RESEARCH ARTICLE

The internationalisation of the Spanish food industry: the home market effect and European market integration

Raúl Serrano[1], Nieves García-Casarejos[1], Salvador Gil-Pareja[2], Rafael Llorca-Vivero[2] and Vicente Pinilla[3]

[1] Universidad de Zaragoza, Facultad de Economía y Empresa, Departamento de Dirección y Organización de Empresas. Gran Vía 2, 50005 Zaragoza, Spain. [2] Universidad de Valencia, Facultad de Economía e Instituto Agroalimentario de Aragón, Departamento de Economía Aplicada. Av. de los Naranjos s/n, 46022 Valencia, Spain. [3] Universidad de Zaragoza, Facultad de Economía y Empresa, Departamento de Estructura e Historia Económica y Economía Pública. Gran Vía 2, 50005 Zaragoza, Spain.

Abstract

The objective of this study was to analyse, from a long-term perspective, the factors determining the process of the internationalisation of the Spanish agrifood industry. The paper concentrates on the empirical verification of the existence of a home market effect in the food and drink industries in Spain and on the effects on trade flows of integration into the European Union. With this aim in mind, we took into account the latest contributions to the estimation of the gravity equation for a sample of export flows from 13 agrifood subsectors between 1970 and 2012, with a destination of 175 markets. From the results of the study the existence of the "home market effect" stands out as the determining factor of the increasing process of internationalisation in the majority of the subsectors of the food industry. On this point, the presence of this effect is remarkable in the most dynamic industries, where the process of re-structuring caused by the development of the internal market was more intense. Furthermore, the influence of the process of European integration has been shown by the literature to be a very important factor. Our results qualify in part the results of previous studies, since the positive effect appeared later than expected. The positive effects did not appear until the completion of the process of transition by the dismantling of the barriers established in the treaty of accession to the European Union.

Introduction

Intra-industrial trade has undergone a considerable increase in recent decades. The models proposed by Krugman (1980) and Helpman & Krugman (1985) permit the causes of this expansion to be understood; they describe a market with a great number of companies, each of them producing a differentiated product without barriers to entry. The key prediction of these models is that trade liberalisation among countries leads to a higher degree of competition, provoking the exit from the market of some companies, while those remaining expand their production by taking advantage of economies of scale.

Thus, in accordance with Krugman (1980), a large domestic market means an increase in the supply of differentiated products, which will subsequently be exported, permitting companies to take advantage of greater economies of scale. This phenomenon, termed the home market effect (HME), generates a reorganisation of resources towards the more efficient companies and encourages the localisation of multinationals in those markets which offer greater potential for growth. Given this context, the processes of trade liberalisation are exploited by companies with higher levels of productivity, thereby becoming exporters, while those whose productivity is lower either exit from the market or limit themselves to merely serving the domestic

market (Roland-Holst *et al*., 1995). The existence of fixed costs to entry into the export markets (such as the acquisition of information regarding consumer tastes, diverse regulations, the establishment of trade networks, etc.) means that only those firms with expectations of profits are those which become exporters (Melitz, 2003). This would explain why only a small number of companies become exporters (Bernard *et al*., 2007). Here, Melitz & Ottaviano (2008) built a model which, allowing for business heterogeneity, predicts how trade liberalisation, associated to a greater size of the domestic market, induces a sectorial process of the self-selection of firms.

The Spanish economy, since its incorporation into the European Union (EU), has demonstrated the principal characteristics described above: strong growth of the domestic market, a profound liberalisation of exchanges and, above all, increasingly elaborated products destined to high-income markets. Some studies have shown the presence of the HME to be a key factor in the upsurge of Spanish manufacturing exports (Claver *et al*., 2011). However, few studies have analysed the long-term effects of the growth of the domestic market as a determinant of exports in the agrifood industry. For the European case, Olper *et al*. (2014) and Chevassus-Lozza & Latouche (2012) have shown that the above-mentioned effect of selection in the food industry has been driven by the growth of the domestic market[1]. For the Spanish agrifood sector, however, research in this line has been very limited in comparison to studies focusing on other effects such as the liberalisation of trade barriers. The focus has been on Spanish incorporation into the EU, paying little attention to other factors which also favour the expansion of such trade (Contreras & Bacaria, 2000; Sanz, 2000; Sanz & Gil, 2001; Gil Pareja *et al*., 2005; Selva & Álvarez-Coque, 2011) and thus studies of this factor are needed. We also believe that analysing the food trade from this other perspective is important, as this is crucial to an understanding of Spanish exports. In Spain, the agrifood industry represents over 18.1% of the sales of the manufacturing sector and employs approximately 18.5% of the workforce (INE, 2012). According to data from the economic report by the Spanish Federation of Food and Drink Industries (FIAB), the agrifood industry was the leading export sector in 2013. Agrifood exports reached a value of €38 billion in 2013, which represented 16% of total Spanish exports.

Given this context, the objective of this study was to analyse the factors determining the process of internationalisation of the Spanish agrifood industry from a long-term perspective. The paper concentrates on the empirical verification of the existence of a home market effect in the food and drink industries in Spain and on the effects on trade flows of integration into the EU. As explained above, market liberalisation also plays an important role in the process of company reorganisation. Consequently, we linked the HME to the possibilities for international expansion offered by Spanish accession to the EU. Thus, our hypothesis was to verify that the development of the domestic market (the home market effect) has been a key factor in the success of the internationalisation of the Spanish agrifood industry.

The present study makes an additional contribution to the literature on the HME, applying a gravity specification for the disaggregated flows of trade for 13 agrifood sectors, from a long-term perspective, and in a period in which an intensive process of liberalisation and growth occurred in the domestic market. Another important contribution is that we have taken into account the latest technical advances in gravity equation estimation, and thus it has been determined by factors such as "multilateral resistance", "unobservable heterogeneity", the heteroscedasticity of residuals and the existence of null values in the dependent variable, which various studies have shown to be very important (Haq *et al*., 2012).

To achieve our objective we used the exports of the Spanish agrifood industry, estimating gravity equations for 13 agrifood sectors with exports destined to 175 countries, in the period 1970-2012. The gravity model for trade is probably one of the most successful empirical applications in international economics and has been used profusely, since the pioneering article by Tinbergen (1962), to analyse aspects of great importance such as: the impact on trade of the GATT/WTO system (Rose, 2004); regional trade agreements (Baier & Bergstrand, 2007); non-reciprocal trade agreements (Gil-Pareja *et al*., 2014); exchange rate systems (Klein & Shambaugh, 2006); or monetary unions (Rose, 2000).

