EAST AFRICAN COMMUNITY'S TRADE POTENTIAL AND PERFORMANCE WITH EUROPEAN UNION: A PERSPECTIVE OF SELECTED FRUIT AND VEGETABLE COMMODITIES

Moses Lubinga, PhD Candidate
Abiodun Ogundeji, PhD
Henry Jordaan,PhD
University of the Free State, South Africa

Abstract

Based on the impressive growth trend within the export-driven horticulture sector over the past 2-3 decades among the East African Community (EAC) member states, this paper aims at predicting the trade potential and performance of a selected fruits and Vegetables (FVs) within the European market. Within the gravity model framework, based on the Zero Inflated Poisson (ZIP) estimator, we use the *out-of sample* approach to predict potential trade flows of FVs by using highly disaggregated panel data. In light of ascertaining trade performance of EAC member states' FV commodities within the EU market, we use the Relative Difference index. Empirical results reveal that Asparagus from Kenya has room for trade expansion across all the EU-member states while Beans and pepper from Uganda also have a large un-exploited market within the EU market. Similarly, Beans from Tanzania also have room for trade expansion across many EU member states. Results further revealed that EAC member states exhibit poor trade performance within the EU-market in the various FV commodities, which suggests that there exists some barriers to trade between the EAC and EU. Thus, it is incumbent upon EAC member states to foster trade cooperation in horticultural commodities with the EU member states.

Keywords: Fruits and vegetables, Trade potential, Trade performance, East African Community, European Union

Introduction

Over the past 2-3 decades, the East African Community (EAC) has registered a drastic increase in the volume of horticultural exports, particularly Fruits and Vegetables (FV) to the European Union (EU). To this effect, UNCTAD (2008) postulates that this impressive trend has led to the involvement of many small-scale farmers in the production of FVs, hence, contributing towards poverty alleviation and rural development. During the same period, FAO (2005) reckons that the FV exports have experienced high growth rates and better prices relative to the region's traditional Agricultural exports, such as coffee and cotton, among others. Considerably, the FV sub-sector has attracted a large number of smallholder farmers in the production of FVs, with the sole aim of exporting to Europe. The EU is the key destination market for FVs from East African countries. For instance, the value of Uganda's exports to the EU increased by more than fivefold from $1.5 million in 1996 to over $8 million in 2006.

Within the EU, FV exports are mainly destined for wholesale markets in the United Kingdom and to small supermarkets in the Netherlands. The commonly exported FVs from

the EAC include; off-season fruits (citrus fruit, pears), tropical fruits (bananas, pineapples, avocados, mangoes and papayas), an assortment of vegetables, such as asparagus, beans, peas, green chilies, sweet and hot peppers, mixed vegetables, okra snow peas and Asian vegetables (UNCTAD, 2008), among others.

With due acknowledgement, some studies (Shinyekwa and Othieno, 2013;Ebaidalla and Yahia, 2013; Rojid, 2006) analysed the trade potential of some EAC's states in one way or another. However, such studies did not focus on the EU market to which the largest proportion of EAC's FVs are destined. Forinstance, the study by Shinyekwa and Othieno (2013) focused on Intra-East African Community trade while Ebaidalla and Yahia (2013) and Rojid (2006) assessed the Common Markert for Eastern and Southern Africa (COMESA).

Furthermore, these studies were based on either aggregated data across sectors or cross sectional data (*see* Rahman, 2009; Rojid, 2006; Shinyekwa and Othieno, 2013). Implicitly, general results founded on aggregated data may be misleading, given that they do not give the actual insight into potential markets for trade expansion for highly disaggregated commodities. Moreover, Egger (2000) argues that analysis based on cross-sectional data leads to inconsistent estimates. Thus, simulated trade potentials based on inconsistent estimates may also be misleading. The misleading aspect is attributable to the fact that cross sectional data is highly susceptible to severe model misspecification problems, given that it omits the time dimension which is vital in capturing variations over time (Egger, 2000; Matyas, 1997).

Worse still, the few studies (Ebaidalla and Yahia, 2013; Shinyekwa and Othieno, 2013; Rojid, 2006)that include atleast one of the EAC states do not take into account of the zero trade flows within matrix. However, omission of the zero trade flows is associated with with loss of important information that could influence the estimated results. Lastly, no study has been come across deliberating to predict EAC's trade potentials at sector level. Therefore, there exists a general knowledge gap about the trade potential of EAC member states with their EU trade partners. This void presents a key for policy makers in designing informed trade-related policies. Similarly, inexistence of such vital information for the business community increases the burden of identifying apt trade partners so as to maximize returns to their investments.

Hence, this study aims at predicting the trade potential and performance of EAC member states in FVs within the EU-15 market[39], by using highly disaggregated panel data. Achievement of this objective will provide an insight into the specific FV commodities that exhibit room for trade expansion within the EU, as well as an indication of EU mamber states with which the EAC member states can expand their trade.

The rest of the paper is organised in five sections as follows: Section two outlines stylized facts about the East African community. Section three provides a brief overview of trends in FVs trade with different destination markets. Section 4 presents a critical review of the relevant literature regarding estimation of potential trade and performance while the research methodology is outlined in section five. In section six, we provide the empirical results as section 7 is devoted to conclusion and policy implications.

Stylized facts about the East African community

East African Community (EAC) is a regional intergovernmental organisation, comprising of five countries, *viz*: Burundi, Kenya, Rwanda, Tanzania and Uganda. EAC's secretariat based in Arusha, Tanzania. The EAC was established upon signin a treaty on 30 November 1999 but it was enacted into force on 7 July 2000. Originally, establishment of the

[39]Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom,

community was ratified by only three states (Kenya, Tanzania and Uganda). However, on the 18th day of June 2007, Rwanda and Burundi acceded to the EAC Treaty and became full members of the Community with effect from 1 July 2007 (EAC, 2014).

