Article

Outlook on AGRICULTURE

Outlook on Agriculture
2017, Vol. 46(3) 213–222

DOI: 10.1177/0030727017728590
journals.sagepub.com/home/oag
SAGE

Impact of European Union Generalized System of Preferences scheme on fruit and vegetable exports from East Africa: A preference margin approach

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Abstract

We evaluate the impact of the Generalized System of Preferences (GSP) scheme on horticultural exports from Kenya, Tanzania and Uganda to the European Union (EU). The preference margin, computed as the difference between trade-weighted Most Favoured Nation's rate and the ad valorem equivalents(, is used as a proxy for the GSP scheme. The zero-inflated Poisson estimator is used to control for overdispersion and excess zero trade flows, while time-invariant effects control for heterogeneity. The findings suggest that the EU-GSP scheme promotes bean exports from the three East African states as well as pepper from Uganda. Conversely, the results suggest that the scheme seems not to enhance export of asparagus from Kenya, vegetables from Tanzania and bananas from Uganda to the EU.

Keywords

Ad valorem equivalent, horticultural exports, gravity model, Kenya, panel data, Uganda

Introduction

The United Nations Conference on Trade and Development (UNCTAD, 2008) argued that the export-driven growth of horticulture had been impressive in many Sub-Saharan African countries. Furthermore, it was noted that the horticulture sector had greatly contributed towards poverty alleviation and rural development given that it involves a large number of small-scale growers who produce fruits and vegetables (FVs) for export (Lenné and Ward, 2010; Mithöfer et al., 2008). Minot and Ngigi (2004) suggest that this sector is the 'African Success Story'. Among other factors, Cardamone (2011) associates such success with the non-reciprocal preferential trade policies granted by the European Union (EU) to developing countries so as to enhance economic growth and development through trade. Recent studies that evaluate the role of trade policies on trade flows of agricultural commodities (Cipollina et al., 2013; Raimondi et al., 2012) reveal that the use of a continuous variable, generally referred to as the preference margin (PM), is a more appropriate approach in estimating the effect of preferential treatment on trade flows rather than using a 'dummy variable'. This approach builds on the various policy instruments, namely, tariffs, quotas and entry prices embedded within the preferential treatment under consideration. Existing literature based on PM measures provides conflicting findings regarding the role of preferential trade policies on trade flows.

The literature reports that preferential trade policies, particularly the Generalized System of Preferences (GSP), selectively promotes trade flows of horticultural commodities into the EU market (Cardamone, 2011; Philippidis et al., 2012). Cirera et al. (2011) and Raimondi et al. (2012) report that the impact of a given non-reciprocal trade policy largely relies on the method used to measure it. In addition, none of the studies reviewed used a combination of all policy instruments (Most Favoured Nation's (MFN), tariff rates and specific duties) embedded within the EU-GSP scheme to compute the PM, yet ignoring any of them jeopardizes the true value of the margin. Therefore, the various preferential margin measures used as a proxy of the impact of the EU-GSP scheme under the gravity model framework do not provide an appropriate estimation of the effect of the GSP scheme on trade flows into the EU market. In addition,

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some studies (e.g. Cipollina et al., 2013) did not focus on particular commodities, yet preferential treatments are tailored to suit different commodities with differing accruing benefits. Thus, existing findings may not be suitable generalize the impacts of the GSP scheme on agricultural exports to the EU, and knowledge gap exists regarding the impact of the GSP scheme on horticultural exports from developing countries (notably Kenya, Tanzania and Uganda) to the EU.

In this study, we use an augmented gravity model based on highly disaggregated data (HS-6 digit level) to estimate the impact of the EU-GSP scheme on selected horticultural exports from Kenya, Tanzania and Uganda to the EU. It was hypothesized that the EU-GSP scheme fosters exports of horticultural commodities from these countries to the EU. To describe a different perspective to that of Cipollina and Salvatici (2010), Cardamone (2011), Raimondi et al. (2012) and Cipollina et al. (2013), we considered asparagus, bananas, beans, peppers and vegetables. Previous studies focused on agricultural commodities including grapes, apples, pears, oranges and mandarins which are of lower economic importance to East African economies (Kenya, Tanzania and Uganda). According to Lubinga (2014), asparagus, bananas, beans, peppers and vegetables exhibit high export competitiveness within the EU market. Furthermore, the specified model employs a PM measure that takes into account the world price (MFN), ad valorem tariffs and specific duties; and we use advanced estimation techniques that account overdispersion and the excess zero trade flows that are a key feature of highly disaggregated data.