Material and methods

Data collection

The data used in this study are Spanish exports from the agrifood sector to 175 countries, extracted from the UN-COMTRADE database (2013) and published by the United Nations Statistics Division. These values have been deflated by price indexes, elaborated on the basis of the unitary value of the exports of the industry

---

[1] The food industry is the main manufacturing industry in Europe, representing 14.9% of total sales (Food Drink Europe, 2012).

according to UN-Comtrade figures, to thereby obtain the series by volume in constant 2005 US dollars. The sectors chosen follow the National Classification of Economic Activities (CNAE) for 2009: processing and preservation of meat and elaboration of meat products; processing and preservation of fish, crustaceans and molluscs; fabrication of dairy products; processing and preservation of fruit and vegetables; fabrication of grain mill products; fabrication of starches and food starch products; fabrication of bakery and farinaceous products; fabrication of sugar, confectionery and chocolate products; fabrication of alcoholic drinks; fabrication of non-alcoholic drinks; fabrication of mineral waters and other bottled waters; fabrication of products for animal feed; fabrication of other food products; fabrication of vegetable and animal oils and fats; tobacco industry.

If we study these series, the increase in the internationalisation of the food and drink industry in Spain has been spectacular, if it is analysed for the period 1970-2012; its exports have multiplied, by volume, more than seven-fold (Fig. 1).

The rhythms of growth of these exports, furthermore, have tended to accelerate. From 1970 until 1986 they increased smoothly. In 1986, the year of Spanish accession to the EU, their growth accelerated, and from 1992, the year which marked the end of the transition period following this incorporation, the increase was notably faster (Table 1). These data show that, apparently, integration into the European market notably benefited Spanish agrifood exports, following a gen-
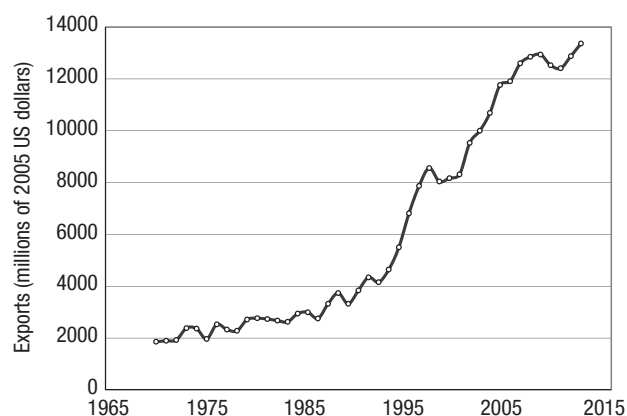

Figure 1. The evolution of exports from the Spanish food and drink industry, 1970-2012 (millions of 2005 US dollars). *Source:* Authors' elaboration, based on FAO (1947-1961) and FAOSTAT (2013).

eral tendency among EU members, whose intracommunity trade had increased significantly from the beginning of the 1960s (Pinilla & Serrano, 2009; Serrano & Pinilla, 2011). This also meant a considerable increase in the quota represented by EU destinations within Spanish agrifood exports (Clar *et al.*, 2015).

The development of the Spanish domestic market resulted in an increase in imports, which grew even faster than exports in the 1970s and 1980s. This increase was especially fast for animal feeds, due to the strong demand arising from the expansion of the new and intensive livestock industry (Clar, 2008). As a consequence, Spain suffered a negative trade balance. Its worst values were in 1975 when it represented 15%

Table 1. Composition and rate of growth of exports of the Spanish food industry. Industries were grouped following the National Classification of Economic Industries (CNAE), homologous to the European NACE

	1971-1976	1980-1985	1989-1994	1998-2003	2007-2012	1970-2012
Processed meat products	0.2	0.4	1.2	3.7	5.3	15.4
Processed fish products	7.1	5.4	3.4	4.5	4.5	3.4
Dairy industry	0.4	1.6	3.9	7.3	7.3	13.2
Processed fruit and vegetable products	26.1	23.4	22.8	18.0	16.8	3.7
Grain mill products	0.4	1.0	2.1	1.1	0.5	1.6
Bakery and farinaceous products	0.4	0.9	2.4	5.4	6.0	14.6
Confectionery and chocolate industry	1.0	2.0	3.7	6.0	4.7	8.9
Non-alcoholic drinks industry	0.1	0.4	1.2	3.5	1.7	12.8
Alcoholic drinks industry	49.9	41.5	31.9	22.3	21.5	3.0
Animal feed industry	1.4	6.6	2.0	3.6	5.0	8.9
Other food products	0.5	1.1	1.9	3.6	7.3	11.7
Oil industry	11.9	15.2	22.8	20.1	17.9	4.7
Tobacco industry	0.7	0.5	0.5	0.9	1.4	7.8
Total	100.0	100.0	100.0	100.0	100.0	4.8

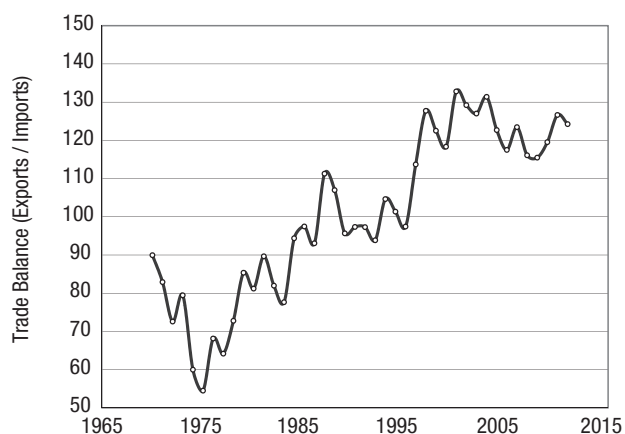*Source:* Own calculation based on UN-Comtrade (2013).

Figure 2. The evolution of the Spanish food trade balance, 1970-2011. *Source:* Authors' elaboration, based on FAO (1947-1961) and FAOSTAT (2013).

of the total trade deficit (Contreras & Bacaria, 2000). From 1995 on, Spain achieved a significant surplus in the food trade balance, with full entry into the European Single Market and the end of the transitional period (Fig. 2). This surplus was especially high in agriculture (Clar *et al.*, 2015). Such rapid growth was distributed unequally, however, among the distinct subsectors of the Spanish food industry. Perhaps it is most interesting to emphasise that the industries which initially had a lesser weight in exports, such as meat products, dairy goods, the bread and pasta industries, confectionery and chocolate, non-alcoholic drinks and animal feed, were those which experienced the strongest growth, which in some cases doubled and almost tripled the average of the food industry. These were sectors which traditionally exported little and which elaborated products with a certain degree of sophistication, thereby having relatively high added value and also strong income elasticity, despite being food products.

The opposite is true of those sectors which from well before the Spanish Civil War (1936-1939) constituted the principal export base of the Spanish food industry: wine, oil and processed fruit and vegetable products (Pinilla & Ayuda, 2002, 2009; Medina-Albaladejo, 2010; Ramon, 2010). Thus, a strong specialisation in food and drink products, linked to Mediterranean products, tended to be complemented by others with a greater degree of transformation and differentiation, among which stand out those linked to industrial livestock production and cattle feed production. Not by chance, it is above all following adhesion to the EU when this increasing diversification of exported prod-

ucts took place. It is also important to underline that the sectors with strongest growth experienced extremely slow development in Spain until the 1960s, while the consumption of their products was at very low levels. The case of dairy products is paradigmatic, their consumption in Spain doubling between 1961 and 1980 (Collantes, 2014).

