Asociación española de historia económica

Documentos de trabajo

DT-AEHE Nº 0606

Vicente Pinilla
María Isabel Ayuda

"HORN OF PLENTY" REVISITED: THE GLOBALIZATION OF MEDITERRANEAN HORTICULTURE AND THE ECONOMIC DEVELOPMENT OF SPAIN, 1850-1935

AEHE, MADRID, 2006

"HORN OF PLENTY" REVISITED:

THE GLOBALIZATION OF MEDITERRANEAN HORTICULTURE

AND THE ECONOMIC DEVELOPMENT OF SPAIN, 1850-1935

VICENTE PINILLA AND MARÍA-ISABEL AYUDA

Vicente Pinilla is Associate Professor, Department of Applied Economics and Economic History, University of Zaragoza, Faculty of Economics and Business Studies, Gran Vía 4, 50005 Zaragoza, Spain. E-mail: vpinilla@unizar.es

María-Isabel Ayuda is Associate Professor, Department of Economic Analysis, University of Zaragoza, Faculty of Economics and Business Studies, Gran Vía 4, 50005 Zaragoza, Spain. E-mail: mayuda@unizar.es

.

ABSTRACT

This paper analizes the impact of the globalization of Mediterranean horticultural products (MHP). From 1850 onwards, the Mediterranean countries took advantage of the new opportunities that arose to increase their production and trade in MHP. The Spanish case shows how the high elasticity of supply with respect to prices helps to explain the enormous increase of its production and trade in MHP, that became the most dynamic sector of Spanish agriculture. The analysis of the counterfactual case of the non-existence of US MHP emphasizes the cost of this increasing competition to the traditional producers from the end of the nineteenth century.

KEYWORDS: Globalization, International Markets, Spanish Economic Development, International Trade, Mediterranean Horticultural Products.

JEL CODES: N50, N70.

RESUMEN:
Este artículo analiza el impacto de la globalización de los productos de la hortifruticultura mediterránea. A partir de 1850 los países mediterráneos aprovecharon las nuevas oportunidades que surgieron para incrementar su producción y comercio de este tipo de productos. El caso español muestra cómo la alta elasticidad de la oferta con respecto a los precios ayuda a explicar el enorme incremento en la producción y comercio de estos productos, que se convirtieron en el sector más dinámico de la agricultura española. El análisis del caso contrafactual de la no existencia de la producción norteamericana de productos hortofrutícolas mediterráneos pone de relieve los costes de la creciente competencia en los mercados internacionales para los productores tradicionales desde mediados del siglo XIX.

Palabras Clave: Globalización, Mercados Internacionales, Desarrollo Económico Español, Comercio Internacional, Productos Hortofrutícolas Mediterráneos.

INTRODUCTION

One of the most important elements of the globalization process that began in the middle of the nineteenth century was the trade boom generated by the fall in transport costs between markets and the move towards free trade[1]. When analysing commodity market integration for agricultural products, emphasis has above all been placed on the impact of the "invasion" of Europe -particularly by cereals coming from America and the Russian Empire- for agriculture in that continent, the way it responded through its trade policies or, in general, the effect of this invasion on its economic development[2].

However, for the Mediterranean countries, and notwithstanding the fact that the analysis carried out from the above viewpoint is very important from the imports side and with respect to the impact of this "invasion" on the agriculture of these countries, it is also of central importance to study their participation in international trade as exporters of those products in which they not only enjoyed clear comparative advantages, but also benefited from a centuries-long tradition of production, namely olive oil, wine and fruits and vegetables. Indeed, a series of recent papers have been devoted precisely to this problem, focusing on international competition in these products and the effects of the trade policy implemented by their importers.

Thus, with respect to wine and olive oil, the literature has pointed above all to the intra-Mediterranean competition (including the discriminatory trade policy applied by France) or the trade barriers erected in the American continent to protect its nascent national industries[3].

As regards Mediterranean horticulture, attention has been drawn to the competition between California and these Mediterranean countries, together with the damage caused to the latter by the emergence of this US State as a world power in these products; such damage has been described as serious and, furthermore, as having made a significant contribution "to the prolonged crisis in Mediterranean agriculture". Finally,

---

[1] O'Rourke and Williamson, "When did globalisation"; Findlay and O'Rourke, "Commodity Market Integration".
[2] O'Rourke and Williamson, *Globalization*; O'Rourke, "European Grain Invasion"; Tracy, *Agriculture*.
[3] Pinilla and Ayuda, "Political Economy"; Ramon-Muñoz, "Specialization".

it has been argued that "the story of the globalization of Mediterranean horticulture echoes familiar themes found in the literature on the European grain invasion"[4].