Synthesis of published evidence

Literature based on different methods of quantifying the value of PM indicates that the EU-GSP scheme has both positive and negative effects on agricultural exports from developing economies to the EU. The various PM measures are discussed by Aiello and Demaria (2010), Cardamone (2009), Carrère (2011), Carrère et al (2010), Fugazza and Nicita (2011) and Low et al (2005). The effects of the scheme vary depending on the commodity under consideration, the PM measure used and the exporting country. A general outlook based on a meta-analysis of literature by Cipolina and Pietrovito (2011) shows that the positive coefficient of elasticity of the different PM measures used ranges between 0.004 and 15.9, while Francois et al (2006) report negative coefficients.

Within the gravity model framework, the literature (see Aiello and Demaria, 2010; Cipollina and Salvatici, 2010) reveals that the GSP scheme enhances export of agricultural commodities to the EU, irrespective of the method used to compute the PM. For example, Cardamone (2011) expressed the PM in absolute terms, as the difference between the applied MFN duty minus the preferential tariffs, while Cardamone (2009) calculated the explicit PM value as the variation between the uppermost tariff applied by the EU and the duty paid by an exporter for a given product. Conversely, Cirera et al. (2011) used relative explicit PM, computed as the ratio of absolute PM to the applied MFN rate. That study also took into account the possible alternative versions of the MFN rate. Raimondi et al. (2012) expressed explicit PM as the percentage difference between the tariff encountered by an MFN exporter and the tariff-rate quota equivalent faced by the beneficiary country when it exports to the EU. Cipollina and Salvatici (2008, 2010) used a relative measure of explicit PM, defined as the ratio of the maximum applied duty to the applied duty, while Cipollina et al. (2013) used relative PM, denoted as the ratio of duties paid by all exporting countries to the applied tariff rate subjected to each exporter within the EU market. In contrast, Aiello and Demaria (2010) measured the relative PM as the ratio between the PM and the MFN rate, with the PM representing the difference between the MFN and preferential tariff.

FV production and consumption trends

According to the Food and Agriculture Organization Statistical Databases (FAOSTAT),[1] the world's FV yield increased by 14.2% between 2005 and 2013, representing an 18.2% rise in the area harvested, while within East Africa, yield in Kenya and Tanzania increased by 18.6% and 23.3%, respectively. Over the same period, Uganda's FV yield dropped by 12.8%, while the area harvested increased across the three countries (12.5% for Kenya, 35% for Tanzania and 8.9% for Uganda). The overall high yield in Kenya relative to Uganda and Tanzania may be due to the high investment in new technologies (Fernandez-Stark et al., 2011). Uganda and Tanzania are not yet advanced in the horticultural sector (Lenné and Ward, 2010), yet the FVs are very vulnerable to changes in climatic conditions. On average of over 9 years (2005–2013), FV production accounted for 21.6%, 16.2% and 37.3% of the total crop production in Kenya, Tanzania and Uganda, respectively (FAOSTAT), with more than 80% of vegetables produced by smallholder farmers in East Africa (Lenné and Ward, 2010; Putter et al., 2007). Despite the increasing trend in FV yield (Figure 1), Sachdeva et al. (2013) noted that daily FV consumption was below the recommended requirement. Latest statistics from the World Bank global consumption database[2] reveal that annual per capita consumption of FV by the end of 2010 in Kenya, Tanzania and Uganda was US$22.8, US$8.1 and US$24.8, respectively.

FV export trends

Based on FAOSTAT, the volume of global agricultural trade from East African economies has been increasing and largely comprises high-value products such as horticultural produce. Over the past two decades, the share in value of world's exports of FV goods from the three economies span from 0.2% (lowest share) in 2012 to 0.7% (highest share) in 2014 (TradeMap database[3]), while dried vegetables (0713), nuts (0801) and leguminous vegetables (0708) accounted for 31%, 23% and 18%, respectively, of the region's total FV exports in value in 2015. The EU remains the major destination for FV exports from the East African (EA) countries (Figure 2). Kenya's FV exports to the EU account for more than 80% of all FV exports from the region, while

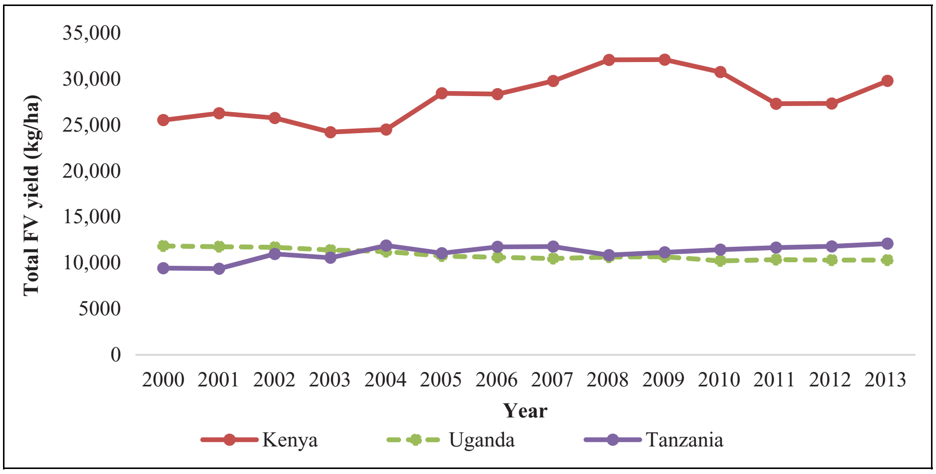

Figure 1. Fruit and vegetable yield from three East African countries. *Source*: FAOSTAT.