The EAC was established as a Customs Union in 2005 but became a fully fledged union, characterized of with zero internal tariffs with effect from 2010. Notably, all EAC states are members of the WTO. Exports from the EAC to the EU are skewed towards agricultural commodities. Such traditional cash crops include; coffee, tobacco and tea while non-traditional cash crops include: cut flowers, fish, fruits and vegetables, among others. On the other hand, EAC imports from the EU are mainly dominated by machinery and mechanical appliances, equipment and parts, vehicles and pharmaceutical products.

An overview of trends in FVs trade with different destination markets

The past two decades registered an increasing volume of global agricultural trade from the EAC, with a rise in high-value non-traditional cash agricultural commodities like fruits and vegetables, among the traditional cash crops. Figure 1 shows trends of fruit and vegetable exports against the traditional agricultural commodities coffee, tea, tobacco, cashew nuts and cotton from Uganda, Kenya and from Tanzania. Ardently, the figure depicts that whereas exportation of the traditional cash crops is on a declining trend, exportation of fruits and vegetables from the EAC is on a gradual but steady rise.

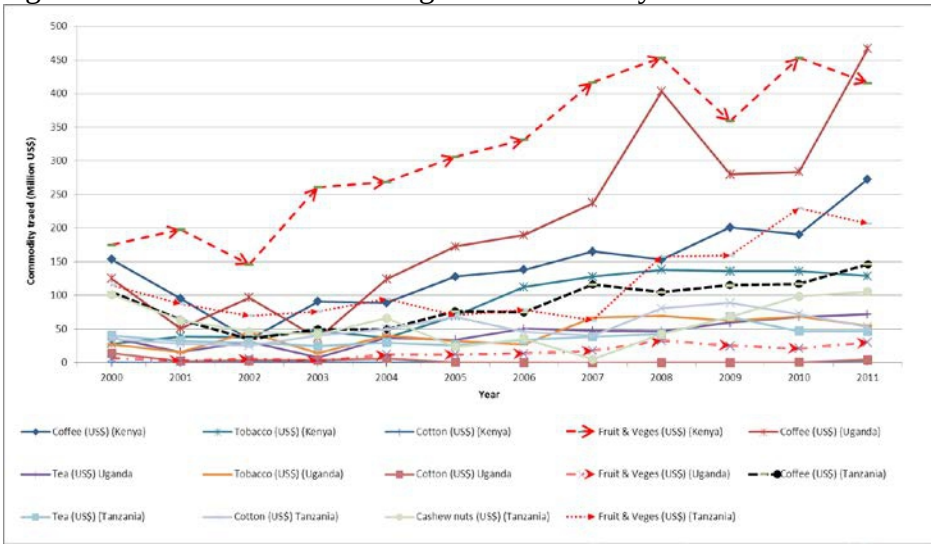

Figure1: Fruits and vegetable export trends against selected traditional cash crops at country level
Source: FAO database (2013)

A critical analysis shows that fruit and vegetable exports in Kenya generally surpass coffee, tobacco and cotton by approximately 30, 76 and 99 times, respectively. In Uganda, exportation of fruits and vegetables only out-weighs cotton exports (by 55 times). In the case of Tanzania, it is also evident that since the early 2000s, fruit and vegetable exports have dominated the traditional cash crops. Statistics reveal that the fruits and vegetable sector realized a drastic increase in exports between 2007 and 2011, accounting for more than 200% rise (from 62,857 million US$ in 2007 to 206,402 million US$ 2011) (FAO database, 2013).

According to Agribusiness East Africa (2013) the European Union (EU) remains the key export market for FVs from the EAC member states. Fresh fruit and vegetable exports are mainly destined to specific ethnic buyers within the EU. The Common Market Eastern and Southern Africa (COMESA), the Middle East, and East Asia Community countries are the other major destination markets of FV commodities from EAC member states. Table 1 shows the main FV export destination markets, disaggregated by the monetary value of imports by the leading trade partners as by the end of 2011.

On the other hand, EAC member states also import some FV commodities from other countries. For instance, the International Trade Center (ITC) database (2013) shows that during 2012, Uganda imported FVs amounting to about 73, 63 and 24 thousand US dollars from France, Netherlands and Italy, respectively. Kenya also imported FVs estimated at 2.4 million US dollars, from France, Netherlands, Italy and the United Kingdom among other European Union (EU) countries. Similarly, an estimated 0.41 million US dollar worth of horticultural commodities were imported by Tanzania from the EU, mainly from Belgium, Netherlands, United Kingdom and Italy.

Table 1: Major export destinations ofEAC member states' FV commodities as at December 2011

Export market	Exporter	Top 2 partners in the market	Value of trade ('000 US$)		Total value ('000 US$)
			HS-07	HS-08	
EU-27*	Kenya	United Kingdom	150,384	5,107	155,491
		Netherlands	32,752	5,559	38,311
		France	15,409	10,166	25,575
	Tanzania	Netherlands	4,139	7,396	11,535
		United Kingdom	661	1,715	2,376
	Uganda	United Kingdom	3,644	121	3,765
		Netherlands	859	1	860
Middle East	Kenya	UAE	5,429	14,124	19,553
		Saudi Arabia	203	4,198	4,401
	Tanzania	UAE	5,119	1,507	6,626
		Saudi Arabia	62	689	751
	Uganda	Oman	115	2	117
		Bahrain	13	46	59
COMESA	Kenya	Uganda	651	293	944
		Sudan	409	104	513
	Tanzania	Kenya	24,469	25,735	50,204
		Rwanda	1,179	115	1,294
	Uganda	Kenya	10,473	654	11,127
		Sudan	2,676	29	2,705

EU-27* denotes the 27 members of the European Union.UAE denotes United Arab Emirates

Source: International Trade Center (ITC) database (2013)

Generally, statistics divulge that EAC member states trade balances are not in a deficit, *that is*, countries actually import less FVs as compared to the exports from the same sector. As illustrated in Figure 2 below, since the year 2000, Kenya and Tanzania have had an increasing positive trend of trade balance in fruits and vegetables. Kenya's lowest positive trade balance, estimated at about 150 million US dollars was observed in 2000 while the maximum of 408 million US dollars was registered in 2008. Between 2007 and 2010, Tanzania recorded the most drastic rise in trade balance (77%) from 49 million US$ to 213 million US$.

