RESEARCH ARTICLE

Analysis of Spain´s competitiveness in the European tomato market: An application of the Constant Market Share method

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Abstract

This paper presents a quantitative analysis of the competitiveness of Spanish tomato export compared with its major competitors in the European Union market countries (EU28). The methodological framework is implemented through Constant Market Share to analyze variations in exports, allowing the portion attributable to competitiveness and segregation into general or specific competitiveness to be quantified. This analysis was carried out with the 2005-2009 and 2010-2014 periods to see if there had been a recovery from the global financial and economic crisis of 2007 in the Spanish tomato trade. Before the global economic and financial crisis, Spain had a positive structural effect of exports which contributed significantly to the growth of tomato sales to the EU, but had a negative change in the volume of exports to the EU28, mainly due to the negative effect of the competitiveness component. According to the segregation effect of competitiveness, a marked general negative competitive effect was evident, that cannot be offset by the positive effect of specific competitiveness. Since 2010, Spain has experienced a positive change in the volume of its tomato exports to the EU28, the competitiveness component also being positive, due to positive investment of the component of general competitiveness and whose greatest contribution was the positive effect of specific competitiveness. Within the group of competitors, Spain is the only country supplying tomatoes to the EU28 that has experienced a positive change in volume when comparing business performance of 2010-2014 *vs* 2005-2009.

Introduction

According to the Food and Agriculture Organization (FAO, http://www.fao.org/statistics/es/), in 2012, global production of fresh tomatoes rose to 211 million tons, a 2.2% increase over the previous year and continuing its upward trend year after year. China is the largest producer in the world with 50 million tons (23.75% of the total) followed by India as the second largest producer of tomatoes with a total of 17 million tons (8.29%). The third place is occupied by the USA, with 13 million tons produced, representing 6.26% of world production. In fourth place in the world ranking

of tomato producers is Turkey, with 11 million tons (5.38%) and Egypt ranks fifth with 8 million tons (4.09%). Then, followed by Iran in sixth place with 6 million tons (2.84%), Italy in seventh place with 5 million tons (2.43%), Spain in eighth place with a production of 4 million tons (1.9%), Brazil in ninth place with almost 4 million tons (1.83%) and Mexico in tenth place with a production of 3 million tons, representing 1.63% of the world production of fresh tomatoes.

International tomato marketing between 2005 and 2014 shows a positive growth trend with a relative variation rate of 60.69% according to data provided by

the international trade statistics division of the United Nations (UN) (COMTRADE, 2016). If the trading volume is broken down into European market and non-European market, it shows that both markets present a positive growth trend, but the greatest growth is attributed to non-European market countries (103.6%) compared to the contribution of the European market (24.9%). However, after the global financial economic crisis of 2007, if the 2010-2014 period is analyzed, trading volumes of tomatoes at both an international and European level have considerably slowed down but are still growing, 10.46% and 13.80% respectively.

Globally, the ranking of the top ten tomato exporters has been disputed between 15 countries, which together cover a market share of 90.81% in 2005 and a share of 85.89% in 2014. Mexico, Spain and the Netherlands have alternately vied for leadership since 2005 in the world export of tomatoes, but since 2010 ranking positions have remained unchanged, with Mexico in the lead, Netherlands second and Spain third. It is worth mentioning Syria's position as a leader in 2006 and fourth in 2007 and 2009. However, the start of armed conflict has meant that this country is no longer actively involved in international trade. This abandonment of position by Syria, has benefited the triad composed of the countries close on the heels; Turkey, Jordan and Morocco. Finally, we can mention India, France, Belgium, USA, China, Canada, Portugal and Iran as countries participating to a lesser degree in international trade. Within the latter group, we can highlight the growth in Indian exports since 2010.

With regard to the European market, according to COMTRADE (2016), the ranking of the top ten tomato exporters has been disputed among 11 countries that together cover a market share of 98.29% (2005) and currently a market share of 98.06% (2014). Leadership in trade in the European tomato market consists mainly of intra-community purchases (82.75% in 2005) and with a minority of exports from non-EU countries, observing the participation of the 28 countries that make up the EU. This trend continued up to 2014, but at a more moderate level, where the percentage of intra-Community purchases (77.80%) decreased in favor of exports from non-EU countries. In the European market, leadership in the commercialization of tomatoes is totally focused on intra-community purchases, covering a market share of 60.02% (2014). Since 2008, the Netherlands has taken over Spain's role as leader. These leading intra-community vendors are followed, far behind, by non-EU exports received from Morocco, with a market share of 12.38% (2014). Other European countries, particularly France and Belgium, participate to a lesser degree in the European tomato trade, along with non-EU exporters such as Turkey and Israel.

The relevance of our work is justified by three facts: tomato is the vegetable with the largest presence in international trade (14%), the European market is the main importer of tomatoes worldwide (21%) according to the Agricultural Trade Policy Analysis Unit (EC, 2012), and Spain is in the top positions in both the world and European ranking of exports of the vegetable and orchard produce sector [UE28] (World Bank, 2014). The importance of determining the competitive position of the Spanish tomato in the European market is due to the internal competition of the Netherlands (in the German market) and the external competition of Morocco (in the French market). Germany and France are Spain´s main customers, representing 39.45% of the total sales of Spanish tomatoes in the European market.

The main aim of this article was to determine the current competitive position of Spain in the marketing of tomatoes on the European market. To accomplish this goal, this study has set out to describe the international tomato trade panorama as well as the European market and the export profile of Spanish agricultural products. From the data obtained it has been possible to identify the main group of countries competing in the European market. Then, quantifying the Spanish competitive position in the European market has been determined through Constant Market Share (CMS) analysis, thus identifying the competitive position of Spain in the European tomato market.

Material and methods

The importance of the analysis of tomato export competitiveness for Spain is based on the fact that it is the main vegetable exported by Spain (Table 1) and its natural market is the European Union (EU), with a low profile of non-EU exports, as shown in Table 2. Spain conducts intra-community sales as extra-EU exports. Germany is the largest customer of intra-EU sales of Spanish tomatoes and up until 2010 a 22% share in the German market remained constant, but in recent years this has increased by 2% (Fig. 1). Until 2010, Spain´s second most important customer was the UK, but the UK market share decreased from 20% to 15% from 2005 to 2014. On the other hand, in 2005, France ranked fourth among Spain´s customers and currently ranks second, although surprisingly the percentage share has not increased but has actually decreased by almost 1%. This situation is due to the fact that the market share of the Netherlands and UK has been falling since 2005. About a quarter of remaining intra-Community sales is distributed among the other 24 member countries of the EU28.

