Trade Dynamics in the Italian Floriculture Sector within EU Borders: A Gravity Model Analysis

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Abstract

Despite its economic magnitude worldwide, the scientific attention to the floriculture sector remains scarce within the borders of the European Union. Focusing on Italy, the aim of this paper is to provide an insight into the floriculture trade for the first time. More specifically, in addition to describing trade dynamics of the floriculture sector both in Italy and in the European Union in recent years, this paper applies a gravity model to investigate and evaluate the role of some major economic and geographical variables as determinants of Italian trade flows of cut flowers and live plants within the European Union, from 2001 to 2013. Among these, findings prove that the most important are the GDP per capita of the European trade partners, as well as their production and consumption volumes.

Keywords

Floriculture sector, Italian trade, gravity model, panel data, Europe.

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Introduction

Flowers are goods with a recognized social value, enhancing life quality and influencing human feelings and their increased use makes the marketing of flowers a lucrative business (Belwal and Chala, 2008). Nevertheless, there is a generalized lack of both data (mostly related to trade) and scientific contributions in the literature on this specific sector. The floriculture sector can be defined as a segment of horticulture concerned with production, marketing and sale of a wide variety of plants and planting materials (Getu, 2009) that can be divided into cut flowers, foliage, plants and bulbs (Gebreeyesus, 2015; Van Rijswick, 2015).

The European Union (EU-28) represents both the largest producer and consumer of cut flowers and live plants worldwide (ITC, 2016) and Italy plays a quite important role in this market. In 2014, supported by the single Common Market Organization (CMO - EU Regulation No 1308/2013) within the new Common Agricultural Policy (CAP) 2014-2020, floriculture sector moved a consistent amount of money within the EU-28 both in terms of imports (about € 9 billion) and exports (about € 6 billion), and the Italian contribution was far from negligible with € 439 million of imports and € 639 million of exports (Eurostat, 2015).

Despite the economic magnitude of this agricultural sector worldwide, EU trade patterns and dynamics have received very little attention in the scientific debate on floriculture sector. Accordingly, there is a clear scarcity of academic literature concerning the breadth and the determinants of floriculture trade.

Hence, the aim of this paper is twofold as, in addition to describing trade dynamics related to the floriculture sector both in Italy and in the European Union in recent years (as the reader can find into the next paragraph), it also provides a better understanding of the dynamics of Italian trade flows applying a gravity model, in order to investigate and evaluate the potential influence of some important economic and geographical variables on Italian trade patterns and volumes of cut flowers and live plants within the EU.

An overview of the floriculture sector

Among the categories considered within the floriculture sector, this study focuses on cut flowers and live plants, firstly because their trade flows (considering both import and export) are more consistent than those of foliage and bulbs (Table 1), and secondly because these two latter categories register a scarce or incomplete availability of information. Due to the complete availability of data from Eurostat database, 2014 was the most recent year that could be considered to describe the Italian trade and the main EU importers and exporters.

According to The Swedish Chambers of Commerce (2011), floriculture consumption is strongly related to income levels, thus clarifying why markets with high purchasing power also have high consumption levels. In addition, although consumers buy flowers even for own use, cut flowers consumption in EU peaks around holidays or festive days (e.g., Mother's Day and Valentine's Day) and other special occasions as weddings and funerals. However, percentage and quantities vary greatly by country; in Italy, over 35% of the total flowers consumption is due to cemetery use followed by special occasions (34%), while only 12% is for private own use (Lauricella, 2013).

Global consumption of cut flowers is estimated at about € 30 billion per year with North America and Europe being the leading markets (Rikken, 2010). Within Europe, Germany (about € 4 billion), Italy (€ 2.7 billion), France (€ 2.7 billion) and the UK (€ 2.2 billion) are the biggest markets in terms of consumption value (CBI, 2016a).