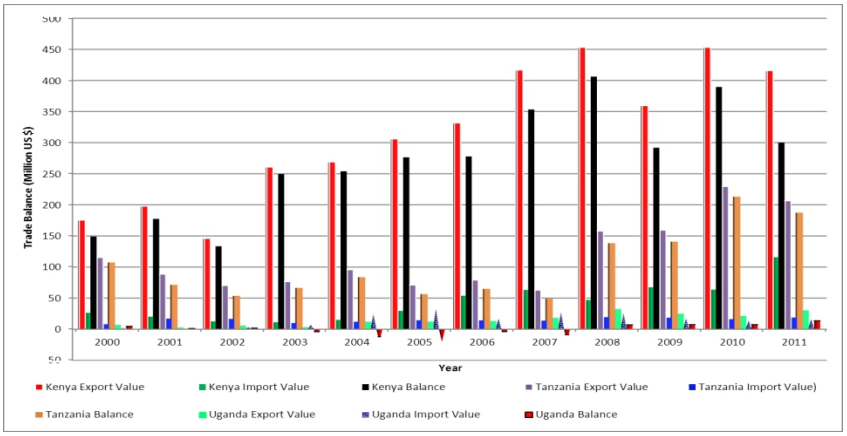

Figure2: East Africa's trade balance in fruits and vegetables at country level

Source: International Trade Center (ITC) database (2013)

Of the three EAC member states, it is only Uganda which registered a deficit in fruits and vegetable trade balance from 2003 until 2007 but a positive trend was restored in the subsequent years thereafter. Uganda's largest trade balance deficit of about 21 million US$ was experienced in 2005.

Brief literature review

The term trade potential refers to the maximum possible trade that can be achieved (Armstrong, 2007). It is used to predict the hypothetical level of trade, in assumption of frictionless and free trade under given conditions at a certain time. Within the gravity flow model framework, existing literature reveals that there are two methods (*In-Sample* and *Out-of sample*) used to simulate trade potential. However, most scholarly work (Gul and Yasin, 2011; Karagoz and Saray, 2010; Batra, 2006; Rojid, 2006; Rahman, 2009) employ the *Out-of -Sample approach*. The Out-of-sample approach entails two steps in simulating potential trade flows. Firstly, a specified model of determinants of trade flows with particular trade partners are ascertained. In the second step, the estimated coefficients are then used to predict trade flows.

Thereafter, the predicted trade volumes are compared with the actual trade flows so as to deduce trade performance. The trade performance may also be ascertained as a proportion of predicted trade to actual trade. A country's trade perfomance can be inferred by using either absolute or relative indicators. The absolute indicator is defined as the absolute difference between the predicted potential and actual trade flows. Strikingly, positive values suggest there exists untapped trade that could be harnessed (trade expansion) while negative values imply that actual trade flows exceed the predicted trade potential. On the other hand, the relative indicator is defined as the ratio of predicted trade potential to the actual trade flows. Relative values of greater than one imply that a country under consideration has a good trade performance with the partners, while the opposite is also true (Gul and Yasin, 2011).

For instance, with the aim of estimating trade potentials of COMESA member countries within the COMESA region, Rojid (2006), used panel data of 21 years to estimate unilateral trade flows from 147 exporting countries. Empirical results reveal that there was limited trade potential within the region but Angola and Uganda still exhibited more room for trade expansion within the region. Similarly, Karagoz and Saray (2010) employed a sample of 23 APEC countries to determine Turkey's trade potential. Study findings divulge that Turkey had a high potential of expanding her trade with countries like Papua New Guinea, Peru, Mexico and Brunei, among others.

Methodology

The study was based on the three EAC member states (Kenya, Tanzania and Uganda) who originally ratified the establishment of the community. Furthermore, the stuy focusses on two FV commodities (*at HS-6 Digit level*) from each country, with the exception of Uganda for whom three commodities are considred. Choice of the selected commodities was based on Lubinga's (2014) empirical results of export competitiveness of East Africa's FV commodities within the EU market. By making use of Lubinga's results, two basic principles were employed to select commodities for each country. (*i*) If the commodity exhibited an average export competitiveness index (*Revealed Comparative Advantage* (*RCA*)) of greater than one across all the three EAC member states, and (*ii*) if the commodity revealed the highest RCA amongst all commodities exported from a given country. Thus, Table 2 presents the selected FV commodities at country level. Other data sources included:- the ITC-Market Access Map (MAcMap) database, the World Bank Development Indicators (WBDI) database, and the worldatlas.