Table 1. Spain´s main vegetable exports (2014)

	Volume exported (millions of tonnes)	Percentage
Tomatoes	0.96	18.32
Peppers	0.86	16.45
Lettuce	0.72	13.64
Cucumbers	0.59	11.27
Cabbages	0.44	8.43
Onions	0.35	6.69
Total vegetables exported	5.27	

Source: Compiled by the authors using data from FEPEX (Spanish Federation of Associations of Fruit and Vegetable Producers, http://www.fepex.es/ext/sector-frutas-hortalizas.aspx).

The completion of this study on Spanish tomato export competitiveness through the CMS method, requires building a dedicated database using data on international marketing provided by COMTRADE, managed by the UN. As a result of the search on 247 countries and commercial regions, 172 countries exporting tomatoes worldwide were found (of which 111 were countries exporting to the EU28 market) through 30.510 transactions between 2005 and 2014. It is clear that not all of the 111 countries participating in the international tomato trade are producers, but many of them participate on the international market as intermediaries or as re-exporters of agricultural products grown in other geographical areas.

The CMS method was introduced by Tysznskin (1951) and Richardson (1971). Later, Ahmadi-Esfahani (1995) adapted Jepma´s (1989) version to specifically apply the analysis on exporters of agricultural products in specific markets. CMS analysis is a method often used in the study of patterns of structural change in international trade. It is a statistical method used to evaluate the influence of structural factors on export growth and participation in import markets (Santeliz & Contreras, 2016). This analysis allows the relative contribution of competitiveness and structural factors of geographical and sectoral destination in the export performance of a country or a group of them to be measured. It basically involves disaggregating trade

Table 2. Main destinations of Spanish tomato exports (2014)

Country	Intra-Community sales		Country	Non EU-exports	
	tonnes	%		tonnes	%
Germany	218,064.278	33.91	Russian Federation	26,339.127	61.57
France	141,665.243	22.03	Switzerland	7,740.912	18.09
Netherlands	106,550.175	16.57	Belarus	4,556.133	10.65
Italy	53,539.385	8.32	Norway	2,531.754	5.91
Czech Rep.	25,658.255	3.99	Andorra	829.720	1.93
Belgium	16,842.773	2.62	Ukraine	220.005	0.51
Lithuania	16,332.316	2.54	Cape Verde	215.461	0.50
Austria	12,728.635	1.98	Gibraltar	163.754	0.38
Denmark	11,900.917	1.85	Rep. Moldova	69.275	0.16
Finland	9,736.164	1.51	Morocco	60.240	0.14
Hungary	8,623.456	1.34	Kazakhstan	14.852	0.03
Latvia	7,608.357	1.18	Albania	14.640	0.03
Ireland	6,201.558	0.96	Serbia	10.811	0.02
Cyprus	2,560.411	0.40	China	6.456	0.01
Estonia	1,721.073	0.27	Senegal	0.307	-
Bulgaria	1,623.456	0.25	Saudi Arabia	0.279	-
Croatia	1,330.796	0.21	Equatorial Guinea	0.241	-
Greece	232.003	0.04	Bahrain	0.167	-
Luxembourg	184.683	0.03	Liberia	0.100	-
Malta	16.101	-	Mauritania	0.29	-
Total	643,120.035		Total	42,726.381	

Source: Compiled by the authors using data from COMTRADE (2016) database

data of a given country (or group of countries) and compares flows in the rest of the world (Gracia, 2000). The main idea behind this approach is to show how the market share of exports of a reference country varies in a given period if the country maintains the same share in all commodities to all markets.

Based on the definition of market share **S** of a specified country, in this case the country whose export competitiveness is being analyzed, the specified country's exports to the relevant market **q** can be defined, with **Q** being the exports of the group of competing countries which export to the relevant market:

$$S = \frac{q}{Q} \Rightarrow q = S \cdot Q \qquad (1)$$

Differentiating (1) in time, we can obtain infinitely short periods of time, applying the decomposition into discrete time intervals [0,1]:

$$\Delta q = \underbrace{S_0 \cdot \Delta Q}_{SE} + \underbrace{\Delta S \cdot Q_0}_{CE} + \underbrace{\Delta S \cdot \Delta Q}_{IE} \qquad (2)$$

The change in a country's exports on the first level can be decomposed into the sum of three effects: Structural Effect (SE), Competitiveness Effect (CE) and Interaction Effect (IE); which are all determined by the expression (2):
i) SE: describes the variation in exports, if the initial share of the country in the global market and in the reference market remains constant. If the effect is positive, growth in the product's demand will positively affect the variation of exports.
ii) CE: indicates the part of the exports variation that can be attributed to changes in competitiveness occurring during the period. The negative or positive sign indicates the loss or gain in competitiveness during the period of analysis.
iii) IE: determines the influence of variation in the market share with regards to changes in the demand.

If we disaggregate the effects of structure, competitiveness and interaction even further, we get the improved CMS model by Jepma (1989). Jepma's improved version was adapted to the case of the export of a single product to a single market by Ahmadi-Esfahani (1995). In this second level of disaggregation we can distinguish six different effects described by Ávila & González (2012) as:

$$\Delta q = \underbrace{S_{T_0}\Delta Q_j}_{GE} + \underbrace{\left(S_{J_0}\Delta Q_j - S_{T_0}\Delta Q_j\right)}_{ME} + \underbrace{\Delta S_T Q_{J_0}}_{GC} + \underbrace{\left(\Delta S_j Q_{J_0} - \Delta S_T Q_{J_0}\right)}_{SC} +$$
$$+ \underbrace{\left(\frac{Q_{T_1}}{Q_{T_0}} - 1\right)\Delta S_j Q_{J_0}}_{SOE} + \underbrace{\left[\Delta S_j Q_j - \left(\frac{Q_{T_1}}{Q_{T_0}} - 1\right)\Delta S_j Q_{J_0}\right]}_{RE} \qquad (3)$$