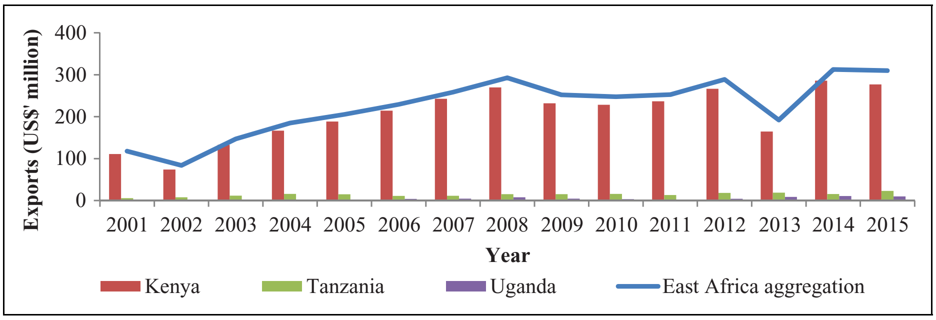

Figure 2. East Africa's fruit and vegetable export trend to the EU, by value. *Source*: TradeMap database.

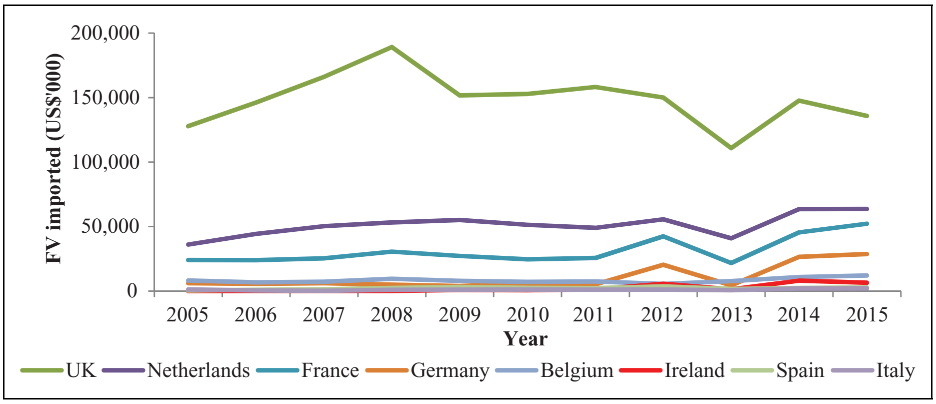

Figure 3. Major EU importers of East Africa's fruits and vegetables. *Source*: TradeMap database. EU: European Union.

Uganda exports the least. Within the EU, EA's FVs are mainly exported to UK, Netherlands, France, Germany and Belgium (Figure 3).

Evaluation of the competitiveness of FV exports from EA states by Lubinga (2014) revealed that asparagus, beans, bananas, vegetables and peppers among others perform well in the EU. For Kenya, beans and asparagus were the core FVs, while beans and vegetables were the most competitive for Tanzania. For Uganda, bananas, beans and peppers were the major commodities. Figure 4 shows that Kenya exported more beans than asparagus. On average, bean exports earned Kenya US$111.4 million as compared to asparagus (US$2.53 million) between 2000 and 2011. Highest earnings from exports were in 2008 (US$162 million for beans and US$0.73 million for asparagus). Similarly, bean exports from Tanzania exceeded other vegetables (070990; Figure 5). On average, bean exports accounted for more than US$2.4 billion, while the value of vegetables was worth US$0.599 billion. For Uganda, the trend in the three most competitive FV exports to the EU is shown in Figure 6, which shows that pepper was the largest crop exported by value, followed by bananas and then beans. Over a 10-year period (2002–2011), pepper exports were on average valued at US$2.4 billion, while bananas were US$1.9 billion. Bean exports were valued at US$5.81 million over the same period.