Table 2: Selected FV commodities with high export competitiveness in the EU market

Country	HS 6- Digit code	Commodity description	Mean RCA
Kenya	070920	Asparagus, fresh/chilled	8,504.32
	070820	Beans (Vigna spp., Phaseolus spp.)	3.70
Tanzania	070990	Vegetables, n.e.s. in 07.01-07.09 fresh/chilled	24.60
	070820	Beans (Vigna spp., Phaseolus spp.)	2.23
Uganda	070960	Fruits of the genus Capsicum/ Pimen	27,668.87
	080300	Bananas, including plantains, fresh/dried.	25.98
	070820	Beans (Vigna spp., Phaseolus spp.)	1.23

Adapted from Lubinga (2014)

Diagnostic tests

Given that the analysis was based on highly disaggregated(HS-6 Digit level) data, four tests (Normality test, over-dispersion test, Pearson's correlation and Levin–Lin–Chu (2002)) were used to ascertain data properties prior to estimating the gravity model. The normality test and the over-dispersion tests were used to examine if the data aborogated the normal distribution and equidispersion assumptions, respectively. On the other hand, the Pearson's correlation test was used to examine if the variables are susceptible to multi-collinearity while the Levin–Lin–Chu (2002) test (hereafter, **LLC-test**) was to test for unit roots of panel datasets. Walker and Madden (2008) argue that multi-collinearity between any two different variables ranges between -1 and +1 while the relationship between a variable with itself is +1. Correlation values equating to zero imply that there is no linear relationship between those variables. As a rule of thumb, scholars (Anderson *et al.*, 2008, Griffiths *et al*., 1993) note that if the value is not greater than the threshold value of 0.7, then the available data does not pose statistical estimation problems.

The LLC-test, proposed by Levin, Lin, and Chu, (2002) allows for heterogeneity of the intercepts across members of the panel. The test is computed basing on the average individual augmented Dickey-Fuller (ADF) t-statistics across cross-section units (Dickey & Fuller, 1979). The LLC-test examines the null hypothesis that each individual time series in the panel is integrated. On the other hand, the alternative hypothesis is that all individual time series are stationary. Notably, variable is said to be integrated of order I(1) if it must be differenced once to become stationary. The integration test is based on the following supporting equation:

$$\Delta y_t = \beta + \delta t + \psi y_{t-1} + \sum \zeta_i \Delta y_{t-1} + \eta_t \quad \text{.....(1)}$$

Where (y_t) is the relevant time series variable, (t) is a linear deterministic trend and (η_t) is an error term with zero mean and constant variance. The general regressions are based on Ordinary Least Squares (OLS) estimator. Thereafter, the estimated error terms from the final co-integration regressions are tested for unit roots using the tests. The lagged term (Δy_{t-1}) is included to make certain that the residuals are white noise.

Predicting trade potential

For each commodity, prediction of trade potential of EAC member states within the EU market was explored using the gravity model, which researchers (Linder, 1961; Linnemann, 1966; Anderson and van Wincoop, 2003) commend to be advantageous in assessing various variables on trade flows over other approaches. We used a two-step, *out of sample* approach to calculate each EAC member's trade potential in exporting a selected commodity to the EU market.

Firstly, we estimated the specified model below, based on panel data for a period of seven years.

$$M_{ijlt} = \beta X + \mu_{ij} + \lambda_{ijlt}$$ (i = Kenya, Tanzania & Uganda; j = 15 EU-member states; t = 2005-2011) .....(2)

Where M_{ijlt} denotes the monetary value of commodity *l* from the *i* th EAC member state to *j* th EU member state in year t in thousand US Dollars. This dependent variable is in a semi-log form so as to take into account of zero trade flows, given that the natural logarithm of zero is undefined. β represents a vector of parameter estimates.

X is a vector of explanatory variables which include:- the natural logarithm of current Gross Domestic Product (GDP) of each *i* th EA state and *j* th EU member state in US Dollars; distance between the economic centres of EAC member states (Nairobi for Kenya, Dodoma for Tanzania and Kampala for Uganda) and their j^{th} trading partner's commercial centre in Miles; preferential treatment granted under the EU-Generalised System of Preferences; annual inflation rate of each EAC member state; trade facilitation for each EAC member state; governance in each of the EAC member state; foreign direct investment of each EAC member state in current US Dollars; a dummy variable ($DLang_{ij}$) represents having the same official language between any pair of trading partners between EAC member states and EU-15 member states.

To control for heterogeneity across countries, both a dummy variable and country time-invariant effects (μ_{ij}) were used. Other than estimating the effects of having a common official language on trade flows between a country pair, the dummy variable (Dlang) was also used to overcome heterogeneity due to observable factors. The unobservable heterogeneity is overcome through the inclusion of country fixed effects (μ_{ij}). λ_{ijlt} is an idiosyncratic error term. In the second step, the obtained parameter estimates for each commodity at country level were used to simulate trade potential (Wang and Winters, 1992; Hamilton and Winters, 1992; and Brulhart and Kelly, 1999). A negative value implies that there exists un-exhausted export potential, hence suggesting existence of supportive evidence that there is room for trade expansion. On the contrary, a positive value implies that there is hardly any room for expansion of trade.

Predicting trade performance

In light of measuring the trade performance of EAC member states in exporting FVs into the EU market, the analysis employed is similar to that of Chen *et al.* (2007) and Amita (2004). Trade performance was evaluated using the *Relativedifference* (*Rd*) Index. The index was computed as expressed in equation (3), while using the mean predicted trade value together and the mean actual trade value.

$$Rdijlt = \frac{\left(\psi_{ijlt} - \phi_{ijlt}\right)}{\left(\psi_{ijlt} + \phi_{ijlt}\right)} * 100 \quad \text{..... (3)}$$

Where Rd_{ijlt} denotes relative difference of each EAC state's trade flows with trade partner j. ψ_{ijlt} refers to the mean actual trade and ϕ_{ijlt} is the mean predicted trade. The index varies between -1 and 1, and it gives an insight into the future direction of trade (Chen *et al.*, 2007). Positive values imply that there exists good trade performance, an indication of cooperation between the trading parties.