The case of meat is also similar. The increase in its consumption was also very important from the 1960s on. This was linked to the appearance in the 1960s of intensive animal farming, following a pattern of specialisation more typical of Central and Northern Europe, which also confirms the protagonism in Spain of increasing diversification and specialisation in differentiated products in recent years. Thus, from the 1960s on an important intensive and industrial cattle structure has been consolidated in Spain, based above all on pork (Domínguez, 2000; Clar, 2008). Traditionally, in the meat and processed meat sector, the ratio of coverage was low; for meats and processed meat the ratio of exports over imports was only 6.9% in 1961-70. Recently, however (in the years 2001-2011), these products not only fully supply the domestic market but generate important surpluses destined for export, the value of their coverage ratio being 209% (Clar *et al.*, 2015).

The intensification of the trade exchanges of an intraindustrial nature produced in the food and drink sector has been important in this process of internationalisation; their advance has been especially significant in the framework of the EU (Reig *et al.*, 1998; Fernández-Núñez, 2000). Intra-industry trade had a certain importance in the 1980s, but since the mid-1990s has grown sharply within Spanish trade (Gamallo, 2004). Intra-industry trade has continuously increased in the food, beverages and tobacco industries, reaching 25% of total trade in 1995[2]. This effect has been more significant in the case of OECD countries and in vertical intra-industry trade (Blanes & Martin, 2000).

In this context of increasing internationalisation the Spanish agrifood industry has undergone a notable process of restructuring in recent decades. The development of the domestic market has produced since the decade of the 1970s an incipient process of concentration in the industry (Peinado-Gracia, 1985). On some occasions, food crises, like in 1981 the adulteration of rapeseed oil, known as the Toxic Oil Syndrome, or Bovine Spongiform Encephalopathy, commonly known as mad cow disease, from 1996 to 2001, may have accelerated these processes of concentration, as they caused, among other results, a crisis of confidence on

---

[2] Blanes & Martín (2010) measured intra-industry trade using Grubel & Lloyd Index (Grubel & Lloyd, 1975) adjusted for categories following Greenaway & Milner (1983).

the part of consumers and displaced consumption to products having greater guarantees of quality, provoking an increase in the concentration of demand in those companies marketing brands which because of their greater prestige offered a guarantee of higher food safety (Briz *et al.*, 2010). However, there is no doubt that adherence to the EU in 1986 has been key to higher industry concentration, since the change proved to be essential to growth and the ability to compete in national and European markets. While in 1981 the 40 leading companies by turnover represented 23% of total industry revenue, in 1998 and 2011 a similar number of companies accounted for over 33% of total sales (Table 2). Furthermore, as Table 2 shows, the number of industrial establishments in Spain in the food sector fell from the 46,349 existing in 1981 until slightly over 20,000 in 2011. When the 347 principal companies in the agrifood sector are taken, for example, a strong concentration in the stage of the accession of Spain to the EU can be observed, as these accounted for 52.3% of sales in the sector in 1981, 67.3 % in 1998 and 71.6% in 2011[3].

In the six-year period immediately subsequent to the integration of Spain into the EU numerous processes of concentration were undertaken. Specifically, mergers and acquisitions among leading European companies were responsible for the process, with the objective of rapidly penetrating new markets or taking advantage of economies of scale, exploiting the geographical position of Spain as a platform to attend to European consumers (Albisu & Gracia, 2002) and attempting to obtain absolute or majority control of food and beverage firms (Sanchís & Martínez, 1992). Foreign direct investment (FDI) played, therefore, a key role in the process of reorganisation of the agrifood industry, as underlined by the strong increase in the investment flows received by Spain, which rose from 1% of Spanish GDP in 1985 to 4.2% six years later (Guillén, 2004).

Nevertheless, the buying and selling of companies which characterised the late 1980s was slowed considerably in the 1990s, and investments, until then predominantly in the hands of foreign capital, made way for national capital, more orientated to the acquisition of small firms (Fernández-Núñez, 2000).

The process of concentration of the industry has been highly heterogeneous. From a disaggregated analysis of the different food industries, while the indexes of concentration of the sales of the four principal companies in 1997 in the three most traditional sectors, processed and conserved fruit and vegetables, the fabrication of vegetable and animal oils and fats or the fabrication of alcoholic drinks did not exceed in any case more than 25% of the total sales of the sector. In other sectors, which gradually became more important in the internationalisation of Spanish industry, the process of restructuring was greater. In that same year, 1997, for the fabrication of non-alcoholic drinks, the four principal companies accounted for 50% of sales. In the case of processed sugar, cacao and chocolate, the Four-firm concentration ratio, CR4 index, reflects an accumulation of 40%, while this same index represented 30% of the sales of the following subsectors: the fabrication of dairy products, the fabrication of grain mill products, bakery products and farinaceous products.

This process does not appear to have finished yet. The *Instituto Internacional San Telmo y Rabobank* (2004) showed a lack of size in agrifood firms. In their study of the Perception of the Dimension of the Spanish Agrifood Industry concluded that half of the businesspeople and directors of the agrifood industry continued to show their interest in understanding how to gain size. Acquisitions, mergers and alliances proved to be the formulae preferred by the directors of the agrifood industry. The study showed, furthermore, that 75% of the entrepreneurs perceived the problem of size as a challenge for the survival of the company itself, due to internationalisation, the processes of concentration undertaken and the increase in the negotiating power of the retail distribution channels. By contrast, those who did not see dimension as a key factor for the future of their companies placed greater importance on differentiation, especially regarding aspects of the quality of service in the local market (Fernández-Núñez, 2000).

An influential article by Melitz (2003) shows how liberalisation, accompanied by business heterogeneity (*i.e.* with significant differences in company, such as those underlined), causes a process of restructuring in the sector via the survival of the fittest. On this point,

Table 2. Concentration indexes (CR) in the food and drink industry, 1981-2011

Year	Establishments (No.)	Employees (No.)	CR40	CR167	CR347
1981	46,349	313,000	23.7	46.4	52.3
1998	26,286	373,341	30.2	54.0	67.3
2011	20,208	361,143	34.0	56.8	71.6

Source: Authors' elaboration, from Alimarket, Industrial Survey of the Spanish Statistical Office and Peinado-Gracia (1985).

---

[3] See on this same point the studies by Ameur & Gil (2003) for agroindustry or Delgado-Gómez *et al.* (2004) and Fariñas & Martin-Marcos (2007) for manufactures.

Melitz & Ottaviano (2008) permitting company heterogeneity in productivity, construct a model which predicts that the liberalisation of trade associated with a greater market size induces a sectorial process of the self-selection of those firms which are capable of confronting internationalisation.

According to figures for 2011 from the Industrial Survey undertaken by the Spanish Statistical Office (INE), the companies of greatest size, with over 200 employees, and which constitute approximately 18% of companies in the food industry, concentrate over 70% of the exports of the sector. Fernández-Núñez (2000), in an analysis of manufacturing companies as a whole, states that size continues to be a key variable in the decision to export of Spanish companies.