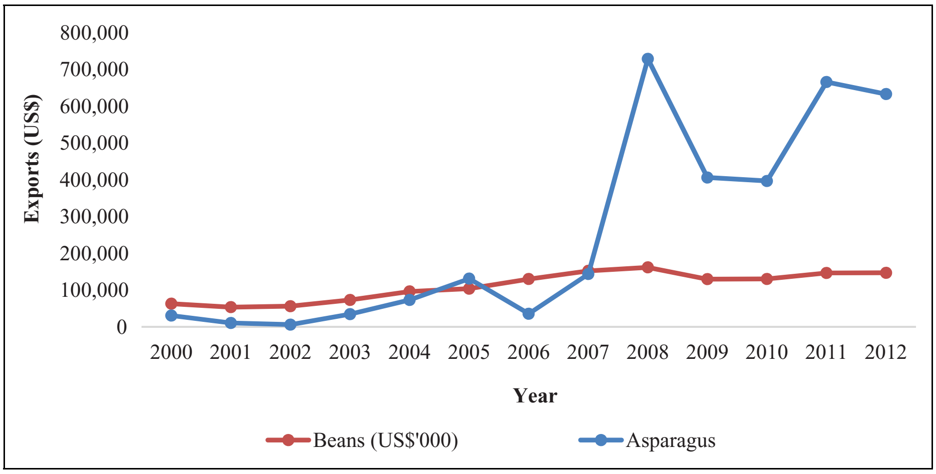

Figure 4. Kenya's top two most competitive FV exports into the EU. *Source*: COMTRADE database (nd) and Lubinga (2014).

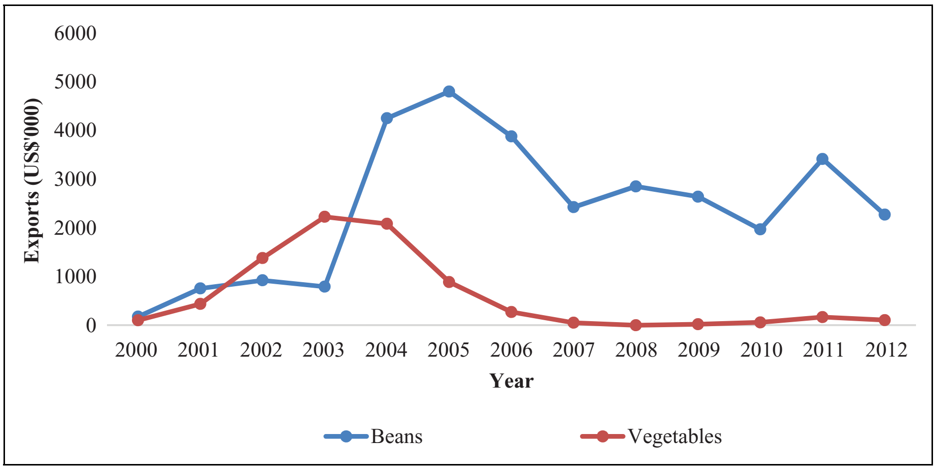

Figure 5. Tanzania's top two most competitive FV exports into the EU. *Source*: COMTRADE database (nd) and Lubinga (2014).

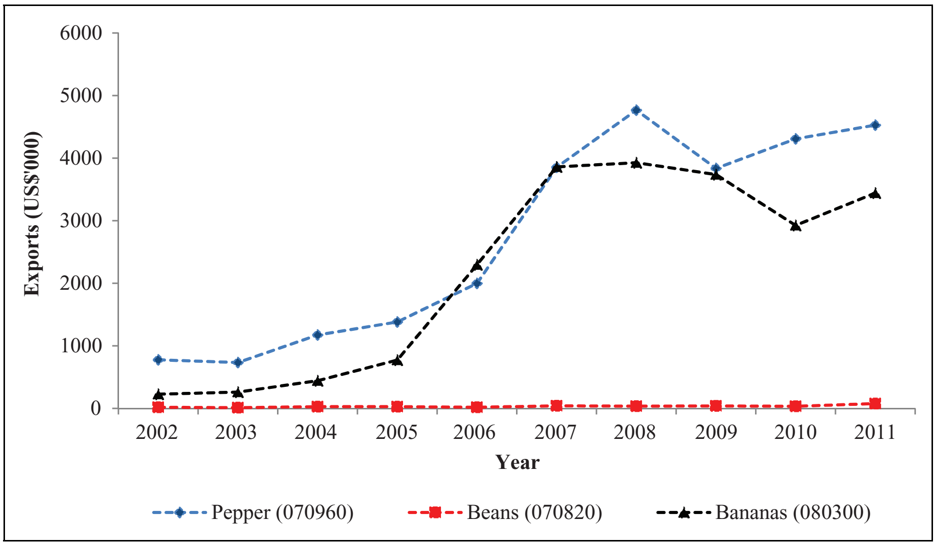

Figure 6. Uganda's top three most competitive FV exports into the EU. *Source*: COMTRADE database (nd) and Lubinga (2014).