Empirical results

Diagnostic test results

Tests results for normal distribution[40] and equidispersion[41] assumptions indicate that FV import data series of the three EAC states abrogated the two assumptions. This implies that the existence of over-dispersion, coupled with distribution asymmetry problems rendered

[40]See Appendix A (Normality test results)

[41]See Appendix B (Over-dispersion test results)

the use of ordinary econometric estimation inapt. On the contrary, Pearson's correlation[42] test results show no supportive evidence for the existance of serial correlation problems, given that the correlation matrix values were not greater than the threshold value of 0.7. However, diagnostic test results for unit roots presented in Table 3 divulge that all commodity series were integrated of first order, with the exception of Beans (070820) from Uganda, Asparagus (070920) from Kenya and Vegetables (070990) from Tanzania. Series of these commodities were inherently stationary. All the other variables specified within the model were also found to be significantly stationary. Hence, the the null hypothesis of a unit root in the series was reject in favour of the alternative hypothesis that all the series are stationary.

Table 3: Panel Unit Root test results by commodity and country

Variable ('000 US$)	**Kenya**	**Tanzania**		**Uganda**	
	Levels	**Levels**	***I(1)***	**Levels**	***I(1)***
070820 Beans (M_{ijlt})	-11.20***	2.95	-6.41***	0.22***	
070920 Asparagus (M_{ijlt})	0.25***	-	-	-	-
070990 Vegetables (M_{ijlt})	-	0.24***		-	-
070960 Peppers (M_{ijlt})	-	-	-		-2.99***
080300 Bananas (M_{ijlt})	-	-	-		-5.0743***

*******, ******, ***** denote significance at 1%, 5% and 10% level respectively.

Source: Author's own calculations

Having ascertained the properties of the various data series at country level, we proceeded to predict potential trade by commodity for each EAC member state.

Predicted Trade potential

Given the fact that our analysis was based on highly disagregated (HS-6 digit level) datasets at country level, which were charaterised of excessive zero trade flows, over-dispersion as well as failure to meet the normal distribution assumption, we employed the Zero-Inflated Poisson (ZIP) model to generate the parameter estimates. ZIP is a modified version of the Poisson model, renown to deal with an excessive number of zero trade flows as well as over-dispersion within the data set. Furthermore, the model is not susceptible to heteroskedasticity (Wooldridge, 2002). With the exception of asparagus (-0.45 million US$) from Kenya and beans (-4,100 US$) from Uganda, results presented in Table 4 generally depict that there exists no un-exhausted trade between EAC states and the EU-15 market for the selected FV commodities. In the case of Kenya', results imply that the current asparagus imports into the EU-market is still way too little by approximately 0.45 million US dollars while Uganda's bean imports are also still less by about 4,100 US dollars than the quantities should be traded.

Table 4: Mean Trade potentialof selected FV commodities for EAC member states with the EU-15 states

EU-15 states	**Kenya ('000 US$)**		**Tanzania ('000US$)**		**Uganda ('000 US$)**		
	Beans	**Asparagus**	**Beans**	**Vegetables**	**Beans**	**Bananas**	**Pepper**
Austria	127.5	-467.4	-5.7	0.9	15.9	7.8	1.1
Belgium	8,043.7	-466.9	423.6	1.4	15.6	514.9	425.7
Denmark	3.4	-474.6	-5.2	-3.1	6.3	28.0	1.9
Finland	66.8	-469.6	10.2	-4.5	16.2	1.3	-0.6
France	17,981	-459.5	64.4	2.9	-14.9	5.6	169.4
Germany	9172.0	-455.6	-2.2	3.8	-19.3	114.4	178.5
Greece	-7.9	-458.5	-7.9	6.9	-72.5	-7.0	-2.4
Ireland	363.9	-473.2	-7.7	-11.6	25.5	2.4	15.2
Italy	121.6	-466.2	-6.3	7.3	-53.5	-7.3	0.3
Luxembourg	857.1	-469.6	-9.0	-11.8	9.8	-2.4	-3.5

[42]Available on request

Netherlands	20,331	-463.2	550.2	-0.1	-0.3	29.7	731.3
Portugal	6.4	-468.2	-5.6	-2.8	-4.2	-0.5	-3.1
Spain	11.4	-469.4	-5.4	2.7	-24.7	6.2	8.8
Sweden	8.4	-470.8	-4.9	-3.1	21.7	30	-1.2
UK	85,164	-184.2	2,071	199.5	16.8	2,233.2	2,284.6
Mean EU-15	**9,483.4**	**-447.8**	**204.0**	**12.5**	**-4.1**	**197.1**	**253.7**

Source: Author's own calculation

Implicitly, this means that Kenya's asparagus and Uganda's beans have a high trade potential within the EU-market. That is, there exists room for further trade expansion within the EU-market for asparagus and beans. This observation may be attributed to the fact Asparagus is among the few speciality vegetables enjoyed by consumers in the EU while Uganda's beans are renown for being organically produced. Conversely, results further reveal that actual EU imports of the other commodities exceeded the ideal tradable quantities. Kenya's beans registered the highest level of trade flows (*US$9.5 million*) that surpassed the optimum level, followed by Uganda's pepper (*US$ 0.25 million*) while vegetables from Tanzania ranked last (*US$ 12,500*). Results imply that there is hardly any room for further trade expansion for these commodities, *viz*: beans (*for Kenya and Tanzania*); Vegetables (*for Tanzania*); Bananas and Pepper (*for Uganda*) with the EU-market.

At country level, study findings indicate that Kenya has un-exhausted trade potential in bean imports with Greece (*US$ 7,900*) while un-exhausted trade potential in asparagus imports exists across all the EU-15 member states considered in this study. This suggests that there is supportive evidence for Kenya's trade expansion with Greece for bean imports and in all EU-15 member states for asparagus imports. For Tanzania, room for trade expansion in bean imports exists with Luxembourg, Greece, Ireland, Italy, Austria, Portugal, Spain, Denmark, Sweden and Germany. Similarly, provision for more vegetable imports from Tanzania still exists with Luxembourg (US$ 118,000), Ireland (US$ 116,000), Finland (US$ 4,500), Portugal (US$ 2,800), Netherlands (US$ 100), as well as an estimated trade worth of 3,100 US dollars for Denmark and Sweden. This also implies that Tanzania has room for trade expansion with the above mentioned EU-member states in bean and vegetable commodities.