The EU also represents the largest producer of flowers and plants worldwide (ITC, 2016): in 2012, it was leader of flowers and plants market with a share of 42.6% of the global production, followed by China (15.5%), USA (11.1%) and Japan (9.5%) (EC, 2013). Over the last 10 years, this sector has faced an almost steady increase in the production trend in EU-28. In 2014, the European production of flowers and plants amounted to € 20.2 billion. The Netherlands represented by far the largest producer, accounting for 33% of production value, followed by Germany (13%), Italy (12%) and France (12%) (Eurostat, 2015). Italy is one of the leading producers of plants in the EU, boasting a strong tradition in cut flowers especially in specific regions (i.e., Liguria, Toscana, Lazio, Campania, Puglia, Sicilia): here the production is concentrated in the north, where smaller growers are disappearing while scales of production are increasing (Rikken, 2010). However, since the last two decades flowers and plants production has started to shift from countries in the northern hemisphere towards developing countries, as Colombia, Kenya, Ecuador and Ethiopia. As suggested by many authors (Korovkin, 2003; Raynolds, 2012; Staelens, et al., 2014), in such countries the spreading of this sector represents a catalyst for rural employment and new job opportunities especially for women. These relatively new producing countries have advantageous production conditions as lower labour costs, availability of land, good climatic conditions, and fiscal incentives (Van Rijswick, 2015). It is worth noting that the increase of flowers' production in such developing countries is a result of specific investments by local and foreign businessmen and migrating European growers. These latter, in addition to relocating their production abroad (Rikken, 2010), have also contributed to consolidate the large-scale production at the expense of smallholders (Gebreeyesus, 2015).

This trend has altered global trade routes and flows, leading to an increasing share of EU's imports coming outside the EU-28. Table 2 shows that cut flowers and plants' imports from outside the EU (Extra-EU imports) amounted to € 1,327 million in 2014. The Netherlands is the main actor when

Italy	**Import**			**Export**		
	from extra EU-28 partners	from intra EU-28 partners	Tot. import	to extra EU-28 partners	to intra EU-28 partners	Tot. export
Live plants	16.8	210.4	227.1	99.1	404.8	503.8
Cut flowers	15.3	135.2	150.4	9.2	56	65.2
Foliage	2.4	15.6	18	8.5	59.5	68
Bulbs	0.2	46	46.2	1.9	3.1	4.9
Tot.	34.7	407.2	441.7	118.7	523.4	641.9

Source: own elaboration on Eurostat data (2015) - http://ec.europa.eu/eurostat/data/database

Table 1: Italian trade (intra and extra EU-28) of floriculture sector in 2014 (million €).

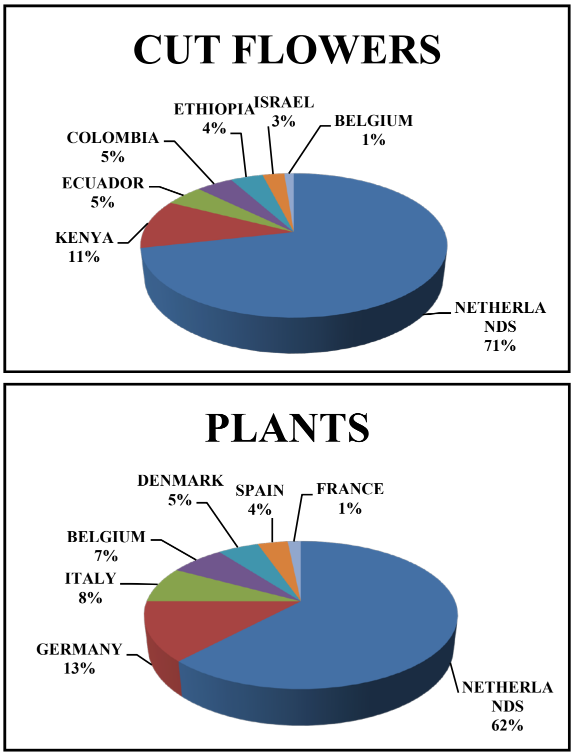
Main European importers (value, in million €, of total import: from EU-28 extra + EU-28 intra partners)			Main European importers only from EU-28 extra partners		
	2014	(%)		2014	(%)
Germany	2,094	27%	The Netherlands	751	57%
The Netherlands	1,166	15%	Belgium	171	13%
United Kingdom	1,007	13%	United Kingdom	163	12%
France	832	11%	Germany	93	7%
Belgium	460	6%	Spain	62	5%
Italy	378	5%	Italy	32	2%
Austria	313	4%	France	15	1%
Poland	233	3%	Sweden	13	1%
EU-28	**7,867**		**EU-28**	**1,327**	

Source: own elaboration on Eurostat data (2015) - http://ec.europa.eu/eurostat/data/database

Table 2: Main EU importers of cut flowers and plants (value of import in million €) and main European importers only from EU-28 extra partners (value of import in million €) in 2014.

it comes to import volumes from outside the EU, with a share of 57% of the total, followed from afar by Belgium (13%) and United Kingdom (12%). Italy lies in the sixth place in this ranking, with only 2% of the total extra EU imports. Despite the increase in the EU flowers' import from non-EU countries, most of the supply keeps coming from the internal market (83% of the total), suggesting a certain degree of self-sufficiency in this sector. Out of the € 6.5 billion worth (i.e., the difference between EU total import in 2014, € 7.8 billion, and the imports from EU-28 extra partners in the same year, € 1.3 billion) of flowers and plants imported in 2014 by EU countries from other partners belonging to EU-28, Italy is the fifth largest importer (5%), preceded by Germany (31%), UK (13%), France (12%) and the Netherlands (6%), respectively.