— Growth effect (GE): it is the change in exports that occurs when an exporter's share remains constant.
— Market effect (ME): this change in exports is observed if the exporter maintains its initial participation in the reference market during the period.
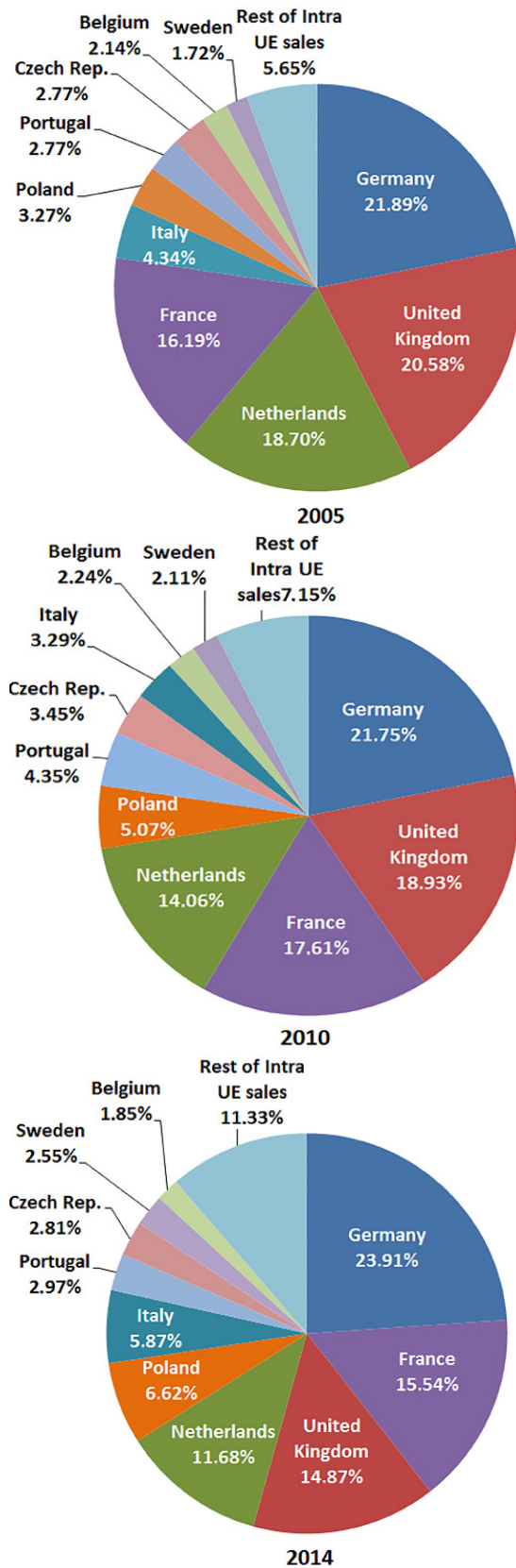

Figure 1. Evolution of intra-community sales of Spanish tomatoes [%]. *Source*: Compiled by the authors using data from COMTRADE (2016) database.

— General competitiveness: represents the part of export variations attributable to changes in general competitiveness, in our case on a global level. This reveals a country's ability to increase its market share only through competitiveness factors.

— Specific competitiveness effect (SCE): measures the change in exports which can be attributed to the change in the competitiveness of the specified market under analysis. This is the difference between the CE and the general competitiveness effect (GCE).

— Second-order effect: it measures changes in an exporter's share in the reference market and changes in global demand.

— Residual effect (RE): it estimates the interaction between an exporter country's share in the reference market and the changes in its level of demand.

In the case of application to the study of Spanish competitiveness in the European tomato market, it must be pointed out that the group of the three major competitors composed of the Netherlands, Morocco and France, are competitors that have higher volumes of intra-community sales and extra-EU exports (Fig. 2). Belgium is ruled out in the selection of the group of competitors, although in general it does not show significant differences with France (Fig. 2), since its export volumes

to Spanish customers are smaller than those of France. The spatial delimitation of the investigation is limited to the scope of intra-EU exports and sales volumes which represent Spanish market shares above 1%. In this case, the methodology allows us to work both in physical and monetary units, but we have chosen to undertake studies in terms of export volumes in physical units or sales to avoid the use of economic deflators.

As for temporary delimitation, the export competitiveness study will focus on the 2005-2014 period. The data provided by the COMTRADE database for this study were complete up to 2014.

Results

The presentation of results based on CMS methodology is an analysis to determine the level of competitiveness of Spanish tomato exports in the EU28 market in comparison to its major competitors: Netherlands, France and Morocco. Notably, the Netherlands and France are competitors of Spain who share the inter-community marketing agreement since they are EU28 member states. Morocco, although not a country belonging to the EU28, has held an agricultural agreement with the EU in 2012.
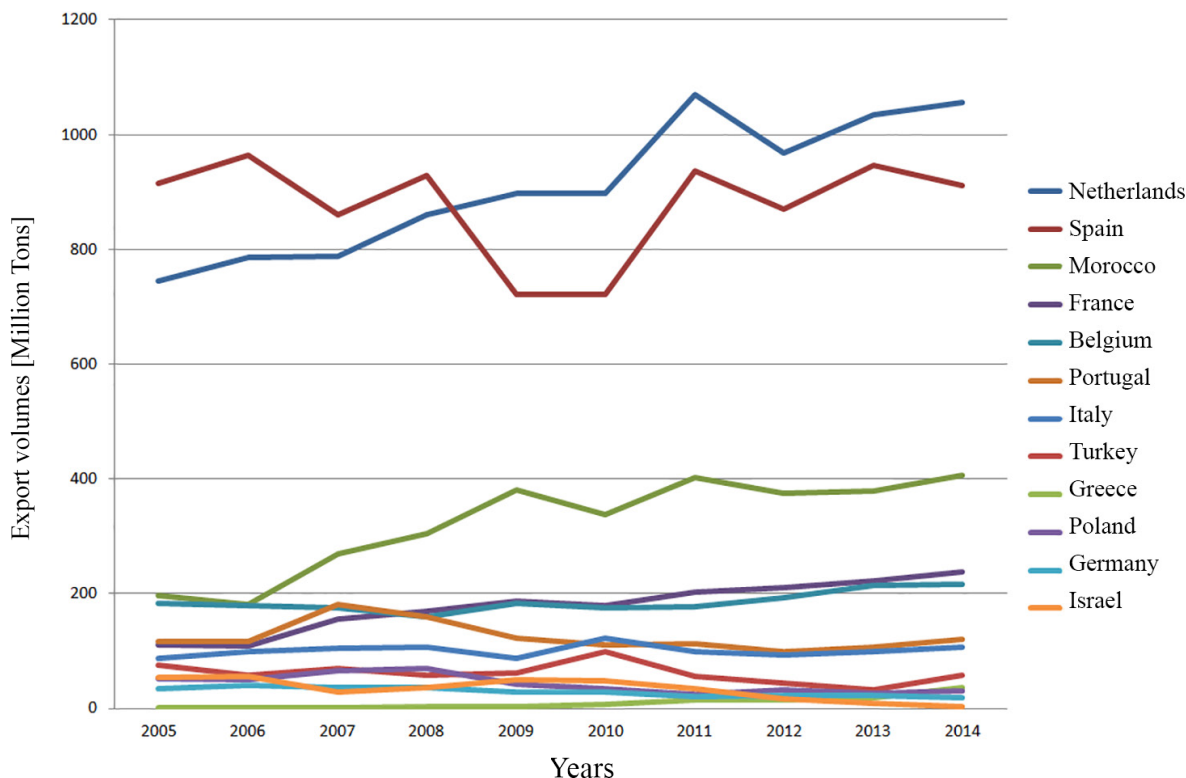