Results show that FV imports from Uganda (Beans, bananas and pepper), there exists un-exhausted trade potential with Greece and Portugal. Thus, trade in these commodities has the capacity to grow further. Findings may be attributed to the fact that the EU-15 market registered no beans and banana imports from Uganda during the 2005-2011 period. In the case of beans, other EU states that exhibited un exploited trade potential, hence existence of room for trade expansion include: Italy (US$ 53,500), Spain (US$ 24,700), Germany (US$ 19,300), France (US$ 14,900) and Netherlands (US$ 300). In the case of bananas, Italy and Luxembourg presented a market of un-exhausted trade potential, estimated at 7,300 and 2,400 US dollars, correspondingly. Other than Greece and Portugal, Luxembourg (US$ 3,500), Sweden (US$ 1,200) and Finland (US$ 600) also provide a ground for more trade expansion in pepper imports from Uganda.

Predicted Trade performance

We used the Relative difference index to determine the trade preformance of the selected FV imports in the EU market from EAC member states. Results presented in Figure 3 depict that Kenya exhibits poor trade performance in asparagus within the EU-market, given that the estimated index is negative across all the EU-15 member states. However, Kenya generally exhibits good trade performance (38%) in her bean imports into the EU-15 market.

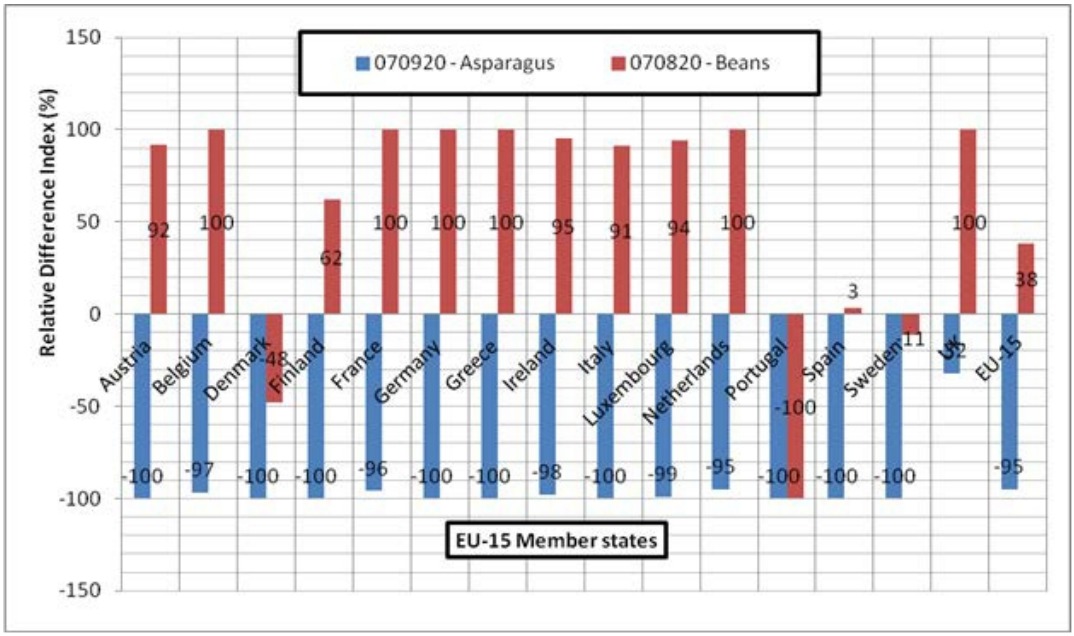

Figure 3: The Relative Difference Index for Kenya's beans and asparagus exports with the EU-15 member states
Source: Author's own calculation

Detailed results also show that Kenya has a poor trade performance with Portugal (100%), Denmark (48%) and Sweden (11%) in bean imports. This poor performance may be associated with language barriers, among other factors. Findings further show that Kenya has very good trade performance with all the other EU-15.

Generally, findings show that Tanzania has a poor trade performance with the EU-15 market for both vegetable (83%) and bean (45%). This may be due to the very few countries with which Tanzania trades within the European Union. Figure 4 illustrates that Tanzania has good trade performance in exporting of beans to Belgium (96%), Netherlands (97%), United Kingdom (UK) (99%) and Finland (14%). Worthwhile to note, UK is the only EU-15 member state with which Tanzania has good trade performance for both commodities. This observation may be associated with the fact that Tanzania was once a British protectorate, thus there exists long term trade relations between the two countries.