The Netherlands plays a key role in the international trade, being the main supplier of both cut flowers (71%) and plants (62%) to EU countries (Figure 1). After The Netherlands, the main suppliers for cut flowers are mainly EU-28 extra countries as Kenya (11%), Ecuador and Colombia (both accounting for 5%), Ethiopia (4%), Israel (3%) and Belgium (1%). On the contrary, European countries as Germany (13%), Italy (8%), Belgium (7%), Denmark (5%), Spain (4%) and France (1%) represent the main suppliers for plants, after the Netherlands (62%).



Source: own elaboration on Eurostat data (2015) - http://ec.europa.eu/eurostat/data/database

Figure 1: Main suppliers of cut flowers and plants to the EU in 2014.

According to Eurostat (2015) (Table 3), the value of EU total export for cut flowers and plants amounted to € 8,462 million in 2014. The EU main exporters are The Netherlands (64%), Germany (8%), Belgium (7%) and Italy (7%). Taking into account only the exports towards EU-28 extra countries (that amounted to 16% of total EU exports in 2014), Italy represents the third country (8%), after the Netherlands (59%) and Germany (8%).

Main European importers (value, in million €, of total import: from EU-28 extra + EU-28 intra partners)			Main European importers only from EU-28 extra partners		
	2014	(%)		2014	(%)
Germany	5,439	64%	The Netherlands	838	59%
The Netherlands	680	8%	Germany	114	8%
United Kingdom	609	7%	Italy	108	8%
France	569	7%	Spain	63	4%
Belgium	295	3%	Denmark	45	3%
Italy	292	3%	France	33	2%
Austria	118	1%	Poland	30	2%
Poland	100	1%	Belgium	30	2%
EU-28	**8,462**		**EU28**	**1,412**	

Source: own elaboration on Eurostat data (2015) - http://ec.europa.eu/eurostat/data/database

Table 3: Main EU exporters of cut flowers and plants (value of import in million €) and main European exporters only in EU-28 extra partners (value of import in million €) in 2014.

Materials and methods

Gravity model represents a kind of spatial interaction model and can be used to calculate the number of interactions between two countries. The fundamental idea underlying spatial interaction models is that the degree of interaction between two countries is a function of the degrees of concentration of people or things in the two countries and a measure of the distance separating these countries. This fundamental idea originally derives from Newton's gravity law (Linnemann, 1966; Niedercorn and Bechdolt Jr., 1969). The gravity equation is found to be very successful in explaining the international trade empirically (Sá Porto, 2000). When analyzing the international trade, the gravity equation for more than two countries can be used adding more variables beyond the original ones as production, consumption, price, territorial boundaries, common languages, exchange rates, common participation in trade agreements, and others (Cochrane, 1975; Anderson, 1979; Frankel, 1997).

A panel gravity model has been used to analyse floriculture trade dynamics between Italy and other EU-28 Members States over the period from 2001 to 2013, considering only data related to plants and cut flowers categories. In particular, we used the following codes available on Eurostat: 0602 for plants and 0603 for cut flowers. The availability of complete data between 2001 and 2013 related to both cut flowers and live plants categories and to all the variables of interest determined the choice to consider such a range, in order to have the widest amount of years possible and, thus, of observations; indeed, 2013 was the most recent available year.

In addition, the Hausman test (1983) has been applied to choose between fixed and random effect to estimate the gravity model. The main difference between both effects is basically on the correlation between the error term and the variables. The fixed effects model eliminates the error term, which is correlated with the variables, through a transformation of fixed effects, called the within transformation because it estimates the estimators by the method of Ordinary Least Squares (OLS) and this method uses the time variation in y and x within each unit of cross-sectional (within variation). There is also variation between units cross-sectional (between variation) that is only used in the estimation in which the intercept is present. In this case, the use of random effects model is the most suitable. The random effects model considers that the error term is not correlated with the variables. Thus, it enables the coefficients to be estimated as a single cross section, that is, the panel data structure is not required for the estimation of the model (Wooldridge, 2002; Baltagi, 2005). Moreover, the Wooldridge test was applied and all the estimates were performed using STATA version 12.