Figure 2. Temporal evolution of the main tomato exporters in the European market [million tons]. *Source*: Compiled by the authors using data from COMTRADE (2016) database.

This agreement, ratified by the European Parliament, falls into the Free Trade Agreement category, and temporarily excluded the entry of tomatoes, cucumbers, peppers and strawberries.

The analysis consists of three parts, first the analysis of the 2005-2009 period, then the analysis of the 2010-2014 period and, finally, a comparative balance of 2005-2009 *vs* 2010-2014.

CMS analysis from 2005 to 2009

Tomato-producing countries that marketed their product on the European market, (EU28), in the 2005-2009 period, present positive changes in export volumes, except for Spain (Table 3). In this period, Spain was still a leader in the intercommunity sales of tomatoes followed closely by the Netherlands, but since 2006 Spain has shown a negative growth rate in the volume of sales, evidenced by the sign of the corresponding component. Finally, in 2009 these roles were reversed and Spain became second in the ranking, and the Netherlands rose to first place. Morocco was in third place, its variation in export volumes to the EU28 being greater than those of France.

The first level of decomposition of the CMS methodology identifies that all countries subject to study have a positive SE, indicating that in the face of greater demand all suppliers had the opportunity to increase their sales in

the European market if they kept their shares constant. Spain presents the greatest opportunity.

Three of the four exporting countries (Netherlands, France and Morocco) have a positive CE, *i.e.* they improved their share as suppliers in Europe, while Spain decreased its share despite its position as leader. The sales policy of the Netherlands to the European market continued to grow, and like Morocco, the largest global volume sold explains the increased share as a supplier in the European market compared to the decline in Spain´s competitiveness. France also grew, although moderately so when compared to its other two rivals, the Netherlands and Morocco. Overall, growth in Spain could have been greater due to increased demand but this opportunity was seized by its other competitors, particularly the Netherlands.

The IE showed a positive variation in the Netherlands, Morocco and France, thereby assuming that the evolution of volume is most important in changes than the variation of commercial share. At the other extreme is Spain, with negative results.

At the second level of decomposition, segregation of the SE indicates that the GE was positive in the four supplier countries analyzed. It represents the hypothetical change in the volume of imports, when the share of exporters analyzed remains constant in relation to the global demand for this product. That is, the demand for imported tomatoes from the supplier countries analyzed, increased between 2005 and 2009, driven

Table 3. Results of CMS methodology in the 2005-2009, 2010-2014 and 2010-2014 *vs.* 2005-2009 periods (million tons). Target market: EU28.

Change in volume of Exports [1]	Main tomato-exporting countries											
	2005-2009				2010-2014				2010-2014 *vs.* 2005-2009			
	Nether-lands	Spain	Morocco	France	Nether-lands	Spain	Morocco	France	Nether-lands	Spain	Morocco	France
	515.97	**-64.19**	183.23	76.91	159.56	190.55	67.48	59.17	**-356.40**	254.75	**-115.74**	**-17.73**
First level of CMS decomposition												
SE	237.69	266.09	76.72	43.52	112.83	92.53	42.94	24.70	**-124.86**	**-173.56**	**-33.77**	**-18.81**
CE	242.68	**-297.45**	98.64	32.37	38.54	84.70	23.20	36.19	**-204.14**	382.16	**-75.43**	3.82
IE	35.58	**-32.83**	7.87	1.01	8.18	13.30	1.33	**-1.72**	**-27.40**	46.14	**-6.54**	**-2.74**
Second level of CMS decomposition												
GE	119.17	128.10	40.23	21.90	**-25.07**	4.31	**-7.60**	**-3.18**	**-144.25**	**-123.78**	**-47.84**	**-25.09**
ME	118.52	137.99	36.49	21.61	137.91	88.22	50.55	27.89	19.39	**-49.77**	14.06	6.27
GCE	**-344.42**	**-742.52**	**-60.94**	**-50.55**	**-137.56**	19.43	16.34	11.84	206.86	761.95	77.28	62.40
SCE	587.11	445.06	159.58	82.93	176.10	65.27	6.86	24.35	**-411.01**	**-379.78**	**-152.71**	**-58.58**
SOE	30.73	**-1.38**	**-9.59**	**-4.52**	3.17	35.62	**-5.89**	**-2.77**	**-27.56**	37.01	3.69	1.74
RE	4.84	**-31.45**	17.46	5.54	5.01	**-22.31**	7.23	1.04	0.15	9.13	**-10.23**	**-4.49**

[1] SE: structural effect. CE: competitiveness effect. IE: interaction effect. GE: growth effect. ME: market effect. GCE: general competitiveness effect. SCE: specific competitiveness effect. SOE: second order effect. RE: residual effect. Numbers in bold mean loss of competitiveness. *Source:* Compiled by the authors using data from COMTRADE (2016) database.

by international demand. This GE was more significant for Spain, followed in importance by the Netherlands, while it had minor implications for Morocco and France, taking into account a constant share as referenced.

In a complementary manner to the SE, the ME represented the additional effect in exports to the European market, provided that the exporter had maintained its initial market share each year during the period analyzed. The four competing countries generated positive effects. This indicates that all had the potential to increase their sales in the European market.

The GCE represents the part of the change in exports attributable to variations in general competitiveness, *i.e.*, considering the global market share of tomato-suppliers, projected onto the European market. From this perspective, the four major exporters should have decreased their sales to the European market.