In addition, the Company Strategies Survey (ESEE), undertaken by the SEPI Foundation for the period 1990-2011 with the support of the Spanish Ministry of Industry, emphasises some of these changes in the industry. Firstly, the sample shows how Spanish firms exporting food are of greater size than those of the industry as a whole. These companies, furthermore, have a strong participation of foreign capital, of approximately 25%, although they have lost weight recently. Secondly, as Table 3 shows, in the third and fifth columns, such firms are additionally more productive than those which do not export. We underline how since the 1990s there has been an accelerated increase in the apparent productivity of labour. In this same direction, Wagner (2007) concludes, following a review of the literature, that exporting companies are generally more productive than their non-exporting counterparts, due to the effect of self-selection; that is to say, the fact that only the most productive can export, among other reasons, due to the presence of irrecoverable costs. Very notable is the high concentration of exports accumulated by the 10 companies with the largest foreign sales figures (Table 3, final column); these accounted in 2011 for almost 60% of the exports in the sample. This would support the thesis that not all companies are prepared to tackle the challenge

of exports and that it is also possible to speak of the concentration of exports in a relatively small number of firms.

We can therefore conclude that the strong growth of the domestic market, accompanied by the process of liberalisation produced by accession to the EU, has caused a process of self-selection in the food industry, that is to say a far-reaching restructuring of the sector with the emergence of more heterogeneous companies, an increase in the size of firms and the establishment of a set of leading businesses which, exploiting economies of scale, exported products with a greater degree of differentiation. This is the central thesis of the present study, the validation of the home market effect for the different industries comprising the sector. In fact, as we know, the reduction of the barriers to imports associated with entry into the EU has produced an increase in the level of productivity, necessary in turn to be able to remain in the domestic market (Blanes & Milgram, 2009). The foregoing arguments should help us to understand what forces determine the international expansion of the Spanish agrifood industry.

Among these are the changes provoked by a strong growth of the domestic market, with an increase in the size of the companies associated with the productivity gains caused by economies of scale. In this process of transformation the increasing presence of foreign multinationals in the sector played a key role at the beginning of the process (Rodríguez-Zúñiga & Soria, 1989). The Spanish agrifood system, following adhesion to the EU, notably increased its advantages for foreign investment, especially after the subsequent implementation of the single market and the free movement of capital (Rama & Calatrava, 2002).

Methods

The methodology employed is the gravity equation. The initial applications of the gravity model, developed by Tinbergen (1962) and Pöyhönen (1963a,b) and employed in the study of the determinants of interna-

Table 3. Indicators of Spanish food companies, 1994-2011

Year	Size		Labour force productivity		Exporters (%)	Exports/ Sales (%)	FDI Participation (%)	Top 10 Exporters (%)
	All	Exporters	All	Exporters				
1994	295.82	513.86	20.32	25.92	48.79	6.56	23.83	8.73
2002	267.15	409.43	25.93	30.97	59.47	12.58	25.12	33.42
2011	182.44	227.37	21.39	36.56	64.59	17.13	8.99	59.85

FDI: Foreign Direct Investment. *Source:* Authors' elaboration, from the Company Strategies Survey (ESEE).

tional trade, lacked a theoretical basis. Subsequently, the success of this approach in explaining international trade patterns caused economists to formally develop its theoretical foundations (Anderson, 1979; Bergstrand, 1985, 1989; Helpman & Krugman, 1985; Deardoff, 1998; Eaton & Kortum, 2002; Evenett & Keller, 2002). Analogous to Newtonian physics (from which it takes its name), this model assumes that bilateral trade flows depend positively on the economic size of countries (normally measured by their income) and negatively on the distance between them. Although the first empirical applications were based on this idea and it could be said that it was merely an econometric model which explained international trade well, from the 1970s on analytical developments began to appear (Anderson, 1979; Bergstrand, 1985, 1989; Deardoff, 1998; Eaton & Kortum, 2002; Evenett & Keller, 2002; Anderson & van Wincoop, 2003); these support it from almost any theoretical approach dealing with the motivations for trade between countries.

In addition to the basic variables (income and distance), the gravity model incorporates other variables which affect, in one direction or another, the trade barriers among countries: this is termed the "expanded gravity model". In particular, for each of the agrifood subsectors considered, the specification used in this study is the following:

$$\ln X_{ijt} = \beta_1 + \beta_2 \ln(Y_{it}) + \beta_3 \ln(Y_{jt}) + \\ + \beta_4 \ln Dist_{ij} + \beta_5 PTA_{ijt} + \beta_6 GATT_{ijt} + \quad [1] \\ + \beta_7 UE_{ij86\text{-}92} + \beta8\, UE_{ij86\text{-}11} + U_{it}$$

where i and j represent the trade partners; t is time and the variables are defined below.

The independent variables are: Y_{it} and Y_{jt} are the real GDP of the exporting country and the importing country, respectively, in year t, in 2005 US dollars. The values of GDP in 2005 dollars for the 175 countries which comprise the sample come from the WDI (World Development Indicators) of the World Bank; $Dist_{ij}$ is the distance between i and j; PTA_{ijt} is a dummy variable which takes the value of 1 if i and j belong to the same preferential agreement in t, taking into account the recent proliferation of this type of trade agreement; $GATT_{ijt}$ is a dummy variable which takes the value of 1 for the signatory countries of the Uruguay Round of GATT, which represents an important advance in the process of liberalisation of the agricultural sector on an international scale; UE is a binary variable which takes the value of 1 if the two countries belong to the EU at moment t. Distinction has been made between the period 1986-1992 and the period 1992-2011, as 1992 was the end of the transitory period for the dismantling of tariff barriers, and U_{it} is the standard error

term. The variable which measures the geographical distance between pairs of countries, and similarly the variables which measure membership of GATT, Preferential Trade Agreements (PTA) and the EU are the authors' elaboration, on the basis of the CEPII database.

It must be underlined that it is necessary to take account of the theoretical foundations of the gravity equation which have been formulated since the well-known article by Anderson (1979), in order to avoid erroneous specifications. Specifically, Anderson & van Wincoop (2003) signalled the bias generated on omitting relevant variables such as the terms measuring the so-called "multilateral resistance", which assume that trade decisions are made taking into account relative and not absolute prices. As these authors state, it is necessary to take into account not only resistance to trade between the two countries considered, but also the resistance with which each of them is faced with regard to the remaining members. From the econometric point of view, "multilateral resistance" is controlled for through the inclusion of dummy variables by countries. Given that in this concrete case a single origin is available, the inclusion of solely fixed destination effects would control for the abovementioned bias.

Similarly, when working with panel data, control must be made for "unobservable bilateral heterogeneity", that is to say, those factors constant over time which affect trade between pairs of countries and which have not been explicitly controlled for by the researcher. On this point, the inclusion of fixed effects by pairs of countries would take into account this econometric problem (Mátyás, 1997, 1998; Egger, 2002). It is necessary to make it clear that the inclusion of these fixed pair effects, on the one hand, already controls in turn for multilateral resistance and, on the other, makes unnecessary the inclusion in the extended gravity model of those specific variables of pairs of countries which do not alter over time and which are usually included when estimation is made by ordinary least squares (OLS), such as a common language, a land border, etc. As occurred in the previous case, having a single origin means that the number of pairs coincides with the number of destinations. In this way, in our specific case, the inclusion of a variable with a different value for each pair and constant over time would control for both "multilateral resistance" and "unobservable heterogeneity". The ideal candidate is the distance variable *(Dist)*.