The estimated gravity model to analyze the Italian trade dynamics has the following form:

$$Trade_{ij} = \alpha_0 GDPit\_pc_i^{\alpha_1} GDPc\_pc_j^{\alpha_2} Prod\_pc_j^{\alpha_3} Consump\_pc_j^{\alpha_4} Dist2_{ij}^{\alpha_5} e^{\alpha_6 ADJ_{ij} + u_{ij}} \quad (1)$$

This equation can be reformulated as:

$$lTrade_{ij} = \alpha_0 + \alpha_1 lGDPit_{pc_i} + \alpha_2 lGDPc_{pc_j} + \alpha_3 lProd_j + \alpha_4 lConsump_{pc_i} + \alpha_5 lDIST2_{ij} + \alpha_6 ADJ_{ij} + u_{ij} \quad (2)$$

where:

i = Italy

j = EU-28 Member States except Croatia, Cyprus, Estonia, Ireland and Malta

$lTrade_{ij}$ = floriculture trade flow between Italy and EU considered Member States

$lGDPit\_pc_i$ = Italian Gross Domestic Production (GDP) per capita

$lGDPc\_pc_j$ = Gross Domestic Production (GDP) of EU Member States per capita

$lProd\_pc_j$ = floriculture production of EU Member States per capita

$lConsump\_pc_j$ = floriculture consumption of EU Member States per capita

$lDist2_{ij}$ = distance-squared between the Italian Capital town and those of the EU Member States

ADJ_{ij} = dummy representing territorial boundary (adjacency)

u_{ij} = error term

Among EU-28 Member States, Croatia, Cyprus and Ireland were dropped because of the lack of production data in the time span considered, whereas Estonia and Malta were dropped because they showed negative consumption values.

Trade, production and consumption variables are derived from Eurostat (2015) (in values in €); GDP (in US $ at constant prices 2005) and population have been collected from United Nations Statistics Division (UNSD, 2015); the distance (in kilometers) has been collected from the Centre d'Études Prospectives et d'Informations Internationales (CEPII, 2015). Trade variable is the sum of imports plus exports (Pietrzak and Łapińska, 2015). In order to obtain data related to EU member states' domestic consumption, firstly we summed up import and production and then we subtracted exports. Finally, all the variables have been divided by the country specific population in order to obtain each variable per capita.

It was expected that GDP of EU Member States per capita had a direct relation (positive sign) with the Italian trade as the general idea behind the inclusion of this variable is that the higher the GDP, the higher the trade between countries in general (Cieślik, 2009). It was also expected that the production variable had a positive sign as it represents the production capacity of each country and the higher it is, the higher the ability to trade for the country. On the other hand, the consumption indicates the market potential for sales (Starck, 2012). In relation to the distance, it can be considered as a proxy of transport costs and it was expected to be negatively correlated (negative sign) to trade (Agostino et al., 2007). Hence, the higher the geographical distance between the capital cities of two trade partners, the higher the trade impediment between them (Simwaka, 2006). Finally, the presence of a common board, that is the adjacency, represents lower transport limitations (Anderson, 1979; Egger, 2002) and promotes trade flows reducing transaction costs (Sánchez-Robles Rute et al., 2012).

Results and discussion

To decide which model was the most suitable to analyze the Italian floriculture trade, this study applied the Hausman test. Results showed that the fixed effect was the better solution to estimate this gravity model [$\chi^2(4) = 12.90$; $p\text{-}value = 0.012$]. In addition, the Wooldridge test showed the presence of the first order autocorrelation [$F(1, 21) = 6.763$; $p\text{-}value = 0.017$]. This problem was solved considering the robust standard errors and the results are in Table 4.

The F statistic tests the hypothesis that all the slope coefficients are simultaneously zero; that is, all the explanatory values jointly have no impact on the regression. Since the computed F value

Dependent variable = *lTrade*	**Coefficient**	**Standard error**	***t***	**p-value**
lGDPit_pc	-1.467	1.01	-1.45	0.147
lGDPc_pc	3.62	0.488	7.41	0
lProd_pc	3.493	0.674	5.18	0
lConsump_pc	-3.12	0.621	-5.02	0
Constant	-2.801	3.238	-0.87	0.388
R^2 (overall) = 0.201	id = 22	temp = 13	n = 286	
R^2 (between) = 0.194				
R^2 (within) = 0.378		$F(21, 238) = 77.15$	Prob>F = 0.000	

Source: own processing, 2015

Table 4: Gravity model results.

of about 77.15 is highly significant (Prob>F = 0.000), it means that the variation in the dependent variable can be explained by the explanatory variables, being the coefficients in the model different from zero. The determinant variables explained up to 20% of the variation in the model, being the variation among the years explained up to 38% and the considered countries up to 19%. The apparently low value of R2 can be explained by the fact that the Italian trade also depends on some other variables that are not included in this analysis and that influence the domestic demand, as consumer purchasing preferences and consumption habits which are different in each country. In addition, according to Gujarati (2004, p. 544) "low R^2 values are typically observed in cross-sectional data with a large number of observations".