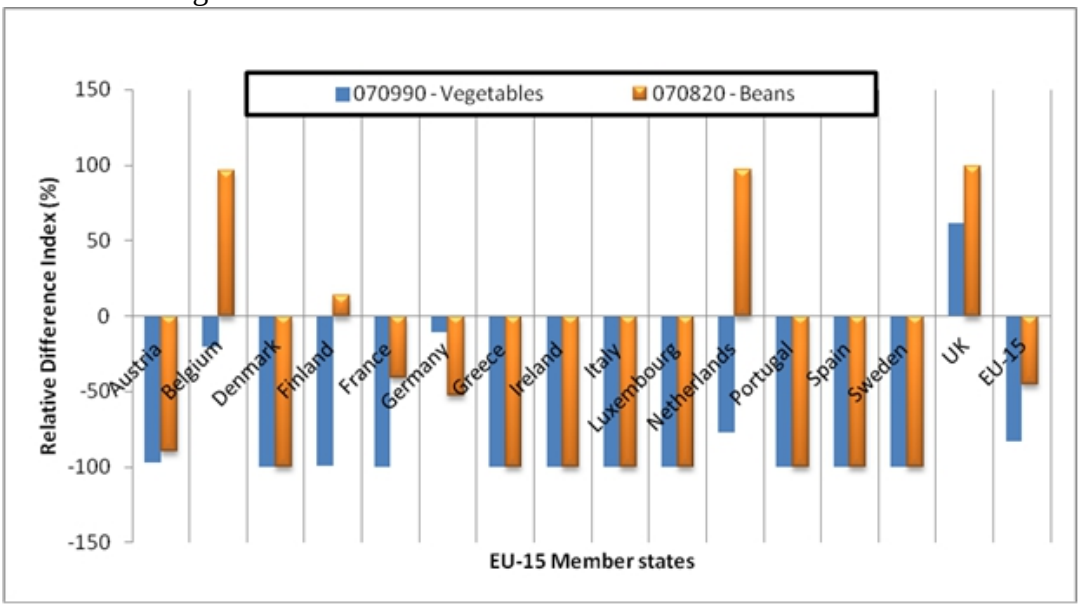

Figure 4: The Relative Difference Index for Tanzania's beans and vegetable exports with the EU-15 member states
Source: Author's own calculation

Uganda's trade performance analytical findings depict that the country has a poor trade performance in all the three commodities with the EU in general. Worst trade performance was observed in imports of bean (74%), followed by pepper (11%) and then bananas at 6%. At commodity level, Uganda exhibited good trade performance trade in all the three horticultural commodities with Belgium and UK only. This may be attributable to the long-term colonial ties with Britain and similarity in language. Although English is not one of the three official languages in Belgium, it is widely spoken country wide as the second native language by the Belgians (Wikipedia, 2014). Conversely, results (Figure 5) indicate that Uganda has poor trade performance with Finland, Greece, Italy, Portugal and Spain in all the three commodities. The results thus imply that Uganda has more room to trade with these EU-15 member states in all the three commodities.

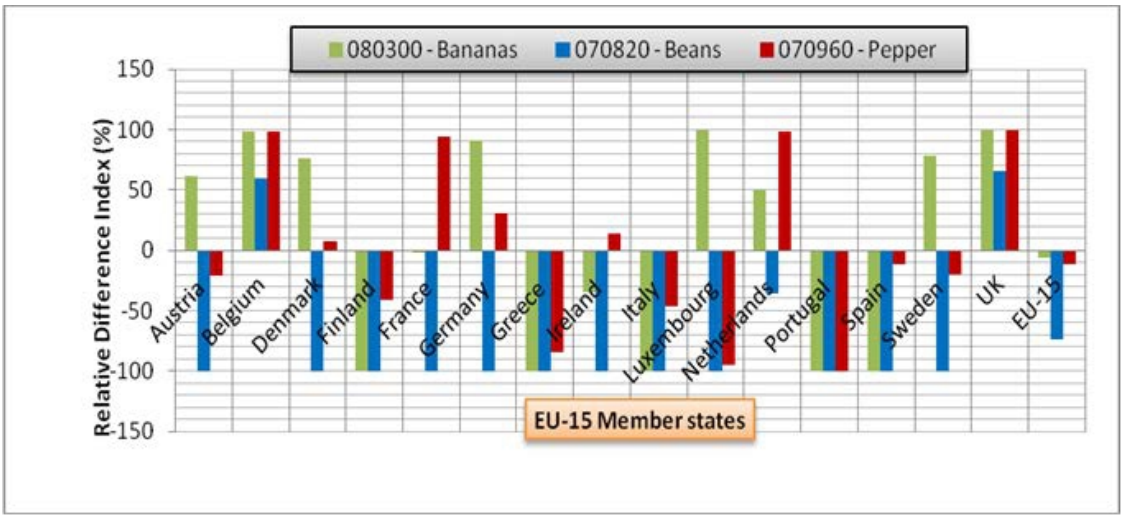

Figure 5: The Relative Difference Index for Uganda's beans, bananas and pepper exports with the EU-15 member states

Source: Author's own calculation

Conclusion and policy implications

In this paper, we aimed at predicting trade potential and performance of EAC member states within the EU-15 market. Generally, Kenya and Uganda exhibit supportive evidence for the existence of un realised trade potential. This implies that these countries can further expand their trade in the selected FVs within the EU-market. For Kenya, asparagus is a key commodity for further market expansion across all EU-member states while Uganda's opportunity in market expansion for beans and pepper lies in establishing stronger trade partnerships with EU states like France, Germany, Luxembourg, Portugal and Greece, among others.

Other than Belgium, Finland, France, Netherlands and the United Kingdom, all the other EU member states have room for trade expansion for bean imports from Tanzania. In light of trade performance, results divulge that all the three EAC member states have poor trade performance with the EU-market in the various FV commodities. This suggests a possibility that there exists an array of trade barriers which curtail EAC member states' imports into the EU-market. As a policy implication, it is incumbent upon the governments of the various states within the EAC and EU to foster trade cooperation in FV commodities.