Lastly, Santos Silva & Tenreyro (2006, 2010) explained the appearance of serious econometric problems as the result of the existence of heteroscedastic residuals and the high percentage of zero values in the dependent variable. Both these aspects are very common when dealing with international trade data, and even

more so when concentrating on sectorial data. These authors argue that in these cases estimation by OLS is biased. Consequently, they propose a non-linear Poisson estimator to estimate the gravity equation which, on the other hand, takes into account the presence of the zeros. This is known as the Poisson pseudo maximum-likelihood (PPML) estimator.

In short, the present study, with the explicit inclusion of a variable (distance) which controls for the fixed pair effects, such that consideration is taken from the econometric point of view of the latest developments formulated by the literature on this point, avoids, as far as possible, the diverse biases which may occur. Following the work of Feenstra *et al.* (1998, 2001), if the estimations reveal a greater sensitivity of domestic income to changes in the income of the importing country, the home market effect will be produced. That is to say, we must conclude that the presence exists of the effect for the subsector "z", if $\beta_2 > \beta_3$.

The data for the dependent variable are Spanish exports from the agrifood sector to 175 countries from the UN-Comtrade (2013) database, published by the UN Statistics Division. The values of GDP in 2005 dollars for the 175 countries which comprise the sample come from the WDI (2013). The variable which measures the geographical distance between pairs of countries, and similarly the variables which measure membership of GATT, Preferential Trade Agreements (PTA) and the EU are the authors' elaboration, on the basis of the CEPII database.

Results

Table 4 presents the results of the estimation of 13 gravity equations (one for each sector), using PPML. From a general perspective, it can be concluded that the exports of the Spanish food and drink industry have been strengthened by the growth of the domestic market, by the increase in demand in the destination markets and by the trade creation effect promoted by adherence to the EU. However, as numerous studies have shown, the physical distance between markets have continued to constitute an important barrier to trade. All the variables have the expected sign.

Firstly, the results of the coefficients (Y_{it}) and (Y_{jt}), which refer to market size, both in Spain and in the countries of destination of exports, display a positive and statistically significant effect in the majority of cases. It can also be observed that there exists empirical evidence supporting the existence of the HME in 9 of the 13 industries studied: processed meat products; dairy industry; grain mill products; bakery and farinaceous products; confectionery and chocolate; non-alcoholic

drinks; animal feed; other food products; tobacco industry. In these nine subsectors $\beta_2 > \beta_3$, which demonstrates the existence of an HME. As columns (1) and (2) show, the coefficients (Y_{ijt}) are statistically significant and superior to the coefficient of the income of the importing country (Yi_{jt}). The most notable exceptions of the presence of the HME, are those of the subsectors of the processing and preservation of fish, the processing and preservation of fruit and vegetables, the oil industry and the elaboration of alcoholic drinks. As stated earlier, these were precisely the most traditional sectors of Spanish agrifood exports, those which experienced lower growth in their sales abroad in the period and also those which displayed less intensity in the processes of industrial reorganisation.

Secondly, as shown by many studies, we have found empirical evidence of the creation of trade by the insertion of the Spanish agro-industry into the EU. In our case, we can offer this new empirical evidence of the positive effect, from a long-term perspective and also in a disaggregated form, for the distinct subsectors comprising the food and drink industry. Furthermore, our results underline that this boost to trade only took place following completion of the process of transition of Spanish integration into the EU, as it was then that tariff barriers for Spanish products were completely eliminated.

Column (6) for the dummy variable $UE_{ij86-92}$, which attempts to capture positive effects in trade in an initial period of liberalisation, shows that neither positive signs nor statistical significance are found in the majority of subsectors in this period. There even exist negative and statistically significant signs in some sectors, which would imply a certain effect of trade deviation. The exceptions to this general result are produced in the alcoholic drinks industry and the animal feed industry, where there was already an effect of trade creation from 1986 onwards.

After 1992, as shown in the sign and significance of the coefficients of the variable $UE_{ij93-12}$, which draws us close to the effect of EU integration, following the finalisation of the transition period, in 7 of the 13 industries considered there is evidence of a positive effect of such integration for Spanish food exports, once completed the transition process with the dismantling of tariff barriers. Specifically, this positive effect is to be found in processed meat products, fish and fruit and vegetables, the confectionery and chocolate industries, alcoholic drinks and the oil industry.

Lastly, we have attempted to explore the effect of the reduction of trade barriers on an international scale, following the Uruguay Round of GATT, and its positive influence upon the exports of the Spanish agroindustrial complex. On the basis of our results, it is only possible to talk of a certain boost to trade

Table 4. Results of the gravity equation, by PPML (Poisson pseudo maximum-likelihood). The number of observations are 6,239 for each industry group. Standard errors in parentheses

Sector	(1) ln (Y_{it})	(2) ln (Y_{jt})	(3) lnDis$_{tij}$	(4) GATT$_{ijt}$	(5) PTA$_{ijt}$	(6) UE$_{ij86-92}$	(7) UE$_{ij93-12}$	(8) R^2
Processed meat products	5.087 (0.715)***	0.617 (0.025)***	−1.581 (0.067)***	−0.684 (0.176)***	−0.702 (0.184)***	−0.861 (0.331)***	0.449 (0.112)***	0.81
Processed fish products	−0.402 (0.373)	0.693 (0.026)***	−0.995 (0.057)***	−0.069 (0.106)	0.440 (0.097)***	−0.265 (0.209)	1.472 (0.120)***	0.50
Dairy industry	4.030 (0.443)***	0.650 (0.037)***	−2.395 (0.066)***	0.311 (0.181)*	−1.115 (0.202)***	−0.106 (0.294)	−0.044 (0.171)	0.80
Processed fruits and vegetables	0.567 (0.292)**	0.973 (0.015)***	−0.849 (0.049)***	−0.400 (0.097)***	−0.420 (0.082)***	−0.305 (0.114)**	0.300 (0.088)***	0.82
Grain mill products	1.937 (0.990)**	0.314 (0.031)***	−2.163 (0.170)***	−0.747 (0.260)***	−3.308 (0.315)***	−4.492 (0.389)***	−1.402 (0.323)***	0.41
Bakery and farinaceous products	4.612 (0.515)***	0.562 (0.016)***	−1.868 (0.063)***	0.443 (0.138)***	−0.843 (0.121)***	−0.503 (0.208)**	0.002 (0.098)	0.89
Confectionery and chocolate	2.406 (0.480)***	0.701 (0.012)***	−0.912 (0.057)***	−0.182 (0.152)	−0.269 (0.100)***	−0.417 (0.125)***	0.276 (0.072)***	0.81
Non–alcoholic drinks	3.426 (0.727)***	0.271 (0.034)***	−2.455 (0.062)***	0.087 (0.165)	−0.257 (0.178)	−0.142 (0.354)	1.048 (0.173)***	0.72
Alcoholic drinks	−0.381 (0.311)	0.736 (0.012)***	−0.769 (0.041)***	0.356 (0.126)***	0.399 (0.086)***	0.326 (0.141)**	0.657 (0.080)***	0.84
Animal feed	1.621 (0.529)***	0.446 (0.021)***	−1.658 (0.069)***	1.381 (0.163)***	−1.047 (0.239)***	0.855 (0.178)***	−0.087 (0.198)	0.65
Other products	3.408 (0.424)***	0.464 (0.017)***	−1.591 (0.057)***	0.542 (0.113)***	−0.969 (0.115)***	−0.121 (0.163)	−0.303 (0.087)***	0.83
Oil industry	0.752 (0.538)	0.666 (0.019)***	−1.092 (0.056)***	0.175 (0.119)	−0.450 (0.121)***	0.077 (0.286)	0.236 (0.122)*	0.39
Tobacco industry	2.992 (0.877)***	0.620 (0.051)***	−1.537 (0.121)***	−0.549 (0.311)*	−0.232 (0.299)	−3.199 (0.436)***	−0.368 (0.297)	0.33