Methodology

In this study, the approach was based on the gravity flow model, pioneered by Tinbergen (1962) and Poyhonen (1963). Despite the fact that the model was initially criticized for lacking theoretical foundations (Cardamone, 2011), it has received a lot of attention coupled with significant modifications (see Anderson and van Wincoop,

Table 1. Independent variables denoted by *Z*.

Variable	Description
$\ln PM_{ijlt}$	Preference margin of a specific commodity (percentage)
$\ln PGDP_{ijt}$	Product of exporter's and importer's per capita GDP in current US$
$\ln D_{ij}$	Distance in miles between trading partners
$\ln AV\_MTR_{ij}t$	Average multilateral trade resistance term
$\ln Costexp_{ijt}$	Cost to exporting a 20-foot container in US$ per container
$\ln GOV_{it}$	The role of the public sector and government institutions (from 1 = *low* to 6 = *high*)
$\ln inflat_{it}$	Exporting country's mean annual inflation rate (%)
$\ln Costbiz_{it}$	The cost of establishing a business (percentage of GNI per capita)
RSI_{ij}	Religious similarity index between trading country pairs
$Dlang_{ij}$	Dummy variable for common language
$Landlocked_{ij}$	Dummy for the number of landlocked countries (=0 if both countries are not landlocked, =1 if one is landlocked and =2 if both are landlocked)
$Island_{ij}$	Dummy for the number of island countries (=0 if both are not islands, =1 if one is an island and =2 if both are islands)
μ_j	Importer time-invariant effects

2003; Deardorff, 1998). Hence our model, based on panel data for a period of 7 years was expressed as

$$Q_{ijlt} = \beta Z + \alpha PM_{ijlt} + \mu_j + \lambda_{ijlt} \quad (1)$$

(i = Kenya, Tanzania & Uganda; j = 15 EU-member states; t = 2005-2011) where

Q_{ijlt} is the value of commodity l from country i within the EA region to country j within the EU in year t in thousand US$. To take into consideration zero trade flows, the dependent variable is expressed in a semi-log form since the natural logarithm of zero is undefined. β represents a vector of parameter estimates. With the exception of the dummy variables, the Religious Similarity Index (RSI) as well as the importer time-invariant effects, all the other covariates were transformed into natural logarithms. Computation of RSI follows Ruiz and Vilarrubia (2007). Z denotes a vector of various independent variables (Table 1). μ_j denotes importer time-invariant effects, while λ_{ijlt} is the idiosyncratic error term.

Following Aiello and Demaria (2010) and Agostino et al. (2007), heterogeneity across countries was controlled by use of a set of dummy variables and time-invariant effects variables. Furthermore, based on the work by Anderson and van Wincoop (2003), the multilateral trade resistance term was incorporated to control for the endogeneity problem associated with gravity model specifications. Anderson and Neary (2005) and Cardamone (2011) suggest that using highly disaggregated data also minimizes the problem. Thus, three approaches were used to overcome the problem of endogeneity bias.

Despite the fact that the approach by Carrère (2011) is theoretically founded and takes into account both domestic and import competition, we closely follow explicit PM measures used in previous studies (Cardamone, 2011; Cipollina and Salvatici, 2010; Cipollina et al., 2013; Raimondi et al., 2012). In contrast to these studies, our computation of PM for each commodity was based on a combination of trade-weighted applied MFN rates, ad valorem tariff rates and specific duties. The trade-weighted applied MFN rate takes into account the global competitors at tariff line level, and the weights were based on reference group imports. In this context, Kenya, Tanzania and Uganda were categorized as least developed countries. These countries are granted similar preferential treatment within the EU market; hence they compete at the same level. The use of a combination of these trade policy instruments enhances the verification of advantages or disadvantages associated with the scheme (Fugazza and Nicita, 2010).

Table 2. Selected FV exports with high competitiveness in the EU.

Country	Code	Commodity	Mean revealed comparative advantage
Kenya	070920	Asparagus	8504.32
	070820	Beans (Vigna spp.)	3.70
Tanzania	070990	Vegetables	24.60
	070820	Beans (Vigna spp.)	2.23
Uganda	070960	Fruits of the genus Capsicum	27,668.87
	080300	Bananas	25.98
	070820	Beans (Vigna spp.)	1.23

Adapted from Lubinga (2014).
FV: fruit and vegetable: EU: European Union.

Given that these instruments cannot be directly compared or summed (Bouët et al., 2004), they cannot be used in large-scale modelling exercises without being transformed. Therefore, the policy instruments are usually transformed into ad valorem equivalents (AVEs). An AVE refers to a tariff presented as a proportion of the value of goods cleared through customs (Bouët et al, 2004; Gibsonet al, 2001). AVEs used in the analysis were extracted from UNCTAD's Trade Analysis Information System. Thus, for each commodity, competition-adjusted PM computed as the absolute difference between the trade-weighted applied MFN rate and the AVEs was expressed as

$$PM_{ijlt} = TwMFN_{jlt} - AVE_{ijlt} \quad (2)$$

where TwMFN represents the trade-weighted applied MFN rate and AVE denotes that ad valorem equivalent of commodity l from country i to country j in year t.