Among the explanatory variables considered by the panel gravity model, the Italian GDP per capita, representing the population's purchasing power, is found to be not significant for the Italian floriculture trade. One possible reason could be the existence of a relatively large home-market effect; accordingly, McCallum (1995) and Sohn (2005) argue that a home-bias effect, such as local distribution networks, can play a greater role in trade compared to the GDP.

Conversely, the GDP per capita of EU partners, being a proxy of richness magnitude, represents a significant variable. In particular, if partners' GDP increased by 1%, the trade between each country and Italy increased by 3.62%. According to this, it is expected that the higher the GDP of the exporter countries, the greater their capacity to supply the importing countries' consumption needs, representing the base of the trade (Cardoso et al., 2016). In addition to this, such GDP per capita effect can be also supported by the fact that, being the exotic varieties commonly superior goods in consumption, low-GDP countries are often dominated by subsistence farming that does not consider specialized and diversified production (Sohn, 2005).

Moreover, results show that the higher the floriculture production of each country, the higher the trade between this and Italy: in particular, a 1% increase in a EU partner's production is associated with about a 3.49% increase of the Italian trade with this country. It is worth highlighting that trade is stimulated mainly by production diversification in each country (Sohn, 2005), whereas production specialization is due to the specific factor endowment and proper climatic conditions of each country.

In relation to the consumption variable, representing the potential market of flowers in each country, it showed an indirect relation with the trade (negative sign). Results indicate that for every 1% increased in EU Member States' consumption, the trade between them and Italy is decreased by 3.12%. One possible reason is that specific flower varieties produced in Italy may not be those mostly consumed in other EU Member States. Because of this, the trade of the flowers varieties produced in Italy not increases when consumption in other EU countries increases, probably because it does not address specific consumers' interests and needs at all. Indeed, consumers have become more refined in demanding new products nowadays (ITC, 2016), as shown by many authors (Özzambak et al., 2009; Rihn et al., 2015; CBI, 2016b). To meet this growing and changing demand, production has continued to move from countries that have traditionally been consumers and growers, such as The Netherlands, to other relatively new producers such as Colombia, Ecuador, Kenya and Ethiopia. In such developing countries, the increased production contributes to food security, mainly by increasing the income and purchasing power of farmers (Van Den Broeck and Maertens, 2016).

Finally, the distance and the adjacency variables are the fixed effects, i.e. they do not vary over the time, and because of this such variables were omitted in the model.

Conclusion

In order to fill a void in the scientific literature, this paper provides a first evaluation of Italian floriculture trade using a gravity model, while generating new questions which need to be answered further. Despite the crisis that has weakened companies of the floriculture sector in recent years, nowadays the Italian floriculture sector still manages to maintain a position of prestige in most European and international markets. This is mainly due to the entrepreneurial capacity of producers and the high quality of production. Although the floriculture production is characterized by farms with small size, that notoriously reveal a little bargaining power, Italy represents the third major producer within the European borders, after The Netherlands and Germany. This research showed that the Italian floriculture trade is positively influenced by European trade partners' both GDP and production volumes, whereas it is negatively influenced by their consumption. Accordingly, high GDP and production volumes of a country suggest a high capacity to buy and to supply the needs of other trade partners and this evidence supports the idea that current bilateral trade flows between Member States will last in the future, whereas it is not easy to forecast future trade relationships between Italy and new emerging producers as developing countries. In relation to flower consumption, the comprehension of its negative influence on Italian trade needs some further investigation, as by means of mixed-method approaches as commonly used for food analysis (Giampietri et al., 2016a, 2016b), and represents a limitation of this study. Since flowers are not primary goods, it is plausible that their consumption is both linked to GDP per capita and specific consumer preferences and habits. It is worth noting that there is still a lack of an extensive assessment of consumer preferences related to flower purchase and their influence on Italian trade, thus requiring further investigations. In addition, the analysis of each plant variety separately could represent an alternative to improve the explanation capacity of this model. Finally, other variables could be investigated further for each country as: the language (Lombardi et al., 2016), the average annual spot price of the investigated categories (cut flowers and live plants), the labour cost, the presence of trade public incentives, the presence of public direct investments in floriculture sector and, by expanding the sample of trade partners, also the EU membership.

