

Sample(adjusted): 1972 2010

Included observations: 39 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SER02(-1)	-0.017599	0.033156	-0.530797	0.5988
D(SER02(-1))	-0.664043	0.147323	-4.507407	0.0001
C	0.511077	0.371779	1.374680	0.1777

R-squared	0.382069	Mean dependent var		0.176311
Adjusted R-squared	0.347739	S.D. dependent var		0.652989
S.E. of regression	0.527371	Akaike info criterion		1.631980
Sum squared resid	10.01234	Schwarz criterion		1.759946
Log likelihood	-28.82361	F-statistic		11.12946
Durbin-Watson stat	1.890471	Prob(F-statistic)		0.000173

Table 3

Lnrer

ADF Test Statistic	-1.032844	1%	Critical Value*	-3.6067
		5%	Critical Value	-2.9378
		10%	Critical Value	-2.6069

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(SER03)

Method: Least Squares

Date: 01/31/14   Time: 12:34

Sample(adjusted): 1972 2010

Included observations: 39 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SER03(-1)	-0.045727	0.044273	-1.032844	0.3086
D(SER03(-1))	-0.392181	0.181640	-2.159109	0.0376
C	0.533467	0.283167	1.883931	0.0677

R-squared	0.154646	Mean dependent var		0.166653
Adjusted R-squared	0.107682	S.D. dependent var		0.716416
S.E. of regression	0.676745	Akaike info criterion		2.130758
Sum squared resid	16.48740	Schwarz criterion		2.258724
Log likelihood	-38.54978	F-statistic		3.292863
Durbin-Watson stat	1.911984	Prob(F-statistic)		0.048606

Unit root at first difference

Table 4

ADF Test Statistic	-3.922106	1%	Critical Value*	-3.6117
		5%	Critical Value	-2.9399
		10%	Critical Value	-2.6080

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(SER01,2)

Method: Least Squares

Date: 01/31/14   Time: 12:35

Sample(adjusted): 1973 2010

Included observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SER01(-1))	-1.180639	0.301022	-3.922106	0.0004
D(SER01(-1),2)	-0.293492	0.181197	-1.619742	0.1143
C	0.177770	0.136666	1.300761	0.2018

R-squared	0.796985	Mean dependent var	0.045210
Adjusted R-squared	0.785384	S.D. dependent var	1.691137
S.E. of regression	0.783447	Akaike info criterion	2.425429
Sum squared resid	21.48261	Schwarz criterion	2.554713
Log likelihood	-43.08316	F-statistic	68.70056
Durbin-Watson stat	2.012737	Prob(F-statistic)	0.000000

Table 5

ADF Test Statistic	-4.987849	1%	Critical Value*	-3.6117
		5%	Critical Value	-2.9399
		10%	Critical Value	-2.6080

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(SER02,2)

Method: Least Squares

Date: 01/31/14   Time: 12:36

Sample(adjusted): 1973 2010

Included observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SER02(-1))	-1.578218	0.316413	-4.987849	0.0000
D(SER02(-1),2)	-0.077145	0.190628	-0.404688	0.6882
C	0.311889	0.105884	2.945560	0.0057
R-squared	0.791591	Mean dependent var		-0.042723
Adjusted R-squared	0.779682	S.D. dependent var		1.131834
S.E. of regression	0.531261	Akaike info criterion		1.648531
Sum squared resid	9.878345	Schwarz criterion		1.777814
Log likelihood	-28.32208	F-statistic		66.46947
Durbin-Watson stat	1.991953	Prob(F-statistic)		0.000000

Table 6

ADF Test Statistic	-4.633260	1%	Critical Value*	-3.6117
		5%	Critical Value	-2.9399
		10%	Critical Value	-2.6080

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(SER03,2)

Method: Least Squares

Date: 01/31/14   Time: 12:36

Sample(adjusted): 1973 2010

Included observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SER03(-1))	-1.409783	0.304274	-4.633260	0.0000
D(SER03(-1),2)	-0.032198	0.238105	-0.135226	0.8932
C	0.246856	0.126081	1.957910	0.0583
R-squared	0.640658	Mean dependent var		-0.075206
Adjusted R-squared	0.620124	S.D. dependent var		1.111380
S.E. of regression	0.684989	Akaike info criterion		2.156828
Sum squared resid	16.42233	Schwarz criterion		2.286111
Log likelihood	-37.97973	F-statistic		31.20015
Durbin-Watson stat	1.886614	Prob(F-statistic)		0.000000