The SCE measures the change in exports attributed to change in exporters´ trade policy regarding the European market in our case study. Contrary to the GCE, the four countries under study had positive values in the European market, unlike what should have happened in relation to their global share. They therefore increased their commercial share. In this effect the beginning of role -reversal in leadership by the Netherlands as opposed to Spain is evident.

The SOE measures the interaction between changes in the market share of an exporter in the target market and changes in global demand. This effect was present in a positive way in the Netherlands only. In addition, the RE estimates the interaction between changes in the market share of an exporting country in the target market and the change in the level of demand for the same country. Only Spain had a negative value.

CMS analysis from 2010 to 2014

It is important to note that unlike the pre-recession period, when the European market increased its demand for tomatoes from the countries analyzed, in the post-recession stage, European demand continued to grow but at a slower rate, where the 28.60% growth rate went down to 13.80%.

In the second period of the study (2010-2014), the four tomato-producing countries who marketed their product in the EU28 market experienced positive changes in their export volumes, including Spain. In this period, Spain even surpassed the Netherlands (Table 3), showing the recovery of Spain, now taking on the role of challenging the leader.

At the first level of decomposition of the CMS methodology, all countries in the study were found to have a positive SE, indicating that in the face of higher demand all suppliers had the opportunity to increase

their sales in the European market if they maintained a CMS. The Netherlands had the greatest opportunity.

The four exporting countries also had a positive effect on competitiveness, but in this case Spain, in addition to reversing its negative value of the previous period, exceeded the Netherlands in competitiveness.

The IE had a positive variation in the Netherlands, Spain and Morocco countries, assuming that the evolution of volume was more important in changes than in the variation of market share. Now it is France that gave a negative result.

At the *second level of decomposition*, structural segregation effect indicates that the GE was positive only in Spain and negative in the three remaining supplier countries. The demand for imported tomatoes from the analyzed supplier countries decreased in the 2010-2014 period, driven by declining international demand.

The ME represents the additional change in exports to the European market, provided that the exporter had maintained its initial market share each year during the period analyzed. In this component, the four competing countries had positive effects, indicating that all had the potential to increase their sales to the European market.

The GCE represents the part of the change in exports attributable to variations in general competitiveness. Three of the four major exporters should have increased their sales to the European market, mainly Spain. However, in the Netherlands the negative value of this GCE was primarily responsible for the low value of competitiveness of their intra-EU sales in the post-crisis period.

The SCE measures the change in exports that is attributed to the change of exporters´ trade policy with regard to the European market. The four countries under study had positive values in the European market, unlike what should have happened in relation to their global market share; they therefore increased their commercial involvement. In this effect, the supremacy that maintains the Netherlands as leader in tomato sales in the European market is evident.

The SOE measures the interaction between changes in the market share of an exporter in the target market and changes in global demand. This effect was present only in a positive way in the Netherlands and Spain. Finally, Spain was once again the only country among its competitors that had a negative value in the RE.

CMS analysis 2010-2014 *vs* 2005-2009

In both periods of analysis, the Netherlands, Morocco and France showed positive changes in the volume of their tomato exports for the European market (Fig. 3). But since in the second period, the positive changes in volume were not as great, by comparison, negative values were obtained (Table 3). However, for
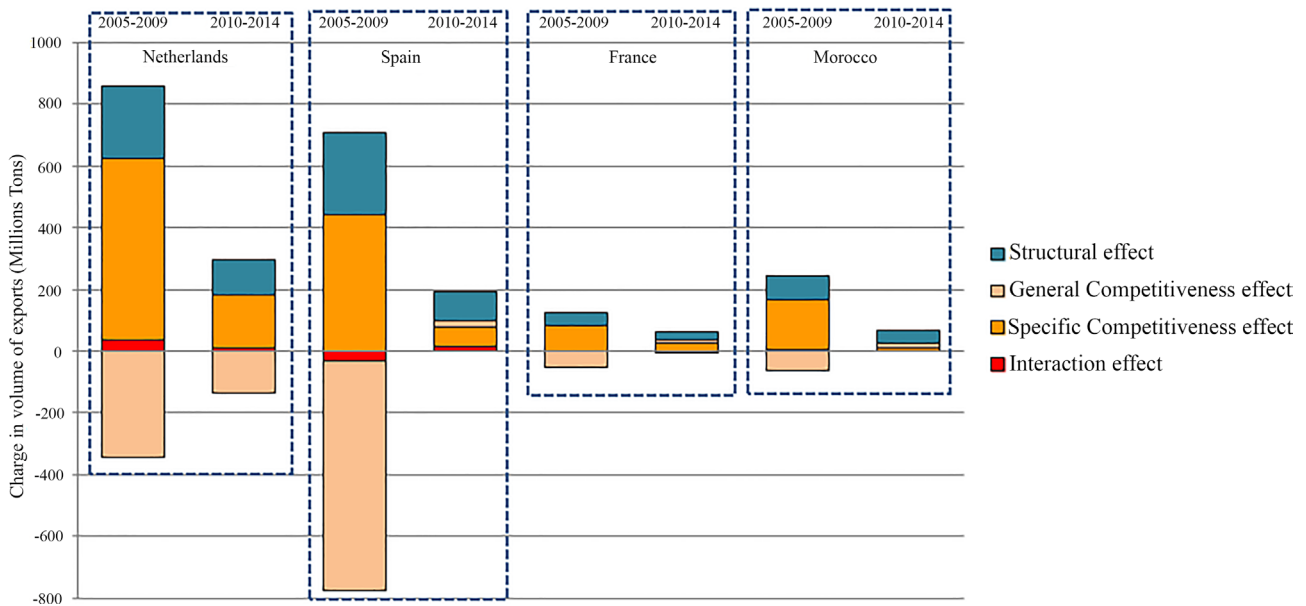
Figure 3. Results of the CMS methodology 2005-2009 and 2010-2014 [million tons]. *Source*: Compiled by the authors using data from COMTRADE (2016) database.

Spain, the mere fact of moving from a negative to positive volume, gave a positive comparative result (Fig. 4).

At the first level of decomposition, the only effect that negatively influenced all competing countries equally, in the change of volume of exports, was the SE, possibly influenced by the global crisis. On the other hand, Spain and France presented positive values in the CE. Although France could not offset the decrease in the volume of exports, Spain showed that export performance greatly exceeded the positive change in the volume of its exports. However, the magnitude of the negative SE could not be fully reflected in the magnitude of positive change in its exports. With respect to the third and final component of change in volume, Spain was the only country with a positive comparative value.