In order to boost the floriculture sector's development and trade, nowadays new policy strategies are required to overcome many sector specific problems. First of all, the lack of infrastructure and logistical centers able to concentrate the production of small scale Italian farms, in order to compete with the main producers all over Europe and abroad. Furthermore, in order to encourage the sustainability of this sector, new alternative means to road transport should be implemented to reach other destinations (new emerging countries) than historical trade partners as EU northern countries. Finally, more innovation is required, related to both quality production and processing, as well as more tailored marketing strategies, in order to address specific segments of consumers according to the seasonal consumption of floriculture products.

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Author Contributions

This paper derives from a full authors' collaboration. In particular: E. Giampietri (E.G.), M. Rasetti (M.R.) and B.F. Cardoso (B.F.C.) designed and performed the research; E.G. and M.R. wrote the introduction and analyzed the data related to the floriculture trade; B.F.C. wrote the methodology; E.G. and B.F.C. discussed and wrote results and conclusion; A. Finco and P.F.A. Shikida provided general supervision and guidance.

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References

[1] Agostino M. R., Aiello F. and Cardamone P. (2007) „Analysing the Impact of Trade Preferences in Gravity Models. Does Aggregation Matter?", TRADEAG Working Paper 07/4. [Online]. Available: http://ageconsearch.umn.edu/bitstream/7294/2/wp070004.pdf [Accessed: Jan 20, 2015].

[2] Anderson, J. E. (1979) „A theoretical foundation for the gravity equation", *The American Economic Review*, Vol. 69, No. 1, pp. 106-116. [Online]. Available: http://www.jstor.org/stable/1802501 [Accessed on: Jan 20, 2015]. ISSN 0002-8282.

[3] Baltagi, B. H (2005) „Econometric analysis of panel data", England John Wiley & Sons Ltd. ISBN 10: 0470518863.

[4] Belwal, R. and Chala, M. (2008) „Catalysts and barriers to cut flower export: A case study of Ethiopian floriculture industry", *International Journal of Emerging Markets*, Vol. 3, No. 2, pp. 216-235. ISSN 1746-8809. DOI 10.1108/17468800810862650.

[5] Cardoso, B. F., Bentivoglio, D., Giampietri, E. and Shikida, P. F. A. (2016) „What is behind the Italian coffee import? Investigating the most relevant dynamics“, *Rivista di Economia Agraria*, Vol. 71, No. 1, pp. 83-92. E-ISSN 2281-1559, ISSN 0035-6190. DOI 10.13128/REA-18379.

[6] CBI - Centre for the Promotion of Imports from developing countries (2016a) „CBI Trade Statistics: Cut Flowers and Foliage“, CBI Market Intelligence, Netherlands Ministry of Foreign Affairs. [Online]. Available: https://www.cbi.eu/sites/default/files/market_information/researches/trade-statistics-cut-flowers-foliage-2016.pdf [Accessed: May 15, 2015].

[7] CBI - Centre for the Promotion of Imports from developing countries (2016b) „CBI Trends: Flowers and Foliage in Europe“, CBI Market Intelligence, Netherlands Ministry of Foreign Affairs. [Online]. Available: https://www.cbi.eu/sites/default/files/market_information/researches/trends-europe-cut-flowers-foliage-2016.pdf [Accessed: May 15, 2015].

[8] CEPII - Centre d'Études Prospectives et d'Informations Internationales (2015) „CEPII distances and geographical database“. [Online]. Available: www.cepii.fr/anglaisgraph/bdd/distances.htm [Accessed: April 22, 2015].

[9] Cieślik, A. (2009) „Bilateral trade volumes, the gravity equation and factor proportions“, *The Journal of International Trade & Economic Development*, Vol. 18, No. 1, pp. 37-59. DOI 10.1080/09638190902757400.

[10] Cochrane, R. A. (1975) „A Possible Economic Basis for the Gravity Model“, *Journal of Transport Economics and Policy*, Vol. 9, No 1, pp. 34-49. [Online]. Available: http://www.bath.ac.uk/e-journals/jtep/pdf/Volume_1X_No_1_34-49.pdf [Accessed: Jan 15, 2015]. ISSN 0022-5258.

[11] Egger, P. (2002) „An econometric view on the estimation of gravity models and the calculation of trade potentials“, *The World Economy*, Vol. 25, No. 2, pp. 297-312. E-ISSN 1467-9701. DOI 10.1111/1467-9701.00432.