***,**,*: significant at 1%, 5%, and 10% level, respectively.

for four industries: dairy products, bakery and farinaceous products, alcoholic drinks and animal feed. Similarly, no positive effect is perceived for the exports of the Spanish food industry from the proliferation of the Preferential Trade Agreements (*PTA$_{ijt}$*), signed from the 1990s onwards with economies outside the EU.

Discussion

The objective of this study was to analyse the factors determining the process of internationalisation of the Spanish agrifood industry from a long-term perspective. The paper verifies the existence of a home market effect in the food and drink industries in Spain as a key factor in explaining its process of internationalisation. The presence of this effect is remarkable in the most dynamic industries, where the process of restructuring caused by the development of the internal market was more intense. Furthermore, the influence of the process of European integration has been shown to be a very important factor.

We have taken into account the latest theoretical advances in the estimation of the gravity equation, such that we have controlled for factors such as "multilateral resistance", "unobservable heterogeneity", the heteroscedasticity of residuals and the existence of zeros in the dependent variable, which various studies have

shown to be very important (Haq *et al.*, 2012). Finally, we have estimated an equation for each of the industries comprising the Spanish agribusiness complex for the period 1970-2012, taking into account a broad sample of destination markets, including data for 175 countries.

The results of the empirical work permit the validation of the hypothesis of the positive effect of the development of the domestic market as a key factor in the success of the process of internationalisation of the Spanish agrifood industry. The test has been performed for 13 industries, evidence of its presence existing in nine of them. Specifically, the HME has appeared in those for which we had previously observed a greater dynamism and a process of restructuring of its more intensive business fabric: processed meat products; the dairy industry; grain mill products; bakery and farinaceous products; confectionery and chocolate; non-alcoholic drinks; animal feed; other food products; and the tobacco industry. This result is consistent with previous studies (Feenstra *et al.,* 2001; Serrano & Pinilla, 2014), which underline that the most traditional sectors, with a predominance of homogeneous products, are those which do not take advantage of the existence of the HME.

Furthermore, the estimation of the gravity equation performed reinforces the idea, already proposed in previous studies, that the Spanish agrifood trade has progressively concentrated in those EU countries with greater market potential. In our case, new empirical evidence is gathered of the positive effect of integration into the EU, from a very long-term perspective and in a disaggregated fashion for the distinct subsectors which comprise the food and drink industry. These results complement the academic debate which has focused solely on the effect of the liberalisation of the barriers to trade with Spanish incorporation into the EU (Contreras & Bacaria, 2000; Sanz, 2000; Sanz & Gil, 2001; Gil Pareja *et al.*, 2005; Selva & Álvarez-Coque, 2011). In addition, we can partially qualify the results of some previous studies, since the positive effect upon the exports of the Spanish agrifood industry as a consequence of the liberalisation of the EU markets occurred later than the actual date of adherence. For a large number of industries, these positive effects did not appear until the completion of the process of transition by the dismantling of the tariff barriers established by the treaty of adhesion. It would also be interesting for future research to analyse the effect of particular products.

These results show that the Spanish food industry, beyond simply seizing the opportunities offered by barrier-free access to a vast market, has displayed very dynamic behaviour. The initial limitations of small size, and the scarcity of financial, human and technical resources has not prevented its transformation into a dynamic industry with large and productive firms. Improved domestic demand has been of key importance in technological development in the sector (Martínez & Burns, 1999; Martínez & Briz, 2000). Firms have had to adapt to conditions of quality demanded by consumers and regulations in international markets. This successful adaptation has led to an increase in productivity for export-oriented firms (Galdeano-Gómez, 2010). The mentioned initials limitations to taking advantage of economies of scale which can also be compensated for in some cases by managers establishing collaboration networks with other firms (Martínez-Carrión & Medina-Albaladejo, 2010).

Finally, the results could be interesting for policymakers designing and implementing export programmes for firms. Internationalisation policy actions can plan improvements to establish new programmes promoting company size or programmes encouraging collaboration between firms as an alternative mechanism. It might, therefore, be of interest to produce export support programmes especially for small and medium-sized enterprises focusing on encouraging cooperation between organisations, in order to improve company competitiveness.

One of the principal limitations of the present study is that it lacks a deeper analysis of the characteristics of the exporting companies in the sector. Some recent studies have attempted to improve the models which explain trade from a microeconomic approach. On this point, Antràs *et al.* (2010) emphasise the importance of business heterogeneity to justify the good behaviour of the Spanish foreign sector. According to these authors, Spanish exporters are dominated by large companies, but also by a considerable number of small enterprises which are also competitive. The latter are companies which innovate, which have managed to differentiate their products and position them in high margin segments or are companies in which their directors have had the capacity to participate in collaborative networks. In turn, Navaretti *et al.* (2011) in a comparative analysis of European exporting companies make clear the greater importance of the internal characteristics of companies, compared to other factors, such as their location. The achievement of a better understanding of the resources and capacities required to face the process of internationalisation in the agrifood sector may be the objective of future research.

References

Albisu LM, Gracia A, 2002. La industria agroalimentaria española ante la ampliación de la UE. Economía Industrial 344: 99-110.

Ameur M, Gil JM, 2003. Estrategias empresariales y propensión exportadora de la industria agroalimentaria catalana y española. Econ Agrar Recurs Nat 3(6): 107-127.

Anderson JE, 1979. A theoretical foundation for the gravity equation. Am Econ Rev 69: 106-116.

Anderson JE, van Wincoop E, 2003. Gravity with gravitas: A solution to the border puzzle. Am Econ Rev 93:170-192. http://dx.doi.org/10.1257/000282803321455214

Antràs P, Segura R, Rodríguez D, 2010. Firms in international trade (with an application to Spain). SERIEs Invited Lecture at the XXXV Simposio de la Asociación Española de Economía, 16-18 Dec.