Long run Regression Output

Table 7

Dependent Variable: SER01

Method: Least Squares

Date: 01/31/14   Time: 12:38

Sample: 1970 2010

Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.50126	1.295755	9.647856	0.0000
LnWPt	0.867959	0.228730	3.794696	0.0005
LnRERt	0.114834	0.236234	0.486103	0.6297
R-squared	0.820101	Mean dependent var		22.76323
Adjusted R-squared	0.810632	S.D. dependent var		2.868174
S.E. of regression	1.248125	Akaike info criterion		3.351518
Sum squared resid	59.19704	Schwarz criterion		3.476901
Log likelihood	-65.70612	F-statistic		86.61474
Durbin-Watson stat	1.290582	Prob(F-statistic)		0.000000

Engle- Granger ADF cointegration test

Table 8

Dependent Variable: DRESID

Method: Least Squares

Date: 01/31/14   Time: 12:57

Sample(adjusted): 1972 2010

Included observations: 39 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RES01	-0.030456	0.135605	-0.224593	0.8235
R-squared	-0.003657	Mean dependent var		-0.072390
Adjusted R-squared	-0.003657	S.D. dependent var		1.038237
S.E. of regression	1.040134	Akaike info criterion		2.941882
Sum squared resid	41.11136	Schwarz criterion		2.984537
Log likelihood	-56.36670	Durbin-Watson stat		1.254860

Johansen cointegration test

Table 9

Date: 01/31/14 Time: 13:01

Sample: 1970 2010

Included observations: 39

Test

assumption:

Linear

deterministic

trend in the data

Series: LNEXPORT LNWP LNRER

Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.480273	42.12863	29.68	35.65	None **
0.342668	16.60500	15.41	20.04	At most 1 *
0.006184	0.241916	3.76	6.65	At most 2

*(**) denotes

rejection of the

hypothesis at

5%(1%)

significance

level

L.R. test

indicates 2

cointegrating

equation(s) at

5% significance

level

Unnormalized Cointegrating Coefficients:

LNEXPORT	LNWP	LNRER
-0.164722	0.044443	0.126918
-0.070475	0.255669	-0.201521
0.019592	-0.067852	-0.015954

Normalized Cointegrating Coefficients: 1 Cointegrating Equation(s)

LNEXPORT	LNWP	LNRER	C
1.000000	-0.269803	-0.770494	-15.17583
	(0.24754)	(0.25870)	

Log likelihood -87.16209

Normalized Cointegrating Coefficients: 2 Cointegrating Equation(s)

LNEXPORT	LNWP	LNRER	C
1.000000	0.000000	-1.062148	-16.41387
		(0.07680)	
0.000000	1.000000	-1.080990	-4.588698
		(0.06742)	

Log likelihood -78.98055

ECM regression output

Table 10

Dependent Variable: DLNEXPORT

Method: Least Squares

Date: 01/31/14   Time: 13:13

Sample(adjusted): 1971 2010

Included observations: 40 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNWP	-0.484679	0.207251	-2.338607	0.0249
DLNRER	-0.085686	0.175681	-0.487734	0.6286
ECt-1	-0.361547	0.102309	-3.533864	0.0011
R-squared	0.447638	Mean dependent var		0.179750
Adjusted R-squared	0.417780	S.D. dependent var		0.948259
S.E. of regression	0.723553	Akaike info criterion		2.262753
Sum squared resid	19.37058	Schwarz criterion		2.389419
Log likelihood	-42.25506	F-statistic		14.99251
Durbin-Watson stat	2.035145	Prob(F-statistic)		0.000017

Trend analysis

Table 11

Dependent Variable: SER01

Method: Least Squares

Date: 02/06/14   Time: 12:50

Sample: 1970 2010

Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18.16395	0.373419	48.64232	0.0000
TREND	0.219013	0.015492	14.13718	0.0000
R-squared	0.836724	Mean dependent var		22.76323
Adjusted R-squared	0.832538	S.D. dependent var		2.868174
S.E. of regression	1.173718	Akaike info criterion		3.205781
Sum squared resid	53.72697	Schwarz criterion		3.289370
Log likelihood	-63.71851	F-statistic		199.8599
Durbin-Watson stat	0.653867	Prob(F-statistic)		0.000000

Median Test

Contingency table

Table 12

	sample 1	sample 2	Total
above	0	21	21
below	16	4	20
Total	16	25	41

Expected frequencies

	sample 1	sample 2	total
above	8.2	12.8	21
below	7.8	12.2	20
total	16	25	41

$X^2 = 21.02$