Data

Panel data for 2005–2011 for Kenya, Tanzania, Uganda and 15 EU member states (Belgium, France, Germany, Italy, Luxembourg, Netherlands, Denmark, Ireland, United Kingdom, Greece, Portugal, Spain, Austria, Sweden and Finland) were used. Seven commodities (Table 2) were selected following Lubinga (2014) who noted that they exhibit export competitiveness within the EU market. Highly disaggregated data at HS-6 digit level were

Table 3. Effect of the EU-GSP scheme on Kenya's asparagus and bean exports.[a]

	Asparagus (070920)		Beans (070820)	
Variable	Coefficient	*p* Value	Coefficient	*p* Value
Constant	78.15[b] (16.912)	0.005	73.05[b] (27.677)	0.000
$\ln PM_{ijlt}$	−0.49[b] (0.136)	0.000	1.93[b] (0.543)	0.000
$\ln PGDP_{ijt}$	−0.94[c] (0.424)	0.027	−0.95[c] (0.426)	0.026
$\ln D_{ij}$	−0.68 (2.672)	0.800	−0.71[b] (2.654)	0.788
$\ln AV\_MTR_{ijt}$	1.09[b] (0.083)	0.000	1.08[b] (0.083)	0.000
$\ln inflat_{it}$	−0.75[b] (0.070)	0.000	−0.75[b] (0.070)	0.000
$\ln Costbiz_{it}$	−14.37[b] (1.094)	0.000	−14.56[b] (1.047)	0.000
$\ln FDI_{it}$	0.36[b] (0.062)	0.000	0.36[b] (0.062)	0.000
$Dlang_{ij}$	2.22[b] (0.161)	0.000	2.23[b] (0.160)	0.000
Importer time-invariant effects	−2.2e−06[b] (5.4e−07)	0.000	2.2e−06[b] (5.3e−07)	0.000
Vuong test (*Z*-value)	3.95[b]	0.000	3.95[b]	0.000
Number of observations (*N*)	105		105	
Nonzero observations (N1)	30		77	
Zero observations (N0)	75		28	
Log likelihood	−494.564		−494.634	

EU-GSP: European Union-Generalized System of Preferences.
[a]Dependent variable (M_{ijlt}) = Value of commodity *l* from Kenya to *j*th EU member state in year *t* (US$'000).
[b]Significance at 1% level.
[c]Significance at 5% level.

obtained from the COMTRADE database, while data used to construct the RSI_{ij}, the dummy for landlockedness as well as the dummy for the number of island countries were obtained from the Cenral Intelligence Agency (CIA) World Factbook. Other data were obtained from the World Bank database of development indicators and world atlas.

Diagnostic tests and estimation technique

Highly disaggregated panel data are susceptible to excessive zero values and overdispersion (Helpman et al., 2008; Linders and De Groot, 2006; Martin and Pham, 2008; Silva and Tenreyro, 2006). Thus, other than the unit root and collinearity tests, we also carried out the normality and overdispersion tests. For unit roots and collinearity, Levin et al. (2002) and Pearson's correlation tests were used, respectively. The normality and overdispersion tests were undertaken to examine if the series for the dependent variable defied the normal distribution and equi-dispersion assumptions, respectively. Overdispersion refers to a condition where the conditional variance deviates from the conditional mean (Martijn et al., 2009; Siliverstovs and Schumacher, 2009) and leads to consistent but inefficient estimates. Statistical theory under the Poisson distribution assumes that the mean and variance are the same. Hence, a large deviation between the mean and the variance suggests existence of overdispersion within the series. To test for this, descriptive statistical analysis was carried out, while in the case of the normality test, a simple histogram was used to show the distribution pattern of the various series. The findings reveal that the series defied the normal distribution and equi-dispersion assumptions. The series also exhibited a high level of zero-valued trade flows; therefore, ordinary estimators such as the ordinary least squares (OLS) and the Poisson model were inappropriate. A zero-inflated Poisson (ZIP) estimator was then used. ZIP is not susceptible to heteroskedasticity and can deal with excessive zero-valued trade flows (Wooldridge, 2002).