Baier SL, Bergstrand JH, 2007. Do free trade agreements actually increase members' international trade? J Int Econ 71: 72-95. http://dx.doi.org/10.1016/j.jinteco.2006.02.005

Bergstrand JH, 1985. The gravity equation in international trade: some microeconomic foundations and empirical evidence. Rev Econ Stat 67: 474-481. http://dx.doi.org/10.2307/1925976

Bergstrand JH, 1989. The generalised gravity equation, monopolistic, and the factor-proportions theory in international trade. Rev Econ Stat 71: 143-153. http://dx.doi.org/10.2307/1928061

Bernard AB, Jensen JB, Redding SJ, Schott PK, 2007. Firms in international trade. J Econ Perspect 21(3):105-30. http://dx.doi.org/10.1257/jep.21.3.105

Blanes JV, Martín C, 2000. The nature and causes of intra-industry trade: Back to the comparative advantage explanation? The case of Spain. Weltwirtschaftliches Archiv 136(3): 423-441. http://dx.doi.org/10.1007/BF02707288

Blanes Cristobal JV, Milgram BJ, 2009. Productividad de las empresas y papel de los costes irrecuperables en la elección de mercados lejanos. Evidencia para las industrias manufactureras españolas. Revista de Economía Industrial 373: 73-86.

Briz Escribano J, de Felipe Boente I, Briz de Felipe T, 2010. Funcionamiento y transparencia en la cadena de valor: aplicación al caso del aceite de oliva en España. Revista de Estudios Empresariales, segunda época 1: 32-53.

Chevassus-Lozza E, Latouche K, 2012. Firms, markets and trade costs: access of French exporters to European agri-food markets. Eur Rev Agric Econ 39 (2): 257-288. http://dx.doi.org/10.1093/erae/jbr009

Clar E, 2008 La soberanía del industrial. Industrias del complejo pienso-ganadero e implantación del modelo de consumo fordista en España: 1960-1975. Revista de Historia Industrial 36: 133-165.

Clar E, Pinilla V, Serrano R, 2015. El comercio agroalimentario español en la segunda globalización, 1951-2011. Historia Agraria 63: 183-213.

Claver ND, Castejón CF, Gracia FS, 2011. The home market effect in the Spanish industry, 1965-1995. Annals of Regional Science 46(2): 379-396. http://dx.doi.org/10.1007/s00168-009-0338-z

Collantes F, 2014. La evolución del consumo de productos lácteos en España, 1952-2007. Revista de Historia Industrial 55: 103-134.

Contreras JM, Bacaria J, 2000. Evaluación del impacto de la integración en los flujos comerciales agrarios de España. Rev Estud Agrosoc Pesqu 187: 63-86.

Deardoff A, 1998. Determinants of bilateral trade: does gravity work in a neoclassical world? In: The Regionalization of the World Economy; Frankel JA (ed.). University of Chicago Press, Chicago. Available in http://www.cepii.fr/CEPII/

Delgado-Gómez JM, Ramírez-Alesón M, Espitia-Escuer M, 2004. Intangible resources as a key factor in the internationalisation of Spanish firms. J Econ Behav Org 53(4): 477-494. http://dx.doi.org/10.1016/j.jebo.2002.11.001

Domínguez R, 2000. Las transformaciones en el sector ganadero en España (1940-1985). Ager 1: 47-83.

Eaton JS, Kortum S, 2002. Technology, geography and trade. Econometrica 70(5): 1741-1779. http://dx.doi.org/10.1111/1468-0262.00352

Egger P, 2002. An econometric view on the estimation of gravity models and the calculation of trade potentials. The World Economy 25: 297-312. http://dx.doi.org/10.1111/1467-9701.00432

Evenett SJ, Keller W, 2002. On theories explaining the success of the gravity equation. J Polit Econ 110(2): 281-316. http://dx.doi.org/10.1086/338746

Fariñas JC, Martín-Marcos A, 2007. Exporting and economic performance: firm-level evidence of Spanish manufacturing. The World Economy 30(4): 618-646. http://dx.doi.org/10.1111/j.1467-9701.2007.01007.x

Feenstra RC, Markusen JA, Rose AK, 1998. Understanding the home market effect and the gravity equation: the role of differentiating goods. NBER Working Paper 6804, Cambridge.

Feenstra RC, Markusen JA, Rose AK, 2001. Using the gravity equation to differentiate among alternatives theories of trade. Can Econ 34(4): 430-447. http://dx.doi.org/10.1111/0008-4085.00082

Fernández-Núñez MT, 2000. La industria agroalimentaria en España: características generales y comportamiento empresarial. Boletín Económico de ICE 2657: 17-27.

Food Drink Europe, 2012. Data & trends of the European food and drink industry 2011. Confederation of the Food and Drink Industries of the EU, Brussels, Belgium.

Galdeano-Gómez E, 2010. Exporting and environmental performance: a firm-level productivity analysis. The World Economy 33(1): 60-88. http://dx.doi.org/10.1111/j.1467-9701.2009.01188.x

Gamallo RN, 2004. Una panorámica sobre los estudios empíricos acerca del comercio intraindustrial español. Información Comercial Española ICE 817: 11-22.

Gil-Pareja S, Llorca-Vivero R, Martínez-Serrano JA, Oliver-Alonso J, 2005. The border effect in Spain. The World Economy 28(11): 1617-1631. http://dx.doi.org/10.1111/j.1467-9701.2005.00749.x

Gil-Pareja S, Llorca-Vivero R, Martínez-Serrano JA, 2014. Do nonreciprocal preferential trade agreements increase beneficiaries' exports? J Develop Econ 107(C): 291-304. http://dx.doi.org/10.1016/j.jdeveco.2014.01.002

Greenaway D, Milner C, 1983. On the measurement of intra-industry trade. Econ J 93(372): 900-908. http://dx.doi.org/10.2307/2232755

Grubel H, Lloyd PJ, 1975. Intra-industry trade: the theory and measurement of international trade in differentiated products. Macmillan, London.

Guillén MF, 2004. La internacionalización de las empresas españolas/ The Internationalization of Spanish Enterprises. ICE Historia Empresarial 812: 211-224.

Haq ZU, Meilke K, Cranfield J, 2012. Selection bias in a gravity model of agrifood trade. Eur Rev Agric Econ 40(2): 331-60. http://dx.doi.org/10.1093/erae/jbs028

Helpman E, Krugman PR, 1985. Market structure and foreign trade; increasing returns, imperfect competition, and the international economy. MIT Press, Cambridge, MA, USA.

INE, 2012. Encuesta industrial de empresas. Instituto Nacional de Estadística, Gobierno de España.

Instituto Internacional San Telmo y Rabobank, 2004. Ganar dimensión: Una necesidad para la industria agroalimentaria española. Federación Española de Industrias de la Alimentación y Bebidas (FIAB), Madrid.

Klein MW, Shambaugh JC, 2006. Fixed exchange rates and trade. J Int Econ 70: 359-383. http://dx.doi.org/10.1016/j.jinteco.2006.01.001

Krugman PR, 1980. Scale economies, product differentiation, and the pattern of trade. Am Econ Rev 70(5): 950-59.