At the second level of decomposition, in the case of the components of the negative SE for all competitors, we can see that all had an effect of negative growth when comparing both periods and only Spain had a negative ME.

Additionally, three of the four competing countries that had a negative CE between the periods analyzed (Netherlands, Morocco and France), was not due to general competitiveness, but to the loss of specific competitiveness. Spain is the only country that had a comparatively positive component of competitiveness; this was due to a significant increase in the general competitiveness which offset the negative component of the specific competitiveness.

Discussion

Beyond the extensive use of the CMS methodology for the analysis of a country´s export performance in a reference market for various agricultural products, there are only precedents of its application in the marketing of tomatoes in the Mexican agricultural trade in the context of the Free Trade Agreement of North America, by Avendaño & Acosta (2009). However, we have seen no application of this type of analysis through CMS methodology on the export performance of Spanish tomatoes in the European market, or any other fruit and vegetable product.

Concept of competitiveness

The concept of "competitiveness" is generally defined as a country´s ability to compete in international markets. This ability is assessed by different parameters of competitiveness in terms of costs and prices, and is supplemented by taking into account "non-price" factors such as the quality and technological content of the goods produced, the ability to diversify and innovation, reliability of the service network, and several other aspects not related to prices. Ideally, it would suffice to observe these parameters to fully understand the direction in which a country is moving (Trichet -President of the European Central Bank-, 2006). Chavarria *et al.* (2002) expanded the definition of competitiveness as a "comparative concept based on the dynamic ability of a spatially localized agri-food chain, to maintain, expand
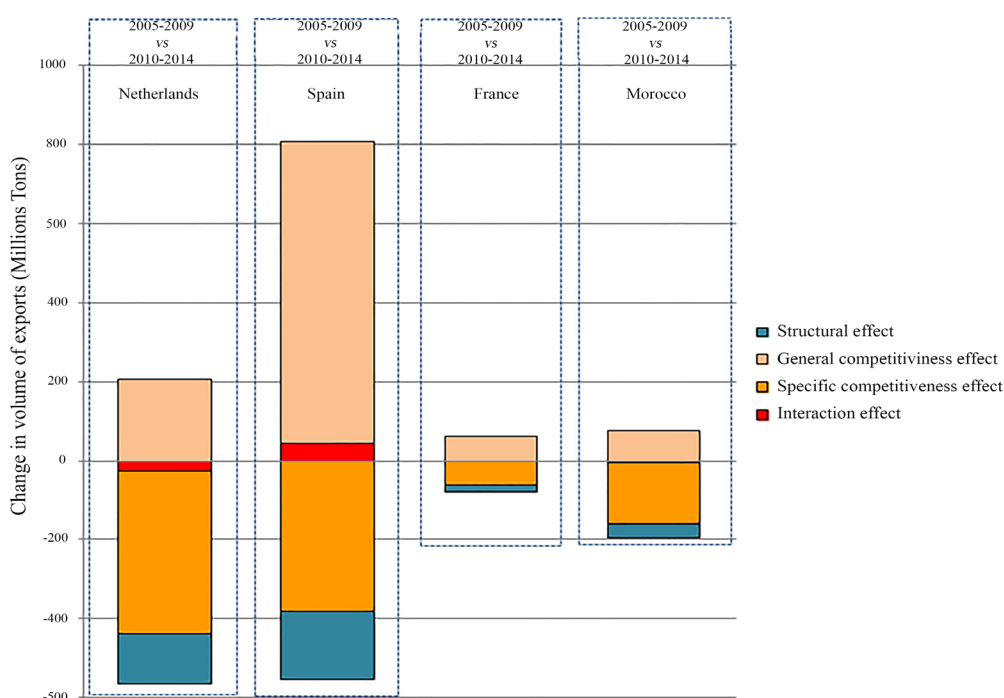
Figure 4. Comparative results of the CMS methodology 2010-2014 *vs* 2005-2009 [million tons]. *Source*: Compiled by the authors using data from COMTRADE (2016) database.

and improve continuously and sustain its market share, both domestic and overseas, through the production, distribution and sales of goods and services in the time, place and ways requested, benefit for society being the ultimate goal". Among researchers there is no consensus to define competitiveness, or about factors that constitute it. Therefore, product competitiveness in the international market depends in principle on its comparative advantages associated with favorable natural factors and lower relative costs in production. However, it also depends on the structure, marketing and transport costs to the place where it is marketed. Besides, its price competitiveness in foreign markets is also influenced by fluctuations in the exchange rate. Finally, competitiveness is also affected by other factors such as product quality, the degree of product differentiation, the seasonality of production and the market and government policies of both the exporting country and the importing country. The increased competitiveness of a product in the international market is expressed in a higher growth of exports and an increase in market share (Contreras Castillo, 1999).

Use of other competitiveness indexes in the European tomato market

According to agricultural research conducted by De Pablo & Giacinti (2009), Germany is Spain´s main export market for fresh tomatoes (currently continues). While Spanish tomato imports dominate from January to April, it is the second largest supplier, in terms of annual volume, behind the Netherlands, and the latter, sets the sales price. The commercial ability of the Netherlands and its competitive costs- production performance/ greenhouses, have an impact on the profitability of the Spanish producer. However, in the French market, second in importance in Europe, behind Germany, Morocco continues to be competition for Spain by superimposing volume -December to April- on less sales value. The authors present price as a key factor that Spain must face with regard to this extra-Community import, due to the cost advantage that Morocco has because of exchange rates, in addition to lower wages and taxes. Thus, the reference price for importing into the EU should take into account the differences in the exchange rate to match the competitiveness of local producers. Finally, it analyzed the UK as the third country in importance with regard to import volume of fresh tomatoes in the EU27, with an average annual increase of 5.6% (the average for 2010-2014 decreases 1.5% annually). Greenhouse production is declining, and is segmented by specialty markets, where the biological sector and demand for vine, cocktail and cherry tomatoes is growing. Spain with an offer of low diversity and innovation, faces the growth of retail sales through lower production costs or greater differentiation.