[12] EC - European Commission (2013) „Working document - Advisory Group Flowers and Ornamental Plants“, DG Agriculture and Rural Development (AGRI) Unit C.2, Bruxelles. [Online]. Available: https://ec.europa.eu/agriculture/sites/agriculture/files/fruit-and-vegetables/product-reports/flowers/statistics-2013_en.pdf. [Accessed: March 2015].

[13] Eurostat (2015) „Data Explorer - Europa“. [Online]. Available: http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do. [Accessed: Jan 22, 2015].

[14] Frankel, J. A. (1997) „*Regional trading blocs in the world economic system*“, Institute for International Economics, Washington. ISBN: 9780881322026.

[15] Gebreeyesus, M. (2015) „Firms' adoption of international standards: Evidence from the Ethiopian floriculture sector“, *Agricultural Economics*, Vol. 46, No. S1, pp. 139-155. E-ISSN 1805-9295, ISSN 0139-570X. DOI 10.1111/agec.12203.

[16] Getu, M. (2009) „Ethiopian floriculture and its impact on the environment: regulation, supervision and compliance“, *Mizan Law Review*, Vol. 3, No. 2, pp. 241-270. DOI 10.4314/mlr.v3i2.54011.

[17] Giampietri, E., Finco, A. and Del Giudice, T. (2016a) „Exploring consumers’ behaviour towards short food supply chains“, *British Food Journal*, Vol. 118, No. 3, pp.618-631. ISSN 0007-070X. DOI 10.1108/BFJ-04-2015-0168.

[18] Giampietri, E., Koemle, D., Yu, X. and Finco, A. (2016b) „Consumers’ Sense of Farmers’ Markets: Tasting Sustainability or Just Purchasing Food?“, *Sustainability*, Vol. 8, No. 11, pp. 1157. DOI 10.3390/su8111157.

[19] Gujarati, D. (2004) „*Basic econometrics*“, The McGraw-Hill Companies. ISBN 10: 0070597936.

[20] Hausman, J. A. (1983) „Specification and estimation of simultaneous equation models“. In Z. Griliches & M. D. Intriligator (Eds.), *Handbook of Econometrics*, Vol. 1, pp. 391-448. North-Holland Publishing Company, Amsterdam. ISBN 10: 0444861858.

[21] ITC - International Trade Center (2016) „Floriculture sector at a glance“. [Online]. Available: http://www.intracen.org/itc/market-insider/floriculture/at-a-glance/. [Accessed: April 15, 2016].

[22] Korovkin, T. (2003) „Cut-flower exports, female labor and community participation in Highland Ecuador“, *Latin American Perspectives*, Vol. 30, No. 4, pp. 18-42. DOI 10.1177/0094582X03030004005.

[23] Lauricella, P. (2013) „*Il mercato dei prodotti florovivaistici - Rilevazione*“, ISMEA - Marzo 2013. [Online]. Available: http://www.ismea.it/flex/files/0/a/0/D.78f8df99401d6c240492/Marzo_13_rev.00.pdf. [Accessed: May 12, 2015].

[24] Linnemann, H. (1966) „An econometric study of international trade flows“, North-Holland Publishing Company, Amsterdam.

[25] Lombardi, P., Dal Bianco, A., Freda, R., Caracciolo, F. and Cembalo, L. (2016) „Development and trade competitiveness of the European wine sector: A gravity analysis of intra-EU flows“, *Wine Economics and Policy*, Vol. 5, No. 1, pp. 50-59. ISSN 2212-9774. DOI 10.1016/j.wep.2015.12.002.

[26] McCallum, J. (1995) „National borders matter: Canada-US regional trade patterns“, *American Economic Review*, Vol. 85, No. 3, pp. 615-623. [Online]. Available: http://www.jstor.org/stable/2118191. [Accessed: June 2015].

[27] Niedercorn, J. H. and Bechdolt Jr, B. V. (1969) „An economic derivation of the “gravity law” of spatial interaction“, *Journal of Regional Science*, Vol. 9, No. 2, pp. 273-282. ISSN 1467-9787. DOI 10.1111/j.1467-9787.1969.tb01340.x.

[28] Özzambak, M. E., Zeybekoğlu, E., Tuncay, O., Başer, S., Haspolat, G. and Olgun, A. (2009) „A survey on cut flower preferences and expectations“, *Acta Horticulturae*, Vol. 807, pp. 771-776. E-ISSN 2406-6168, ISSN 0567-7572. DOI 10.17660/ActaHortic.2009.807.117.