Martínez MG, Burns J, 1999. Sources of technological development in the Spanish food and drink industry. A "supplier-dominated" industry? Agribusiness 15(4): 431-448. http://dx.doi.org/10.1002/(SICI)1520-6297(199923)

Martínez MG, Briz J, 2000. Innovation in the Spanish food & drink industry. Int Food Agribus Manage Rev 3(2): 155-176. http://dx.doi.org/10.1016/S1096-7508(00)00033-1

Martínez-Carrión, JM, Medina-Albaladejo FJ, 2010. Change and development in the Spanish wine sector, 1950–2009. J Wine Res 21(1): 77-95. http://dx.doi.org/10.1080/09571264.2010.495856

Mátyás L, 1997. Proper econometric specification of the gravity model. The World Economy 20: 363-369. http://dx.doi.org/10.1111/1467-9701.00074

Mátyás L, 1998. The gravity model: Some econometric considerations. The World Economy 21: 397-401. http://dx.doi.org/10.1111/1467-9701.00136

Medina-Albaladejo FJ, 2010. External competitiveness of Spanish canned fruit and vegetable businesses during the second half of the twentieth century. Business History 52(3): 417-434. http://dx.doi.org/10.1080/00076791003721845

Melitz MJ, 2003. The impact of trade on intra-industry reallocations and aggregate industry productivity. Econometrica 71: 1695-1725. http://dx.doi.org/10.1111/1468-0262.00467

Melitz MJ, Ottaviano GIP, 2008. Market size, trade, and productivity. Rev Econ Stud 75(1): 295-316. http://dx.doi.org/10.1111/j.1467-937X.2007.00463.x

Navaretti G, Bugamelli M, Schivardi F, Altomonte C, Horgos D, Maggioni D, 2011. The global operations of European firms. The second Efige policy report. Bruegel Blueprint Series. Available in http://econpapers.repec.org/bookchap/brebluprt/581.htm.

Olper A, Pacca L, Curzi D, 2014. Trade, import competition and productivity growth in the food industry. Food Policy 49: 71-83. http://dx.doi.org/10.1016/j.foodpol.2014.06.004

Peinado-Gracia ML, 1985. El consumo y la industria alimentaria en España. MAPA, Madrid, 453 pp.

Pinilla V, Ayuda MI, 2002. The political economy of the wine trade: Spanish exports and the international market, 1890–1935. Eur Rev Econ Hist 6(1): 51-85. http://dx.doi.org/10.1017/S1361491602000035

Pinilla V, Ayuda MI, 2009. Foreign markets, globalisation and agricultural change in Spain. In: Markets and agricultural change in Europe from the 13th to the 20th century; Pinilla V (ed.). pp: 173-208. Brepols Publ. Turnhout.

Pinilla V, Serrano R, 2009. Agricultural and food trade in the European Community since 1963. In: Fertile ground for Europe? The history of european integration and the common agricultural policy since 1945; Patel K (ed.). pp: 273-300. Nomos, Baden-Baden.

Pöyhönen P, 1963a. Toward a general theory of international trade. Ekonomiska Samfundets Tid-skirf, Tredje Serien, Argang 16: 69-77.

Pöyhönen P, 1963b. A tentative model for the volume of trade between countries. Welrwirtschajtliches Archiv 90(1): 93-100.

Rama R, Calatrava A, 2002. Nuevos procesos de industrialización rural en España. In: Agricultura y sociedad en el cambio de siglo; Gómez Benito C, González JJ (eds.). pp: 477-503. McGraw Hill, Madrid.

Ramon Muñoz R, 2010. Product differentiation and entry barriers: Mediterranean export firms in the American markets for olive oil prior to World War II. Business History 52(3): 390-416. http://dx.doi.org/10.1080/00076791003721613

Reig E, Picazo A, Hernández F, 1998. Precios y calidad en el comercio exterior español de productos agroalimentarios. Revista Agroalimentaria 4(7): 97-107.

Rodríguez-Zúñiga M, Soria R, 1989. Concentración e internacionalización de la industria agroalimentaria española: 1977-1987. Agricultura y Sociedad 52: 65-94.

Roland-Holst DW, Polo C, Sancho F, 1995. Trade liberalization and industrial structure in Spain: an applied general equilibrium analysis. Empirical Economics 20(1): 1-18. http://dx.doi.org/10.1007/BF01235155

Rose AK, 2000. One money, one market: estimating the effect of common currencies on trade. Economic Policy 30: 7-45. http://dx.doi.org/10.1111/1468-0327.00056

Rose AK, 2004. Do we really know that the WTO increases trade? Am Econ Rev 94(1): 98-114. http://dx.doi.org/10.1257/000282804322970724

Sanchís López A, Martínez Serrano JA, 1992. Las fusiones y adquisiciones en el sector de la alimentación. In: Economía española, cultura y sociedad. Homenaje a Juan Velarde; García Delgado JL & Serrano Sanz JM (coords.). pp: 727-762. Eudema, Madrid.

Santos Silva JMC, Tenreyro S, 2006. The log of gravity. Rev Econ Stat 88: 641-658. http://dx.doi.org/10.1162/rest.88.4.641

Santos Silva JMC, Tenreyro S, 2010. On the existence of the maximum likelihood estimates in Poisson regression. Econ Lett 107: 310-312. http://dx.doi.org/10.1016/j.econlet.2010.02.020

Sanz F, 2000. A kalman filter-gravity equation approach to assess the trade impact of economic integration: The case

of Spain, 1986–1992. Weltwirtschaftliches Archiv 136(1): 84-110. http://dx.doi.org/10.1007/BF02707397

Sanz F, Gil JM, 2001. An assessment of the agricultural trade impact of Spain's integration into the EU. Can J Agric Econ 49(1): 53-69. http://dx.doi.org/10.1111/j.1744-7976.2001.tb00290.x

Selva MLM, Álvarez-Coque JMG, 2011. Impacto de los acuerdos de asociación en el comercio Euromediterráneo de frutas y hortalizas. Econ Agrar Recurs Nat 7(13): 27-48.

Serrano R, Pinilla V, 2011. Agricultural and food trade in European Union countries, 1963-2000: a gravity equation approach, Économies et Sociétés, Série Histoire économique quantitative, AF 43(1): 191-219.

Serrano R, Pinilla V, 2014. Changes in the structure of world trade in the agri-food industry: the impact of the home market effect and regional liberalization from a long-term perspective, 1963–2010. Agribusiness 30(2): 165-183. http://dx.doi.org/10.1002/agr.21355

Tinbergen J, 1962. Shaping the world economy; suggestions for an international economic policy. Twentieth Century Fund, New York.

UN-Comtrade, 2013. UN Statistical Division's Commodity Trade Statistics Database, New York. Available in http://comtrade.un.org/db/.

Wagner J, 2007. Exports and productivity: A survey of the evidence from firm-level data. The World Economy 30(1): 60-82. http://dx.doi.org/10.1111/j.1467-9701.2007.00872.x

WDI, 2013. World development indicators. The World Bank, Washington DC. Available in http://data.worldbank.org/data-catalog/world-development-indicators.