Although Spanish tomato exports outside the EU28 in 2014, only represented 6.24%, greater exports were reported to the Russian Federation, followed by Switzerland (Table 2). The Russian Federation, as an importer of Spanish tomatoes, has almost doubled its purchase percentage since 2005. The third place was occupied until 2010 by Norway, which gave way to Belarus. These four non-EU countries are characterized as being geographically located close to EU territory. In 2014, sales outside Europe were almost non-existent. However, in the past, products were exported to Africa (Cape Verde) and the Americas (USA and Canada).

De Pablo & Giacinti (2009) argued that the main tomato-exporting countries were Spain and the Netherlands. Eight EU countries (Netherlands, Spain, Belgium, France, Italy, Portugal, Poland and Germany) accounted for almost all intra-EU exports, with a low profile of non-EU sales, showing annual growth rates of 0.63% between 2004 and 2007 (1.8% between 2010 and 2014). However, some countries have recoil, as in the case of Spain, and others recorded significant slow progress (Netherlands). There are other non-EU countries with strong export activity, such as Morocco and Turkey, but there were also others with potential relevance in the medium and long term; the case of Egypt. These countries have a higher share of sales to the EU, increasing from 47.7% to 58.8% between 2004 and 2007, and their rate of overall annual growth is 10.45% (69.12% in 2014) -much higher than that shown in EU countries, at 0.63% (1.8% in 2014). Therefore, we can say that Morocco does not just pose a threat to Community producers. In the Netherlands, we can highlight their high population density, the need for intensive production and preservation of nature and the environment. In addition, they are leaders in technology of agrifood R&D+i, 2nd/3rd largest exporters of food and the integration of the agri-food chain is a key factor in production. The aims of this integration was to improve competitiveness by expanding economies of scale, consolidating their position in the European and global market, improve their negotiating position with buyers and expand their financial capacity. The distinguishing feature of Dutch horticulture has been its commercial capacity, which has allowed it to become a major transshipment center for fruit and vegetable products to the major consumer markets of Europe and North America. Thus, the quantities exported by Netherlands far exceed the values of their domestic production. The main supplier country of tomatoes to the Netherlands was Spain with a 71.58% share of Dutch tomato imports (53.24% in 2014), 42.59% of Dutch tomato exports is destined to Germany (43.42% in 2014). Followed then by the UK with a 16.70% (18.41% in 2014), Sweden with a 6.57% (6.03% in 2014), Italy with a 4% (4.84% in 2014) and France with a 4% (4.39% in 2014).

The seasonal pattern of Moroccan tomato exports to the EU is practically defined by a quota system of conventional entry prices that are negotiated with the EU. The goal was to maintain the level of traditional Moroccan tomato exports to the Community and to avoid disruptions in Community markets. This system imposes a calendar for entry of the Moroccan tomato on the European Single Market. Morocco has a preferential entry price for its tomato exports to the EU, 95% (81.8% in 2014) of tomato exports are directed to the French market and are mainly concentrated in the October to March period (84%). The North African country is not respecting either the preferential price or quotas it had been granted; the quantities imported being much higher than those established under the Agreement.

Comparison with revealed comparative advantage results

Comparison of the results obtained with the CMS methodology with similar studies on analysis of the competitiveness of Spanish tomatoes in the European market, can only be carried out by applying the Revealed Comparative Advantage (RCA) index, also known as the Balassa (1965) index. The study of De Pablo et al. (2012) on the competitiveness revealed in the case of the Spanish tomato is the most recent article on this subject matter. A strict comparison of the results of both studies cannot be performed, because the study of De Pablo et al. (2012) only calculates the RCA index for a one-off period in 2009 and not for a period of time, and much less for comparing time periods with others. Both studies agreed in selecting the group of competing countries in the European tomato market (Spain, the Netherlands, Morocco and France), including the analysis of De Pablo et al. (2012) which annexed Turkey in the study as a future competitor in the European market. Another point to consider is that the data on trade volume used to calculate the Balassa index were in monetary units. But because of the low rate of inflation in the European market, both studies can provide complementary results between them, although the results from the CMS methodology were obtained using data on trade volume in physical units. According to De Pablo et al. (2012), tomato exports from Spain in 2008 were € 851,292,000 and for the world, € 5,012,612,000; in turn, vegetable exports from Spain in the same year were € 3,756,883,000 and for the world, € 33,406,414,000. Both values obtained a percentage for Spanish tomato exports with respect to the total vegetable export, of 22.7%, while the percentage for the world average would be 15%, reflecting a comparative advantage in this sector for Spain of 1.51, which is greater than unity. An RCA value > 1 indicates

a comparative advantage in this sector, with respect to the world as a whole. That is, the product has an advantage, and the sector occupies a large proportion of exports in the region. In addition, De Pablo *et al.* (2012) indicated that these data provided more information when compared with its competitors and also when calculated over a number of years where trends can be seen. The RCA_{2009} of the countries that most influenced Spain were: Morocco 3.81; Turkey 2.87; Netherlands 1.61; Spain 1.59; and France 0.99. From the foregoing it can be concluded that even when outside the Community area and therefore not having commercial facilities offered by the EU, Morocco has a RCA. Another important fact noted is the competition between Spain and the Netherlands, who had a similar revealed advantage. Other countries such as Germany, the UK and Poland showed a comparative disadvantage, which makes them target importers for this horticultural sector. However, as mentioned above, the results of both studies cannot be strictly compared. The study of De Pablo *et al.* (2012) can provide some ideas on the competitive relationship between the Netherlands and Spain. These authors indicated that Germany was the main export market for fresh tomatoes from Spain. While the Spanish tomato dominated the German import market (January to April), Spain was the second largest supplier in importance in terms of annual volume, behind the Netherlands, the nation that set the selling price.

The Netherlands is one of the world's leading food exporting countries that attaches great importance to the integration of the agri-food chain. The aim of this integration is to improve competitiveness by expanding economies of scale, consolidate its position in the European and world market, improve its negotiating position with buyers and expand its financial capacity. Exports from Spain and France account for almost the total of tomato imports to Germany. In addition, growth of the export quota in the Netherlands was reflected, which has increased the share of the latter and decreased that of Spain. Even in the months of increased production in Spain both Spanish and Dutch tomatoes are sold. It should be remembered that the Netherlands is a major buyer of Spanish production. The report on the German market of the Spanish Institute for Foreign Trade (De Pablo *et al.* , 2012) comments that the Netherlands is Spain´s main competitor nation and it will continue to gain market share, not only because of its proximity to Germany, but also for productive diversification into vine and cherry tomatoes. The Netherlands remain the most innovating as they research and develop seeds, even producing varieties in new colors. So its strategy was based on a number of competitive advantages. In addition, they occupied a central position in Western Europe and connect with all major European cities (the port of Rotterdam is the largest in Western Europe). They produce and export large amounts of fresh fruits and vegetables during the summer and have established a stable trade with many intermediaries and European supermarket chains, which continue to buy this type of product, even during the winter. The RCA between the Netherlands and Spain using the Balassa index was a bit higher for the first nation, but we must not forget that the Netherlands sell Spanish tomatoes as theirs, particularly to Germany, its main market.