[29] Pietrzak, M. B. and Łapińska, J. (2015) „Determinants of the European Union’s trade - evidence from a panel estimation of the gravity model“, *Ekonomie a Management*, Vol. 18, No. 1, pp. 18-27. E-ISSN 1802-8934. DOI 10.15240/tul/001/2015-1-002.

[30] Raynolds, L. T. (2012) „Fair Trade Flowers: Global Certification, Environmental Sustainability, and Labor Standards“, *Rural Sociology*, Vol. 77, No. 4, pp. 493-519. E-ISSN 1549-0831. DOI 10.1111/j.1549-0831.2012.00090.x.

[31] Rihn, A., Yue, C., Behe, B. K. and Hall, C. R. (2015) „Consumer preferences for cut flower guarantees“, *Acta Horticulturae*, Vol. 1090, pp. 45-54. E-ISSN 2406-6168, ISSN 0567-7572. DOI 10.17660/ActaHortic.2015.1090.8.

[32] Rikken, M. (2010) „The European Market for Fair and Sustainable Flowers and Plants“, Belgian Development Agency (BTC) - Trade for Development Centre. [Online]. Available: http://www.befair.be/sites/default/files/all-files/brochure/The%20European%20Market%20for%20Fair%20and%20Sustainable%20Flowers%20and%20Plants_1.pdf. [Accessed: June 20, 2015].

[33] Sá Porto P. C. (2000) „Mercosul and Regional Development in Brazil: A Gravity Model Approach“. In: *Fifth Latin American and Caribbean Economics Association (LACEA) Meeting*, 2000, Rio de Janeiro. DOI 10.2139/ssrn.654423.

[34] Sánchez-Robles Rute, B., Martínez San Román, V. and Bengoa Calvo, M. (2012) „European Union and trade integration: does the home bias puzzle matter?“, *Revista de Economía Mundial*, Vol. 32, pp. 173-188. ISSN 1576-0162.

[35] Simwaka, K. (2006) „Dynamics of Malawi's trade ows: a gravity model approach“. MPRA Paper No. 1122, posted 11. [Online]. Available: http://mpra.ub.uni-muenchen.de/1122/. [Accessed: March 15, 2015].

[36] Sohn, C. H. (2005) „Does the gravity model fit Korea’s trade patterns? Implications for Korea’s FTA policy and North-South Korean trade“. Center for International Trade Studies (CITS) Working Papers 2005-02. [Online]. Available: http://www.econ.ynu.ac.jp/cits/publications/pdf/CITSWP2005-02.pdf. [Accessed: April 18, 2016].

[37] Staelens, L., Louche, C. and Haese, M. D. (2014) „Understanding job satisfaction in a labor intensive sector: Empirical evidence from the Ethiopian cut flower industry“. Paper prepared for presentation at the EAAE 2014 Congress ‘Agri-food and rural innovations for healthier societies’, 26-29 August, Ljubljana. [Online]. Available: http://purl.umn.edu/182815. [Accessed: May 2015].

[38] Starck S. C. (2012) „*The theoretical foundation of gravity modeling: what are the developments that have brought gravity modeling into mainstream economics?*“, Copenhagen Business School. [Online]. Available: http://studenttheses.cbs.dk/bitstream/handle/10417/3335/sarah_catherine_starck.pdf?sequence=1. [Accessed: March 2016].

[39] The Swedish Chambers of Commerce (2011) „*Market Report – Focus on the EU and Swedish Market – Floricultural Products“*. Sida, Stockholm, Sweden. [Online]. Available: http://chambertradesweden.se/wp-content/uploads/2012/12/Flowers_EU_final_webb.pdf. [Accessed : June 2015].

[40] UNSD - United Nations Statistics Division (2015) „National accounts main aggregates database“. [Online]. Available: http://unstats.un.org/unsd/snaama/selbasicFast.asp. [Accessed: Feb 14, 2015].

[41] Van Den Broeck, G. and Maertens, M. (2016) „Horticultural exports and food security in developing countries“, *Global Food Security*, Vol. 10, pp. 11-20. ISSN 2211-9124. DOI 10.1016/j.gfs.2016.07.007.

[42] Van Rijswick, C. (2015) „*World Floriculture Map 2015*“, Rabobank Industry Note. [Online]. Available: https://www.rabobank.com/en/images/World_Floriculture_Map_2015_vanRijswick_Jan2015.pdf. [Accessed: May 21, 2015].

[43] Wooldridge J. M. (2002) „*Econometric analysis of cross section and panel data*“. The MIT Press, Cambridge. ISBN 0-262-23219-7.