Results and discussion

Empirical results for Kenya asparagus and bean exports are presented in Table 3. They reveal that the scheme promotes export of beans but not asparagus to the EU. At a 1% level of significance, a unit increase in the preferential margin granted under the EU-GSP scheme leads to a rise in the value of Kenya's bean exports by US$1930 ($p < 0.01$), while asparagus exports decline by US$490 ($p < 0.01$). The negative observation exhibited by asparagus exports may be attributed to competition from other exporters (e.g. Colombia, Ecuador and Egypt among others) with similar commodities to the EU (Government of Kenya, 2012). Furthermore, the negative results may be associated with the stringent standard requirements (e.g. GLOBALG.A. P) where FVs are subject to entering Europe. Compliance to these standards is expensive, thus directly impacting smallholder farmers from the international market (Aloui and Kenny, 2005; Augier *et al*, 2005; Kuwornu and Mustapha, 2013). The negative results of the EU-GSP scheme on Kenya's asparagus exports concur with Asfaw et al. (2010). Estimates of the other covariates were found to be consistent with the theoretical expectations of the gravity model.

For Tanzania, parameter estimates of all the other covariates exhibit significant effects on vegetable exports to the EU and the variables were found to exhibit the expected signs (Table 4). The coefficient on PM ($\ln PM_{ijlt}$) suggests that the EU-GSP scheme significantly boosts the export of Tanzanian beans to the EU. A unit change in the PM granted under the scheme is associated with an increase

Table 4. Effect of the EU-GSP scheme on Tanzania's vegetables and bean exports.[a]

Variable	Beans (070820)		Vegetables (070990)	
	Coefficient	*p* Value	Coefficient	*p* Value
Constant	8.03 (8.944)	0.369	213.40[b] (96.937)	0.028
$\ln PM_{ijlt}$	1.65[c] (0.089)	0.000	−4.41[c] (0.426)	0.000
$\ln PGDPijt$	0.59[c] (0.061)	0.000	−13.34[c] (2.074)	0.000
$\ln D_{ij}$	−1.28 (1.105)	0.245	5.81 (9.600)	0.545
$\ln AV\_MTR_{ijt}$	0.49[c] (0.028)	0.000	7.06[c] (1.212)	0.000
$\ln Costexp_{it}$	−0.80[c] (0.117)	0.000	–	–
$\ln GOV_{it}$	2.03[c] (0.105)	0.000	–	–
$\ln inflat_{it}$	–	–	1.75[c] (0.210)	0.000
$\ln Costbiz_{it}$	–	–	−1.19[b] (0.495)	0.016
$Dlang_{ij}$	2.05[c] (0.056)	0.000	2.98[b] (1.564)	0.056
$Landlocked_{ij}$	−4.47[c] (0.712)	0.000	−1.13 (3.240)	0.727
Importer time-invariant effects	−5.52e−06[c] (1.18e−07)	0.000	−6.1e−05[c] (1.2e−05)	0.000
Vuong test (*Z*-value)	5.31[c]	0.000	1.50[d]	0.066
Number of observations (*N*)	105		105	
Nonzero observations (N1)	34		13	
Zero observations (N0)	71		92	
Log likelihood	−3337.181		−117.516	

EU-GSP: European Union-Generalized System of Preferences.
[a]Dependent variable (M_{ijlt}) = Value of commodity *l* from Tanzania to *j*th EU member state in year *t* (US$'000).
[b]Significance at 5% level.
[c]Significance at 1% level.
[d]Significance at 10% level.

Table 5. Effect of the EU-GSP scheme on Uganda's banana, beans and pepper exports.

Variable	Bananas (080300)		Beans (070820)		Pepper (070960)	
	Coefficient	*p* Value	Coefficient	*p* Value	Coefficient	*p* Value
Constant	43.88[b] (2.263)	0.000	99.92 (1165.02)	0.932	−0.29[b] (2.188)	0.000
$\ln PM_{ijlt}$	−1.48[b] (0.050)	0.000	1.98[c] (1.183)	0.095	0.40[b] (0.081)	0.000
$\ln PGDP_{ijt}$	−0.569[b] (0.047)	0.000	−0.145 (1.059)	0.891	1.08[b] (0.042)	0.000
$\ln D_{ij}$	−1.48[b] (0.246)	0.000	−6.68 (9.022)	0.459	−0.64[d] (0.260)	0.014
$\ln AV\_MTR_{ijt}$	0.33[b] (0.015)	0.000	9.22[b] (0.862)	0.000	0.66[b] (0.026)	0.000
$\ln inflat_{it}$	–	–	0.21 (0.133)	0.110	0.02 (0.017)	0.363
$\ln Costbiz_{it}$	−2.72[b] (0.157)	0.000	–	–	0.80[b] (0.166)	0.000
$\ln Costexp_{it}$	–	–	−0.04 (0.377)	0.911	–	–
$\ln Gov_{it}$	2.26[b] (0.143)	0.000	−7.69[b] (1.066)	0.000	−1.66[b] (0.125)	0.000
$Dlang_{ij}$	2.27[b] (0.000)	0.000	3.70[d] (1.729)	0.032	−0.83[b] (0.091)	0.000
$Landlocked_{ij}$	–	–	−14.10 (1162.62)	0.990	−5.09[b] (0.444)	0.000
$Island_{ij}$	–	–	–	–	2.55[b] (0.092)	0.000
RSI_{ij}	−0.0004[b] (0.00001)	0.000	0.001[b] (0.0002)	0.000	−0.0005[b] (0.00001)	0.000
Importer time-invariant effects	–	–	−0.00008[b] (0.00001)	0.000	−3.30e−06[b] (1.06e−07)	0.000
Vuong test (*Z*-value)	4.96[b]	0.009	1.81[d]	0.035	3.40[b]	0.000
Number of observations (*N*)	105		105		105	
Nonzero observations (N1)	58		19		75	
Zero observations (N0)	47		86		30	
Log likelihood	−8408.813		−76.421		−8671.796	