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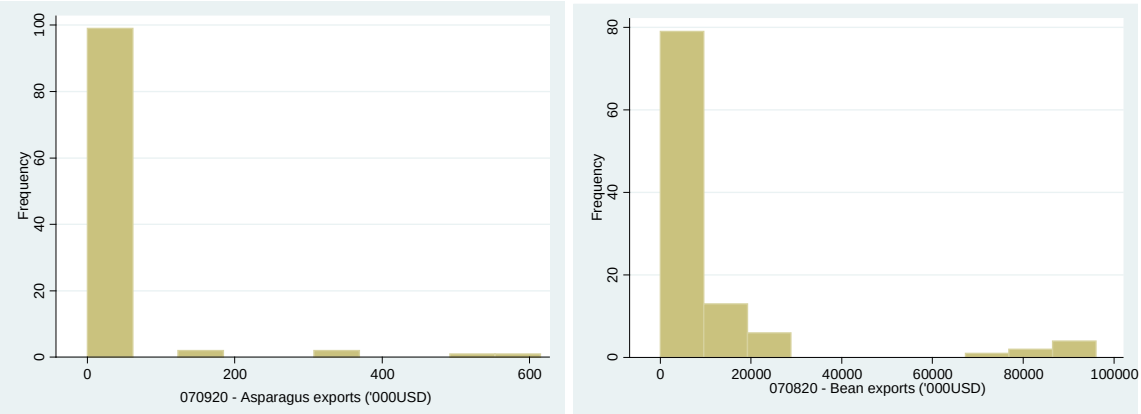
Appendix A: Normality test results for FV commodities for each EAC member states

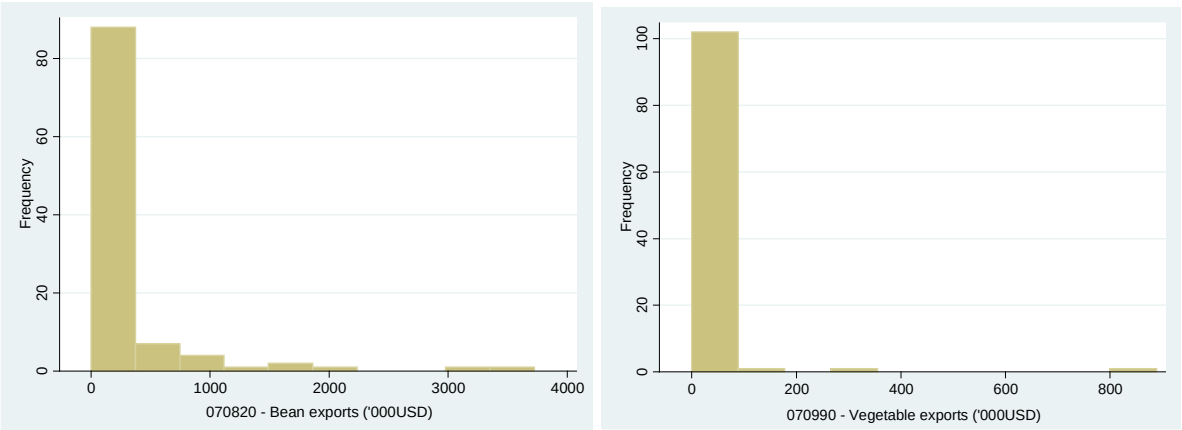
A1: Kenya's normality test results for Asparagus and Beans

Asparagus **Beans**



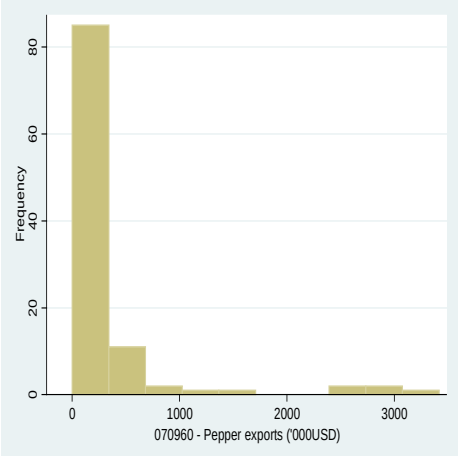
A2: Tanzania's normality test results for Beans and Vegetables

Beans **Vegetables**

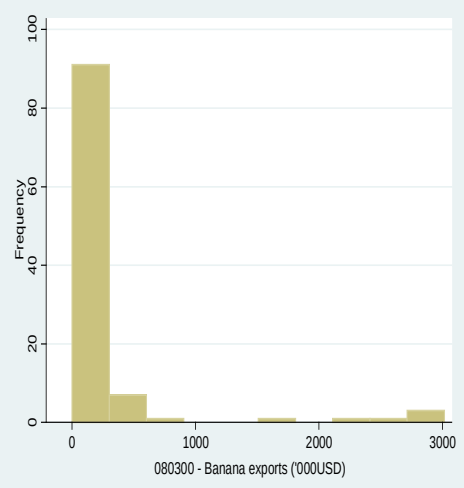


A3: Uganda's normality test results for Pepper, Bananas and Beans

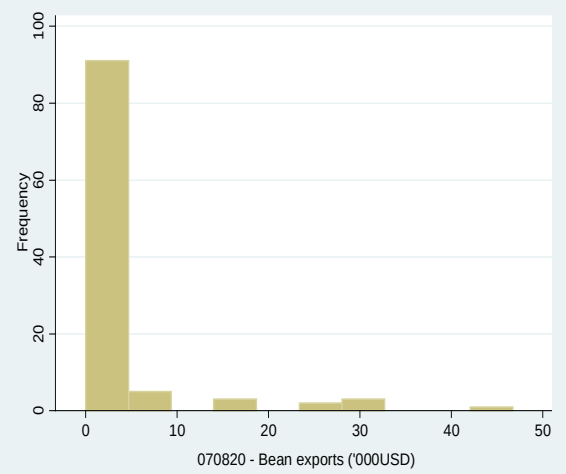
Pepper



Bananas



Beans



Appendix B: Over-dispersion test- results for the FV commodities

Country	HS 6- Digit code	Description	Mean ('000 US$) (n=105)	Variance
Kenya	070820	Asparagus, fresh/chilled	9,488.14	4.68e+08
	070920	Beans (Vigna spp.)	22.10	8,017.33
Tanzania	070820	Vegetables,fresh/chilled	210.14	353,270.4
	070990	Beans (Vigna spp.)	13.88	8,393.40
Uganda	070820	Peppers	2.67	64.85
	070960	Bananas	257.82	422,124
	080300	Beans (Vigna spp.)	200.11	373,606