As seen in this analysis, Spain, intra-community sales leader in the European market until 2009, relinquished its leadership to the Netherlands after that date. Spain before the global economic and financial crisis had a positive SE of its exports which contributed largely to sales growth of tomatoes to the EU, but had a negative change in the volume of exports to the EU28 mainly due to the negative effect of the competitiveness component. According to decomposition of the effect of competitiveness, a strong general negative competitive effect shown cannot be offset by the positive effect of specific competitiveness. Since 2010, Spain has experienced a positive change in the volume of tomato exports to the EU28, the component of competitiveness also being positive since the component of general competitiveness was positively reversed and whose greatest contribution was the positive effect of specific competitiveness. Within the group of competitors, Spain is the only supplier of tomatoes to the EU28 with a positive change in volume when comparing business performance of 2010-2014 *vs* 2005-2009.

Relationship between Morocco and EU

The beginning of Morocco's relations with the EU arose from the Global Mediterranean policy (1972-1990), which also affects other countries of the Mediterranean Basin (Turkey, Malta, Cyprus, Morocco, Algeria, Tunisia, Egypt, Lebanon, Syria, Jordan, Yugoslavia and Israel). It was initially characterized by tariff reductions in agricultural products subject to schedule, quotas and reference price. On the other hand, Spain, until 1986, had a less favorable preferential agreement and its exports presented disadvantages for trading with respect to these countries. During the 1986-1990 period, Spain was in the convergence verification period, continuing the situation at a disadvantage with respect to the countries of the Mediterranean Basin. After this period, the Spanish fruit sector began its true integration, showing advantages with respect to these countries.

After that, the renewed Mediterranean policy (1992-1995) was approved (González & Maesso, 2001), where the countries of the Mediterranean Basin once

more see a boost in their exports, with an increase in quotas, reduction in entry prices, etc. Following the declaration of Barcelona in 1995, the EU established a free trade area with the countries of the Mediterranean Basin within the neighborhood policy. This new policy is implemented in 2009, with the approval of liberalization in agricultural and processed products (except for sensitive products such as tomatoes). In 2012, the EU-Morocco Agricultural Agreement came into force, which moderately extends reciprocal agricultural trade liberalization without modifying schedules and entry prices. Subsequently, in 2014 entry prices for these sensitive products were reduced and the medium-term trend was towards full liberalization. Morocco is the country that has been competing more directly, traditionally, with Spain in the French market (De Pablo & Perez Mesa, 2004), a situation that has been aggravated in recent years by the incorporation of Western Sahara tomatoes along with Moroccan tomatoes in exports to Europe.

According to the Western Sahara Resource Watch (WSRW, 2016) press release in February 2016, sector unions are concerned about the tomato market in the EU. Russia has recently banned imports from Turkey and EU tomato growers fear that Turkish production in the short term may invade the EU market. This market is already under severe pressure according to farmers who are complaining about Morocco; not only are imports from that country not properly controlled, but Western Sahara products also benefit from protection offered by the Free Trade Agreement.

Due to this situation the European Court of Justice, in Case T-512/12, annulled the free trade agreement between the EU and Morocco, the Commission ruling that increased imports of tomatoes and other products, from Western Sahara were subject to the same conditions as those of any other country with which the EU has not signed a trade agreement and should therefore be subject to the general admission price and must pay the corresponding customs duties. In this regard, it has asked the EU authorities to ensure the correct application of the law, clarify how it will control the source of the tomatoes and if this is done through special labeling to distinguish products from Morocco or Western Sahara.

Limitations and future research areas

As noted above, studies on competitiveness indicators are numerous in the literature since 1965 (Balassa, 1965; Richardson, 1971; Macías Macías, 2010, among others). But in most cases they were applied alone and not as complementary to each other. It would be desirable to analyze results from the application of different integrated methodologies into a system of indicators to measure competitiveness in the international trade of agricultural products.

In other areas of knowledge, indicator systems are usually developed, such as quality indicators, and social, environmental, or management indicators, among others. The Economic Commission for Latin America (Sterimberg, 2004) noted that the indicators make sense when considered as a system, as ordered and coherent constructions. In this context, the term "system" refers to data which is relative to an articulated whole. Any system of indicators seeks to organize the information available to clarify a particular issue or problem raised in society. An indicator system corresponds to a need for analysis. It is not limited to compiling a set of series, but seeks to find the relationships between them. It is like a "reference framework" to better understand how relevant variables interact throughout the various processes involved.

The potential importance of a system of export competitiveness indicators that complement each other should be highlighted. Without disputing which is the best indicator of all, since each indicator has a different approach to the competitiveness of a product in a specific market and as a whole provides a broader picture of the situation analyzed than the result of applying each index separately, thereby achieving a comprehensive picture of the exporting competitiveness of a determined country in a target market. The index derived from the CMS methodology can be supplemented with other indices (revealed competitive advantage, inter-industrial index, etc.) in order to provide a system of indices that complement a global panorama of tomato export competitiveness. Regarding future lines of research, it is our intention to apply this methodology linked to econometric models, on the one hand, and the study of different agricultural products, of importance in the Spanish economy, on the other. Additionally, another possible interesting extension would be to mix competitiveness and efficiency-productivity (Charles & Zegarra, 2014).

Finally, we can say that the results may provide relevant information to determine whether Spain can regain its former leadership in the tomato market. This type of study can be used for subsequent strategic analysis in the agri-food industry and can guide exporters in making decisions on business opportunities for export and intra-EU sales that could bring greater growth and profitability to companies involved in the trading of agricultural products. There is currently a consensus that this CMS methodology allows trading trends to be analyzed with the aim of formulating economic policy (González *et al.*, 2014). As previously stated, these results can provide guidance

to the various administrations (at national, autonomous and regional levels) to set public policies related to the sector, which set out to encourage the opening up of new markets or maintaining or strengthening existing markets in accordance to observed trends.

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