EU-GSP: European Union-Generalized System of Preferences.
[a]Dependent variable (M_{ijlt}) = Value of commodity *l* from Uganda to *j*th EU member state in year *t* (US$'000).
[b]Significance at 1% level.
[c]Significance at 10% level.
[d]Significance at 5% level.

(US$1650, $p < 0.01$) in the value of bean exports in the EU. Conversely, the EU-GSP scheme exhibits a significant negative effect with an estimated US$4410 ($p < 0.01$) decline in value of vegetable exports. This implies that a unit increase in the PM is associated with a loss in vegetable exports worth over US$4000. The results concur with Emlinger et al. (2008) and Cardamone (2009, 2011) who reported that the influence of the EU-GSP on horticultural exports to the EU depends on the type of commodity and its origin.

With the exception of bananas, data in Table 5 show that the scheme significantly fosters export of beans and pepper from Uganda. A 1% rise in the preferential margin is associated with an increase in the value of beans and pepper exports at 1% level of significance. Conversely, a unit increase in the PM is associated with decline in the value of banana exports at 1% level of significance. This may be associated with the high airfreight costs since Uganda is landlocked and bananas are bulky in nature. Hence, Uganda's bananas may not be favourably competitive within the EU market compared to those from Ecuador, Costa Rica and other developing countries in Latin America. Uganda's positive results closely relate with findings from Aiello and Demaria (2010), Cirera et al. (2011) and Cipollina et al. (2013). These studies report that the scheme promotes trade in an assortment of FVs from developing countries. For all Uganda's FV exports, the signs of all the significant coefficient estimates were consistent with the theoretical model expectations.

Conclusions

Other than a dummy variable, we used a continuous count data variable (PM) based on the trade-weighted applied MFN rate and the AVEs to assess the role of the EU-GSP scheme on selected FV exports from EA states to the EU. By using the ZIP estimator, we controlled for heterogeneity, endogeneity bias as well as zero trade flows. The findings suggest that the EU-GSP scheme selectively fosters exportation of FV commodities to the EU, depending on the country of origin. That is, the scheme promotes bean exports from the three countries as well as pepper exports from Uganda. Conversely, the scheme seems not to boost the exportation of asparagus, bananas and vegetables from Kenya, Uganda and Tanzania, respectively. The mixed results (positive and negative) concur with findings of other scholars.

From a policy perspective, evaluation of the influence of non-reciprocal preferential trade agreement(s) granted to developing countries based on preferential margins should always take into account all the various policy instruments (MFN rate, tariff rates and specific duties) embedded within the agreement and competition from other suppliers that fall within the same category. Omission of any of the policy instruments may lead to overestimation of the accruing benefits. While computing the PM based on three policy instruments embedded within the EU-GSP scheme, no considerations of other proclaimed trade barriers such as compliance to the stringent EU-market standards and the entry price system were taken into account. Furthermore, although the EU grants other non-reciprocal preferential treatments (e.g. the Cotonou Agreement for the African, Caribbean and Pacific (ACP) countries and the Everything but Arms (EBA) initiative) to developing countries to access the market, this study does not take into consideration the overlapping nature of these trade preferential agreements. Thus, future research should disentangle facts relating to horticultural trade flows from East African economies into the EU and the above-mentioned limitations of this study.

Acknowledgement

We acknowledge the invaluable input provided by participants of the 53rd conference of the Agricultural Economics Association of South Africa.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship and/or publication of this article: This research was supported by the National Research Foundation (NRF) of the Government of South Africa and the Research directorate at the University of the Free State, Bloemfontein.

Notes

1. FAOSTAT uses hectogram/hectare (hg/ha) as the unit measure for yield. However, for convenience, we converted Hg/Ha to kilograms/hectare (kg/ha) as seen in Figure 1.
2. Global Consumption database provides disaggregated data. Average per capita consumption figures were computed using three products (fresh or chilled fruits or vegetables other than potatoes and fresh or chilled potatoes).
3. TradeMap database uses International Trade Centre (ITC) calculations based on UN COMTRADE statistics.

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