In this sense a scheme has been proposed of factor and commodity flows between old and new areas. In the first phase of this scheme, the competition of the New World in grain products expelled the labor factor of the "old agriculture" of the Old World towards urban activities or towards the New World itself. In the second, this competition and the new urban demand drove farmers from the "old" to the "new agriculture" (fruit and nut cultivation) in the Old World. In its final phase, competition from the New World in these new agricultural products even ended-up implying the exit of workers from the "new" Mediterranean agriculture of the Old World[5].

Against this background, the aim of this paper is to proceed further with this last line of research, revising some of the conclusions that have been reached up to now and, therefore, analyzing the impact that the globalization of the production and marketing of Mediterranean horticultural products had for its traditional producers.

>From our point of view, the globalization process did not lead to a prolonged crisis of European Mediterranean horticulture. Rather, this was by some way the most dynamic part of its agricultural sector, as well as being the most competitive from an international point of view. By contrast to the earlier-mentioned scheme of factor and product mobility, Mediterranean horticulture in Europe, at least until the outbreak of the Second World War, did not end-up losing productive factors as a consequence of globalization; instead, with the exception of very specific products such as dried fruits, it continued to absorb these factors from the old agriculture.

Therefore, the main effect of transatlantic competition was essentially the loss of the North American market to European exporters and the impact that the increase in New World production could have on prices. However, by contrast to the well known case of the invasion of Europe by New World grain, to which the old continent responded not only with tariff barriers, but also with an important process of technological change, the invasion that the New World suffered from European Mediterranean horticulture not only met with a response of technological modernization and marketing innovation, but also with a high degree of tariff protection.

---

[4] Morilla, Olmstead and Rhode, "Horn of Plenty", p. 346.
[5] Morilla, Olmstead and Rhode, "International Competition" , p. 200-202.

In order to achieve the objective we have set ourselves, that is to say, to demonstrate the dynamic character of European Mediterranean horticulture, as well as its sensitivity to the signals that the market sent out during the globalization process and its high competitiveness in some market sectors, we have divided our work into three sections, which follow on from this introduction.

We first analyse the evolution of the international trade in Mediterranean horticultural products, also placing this in relation with production, basing ourselves on the reconstruction of its main magnitudes for the first third of the twentieth century. In this way, our aim is to demonstrate that in the European markets the Mediterranean producers not only maintained their export levels, but actually saw them increase during a substantial part of the twentieth century.

All this has led us to evaluate and test two distinct models for the production and marketing of these types of products, namely that of the traditional producer countries, in our case Spain, and that of the New World, specifically California. In summary, our interest lies in determining what were the sources of competitiveness of both types of producers, with an attempt being made to understand the different types of success that they enjoyed in the distinct markets, that is to say, the UK and Western Europe and the North-American markets. Our working hypothesis coincides with that described in Ramon Ramon-Muñoz for the case of olive oil, namely that specialization, following the Heckscher-Ohlin approach, is produced in function of the respective comparative advantages[6]. Thus, whilst Californian horticulture compensated its high wage costs with the highly intensive use of capital, technological change and new marketing techniques, that of the Mediterranean countries took advantage of low wages in order to obtain products that were price competitive, although normally of a lower quality and with a significantly less sophisticated marketing techniques. The weakest point for these countries was their relative scarcity of capital and, consequently, the high cost of money. Furthermore, the different spatial location of producers and consumers also played a relevant role in explaining their distinct positions in the international markets, as a consequence of the differentials in transport costs.

As we try to indicate, these two patterns of specialization, in accordance with their respective endowments of resources, degree of economic development and 'foreign

---

[6] Ramon-Muñoz, "Specialization".

market access', generated different results for distinct products[7]. Having said that, we find that in general the damage caused by Californian horticulture had a greater affect on the loss of the North-American market and its impact on international prices than on the loss of very significant market shares in the northern European markets.

Finally, we use the Spanish case in order to evaluate the impact that globalization had on its Mediterranean horticulture. To that end, we study the evolution of its foreign trade figures, propose a bi-equational model of export demand and supply and examine the counterfactual case of the non-existence of this type of production in the New World.

COMPETING IN A GLOBAL MARKET

In the first half of the nineteenth century the production and trade in Mediterranean horticultural products (fresh fruit, such as oranges, lemons, peaches or table grapes; dry fruits, such as raisins; nuts, such as almonds; and fresh vegetables, such as tomatoes, peppers or onions) was concentrated to a very significant extent in the countries lying on the northern and southern shores of the Mediterranean Sea. Whilst there was also an important production of these types of products in Asian Far East countries, more particularly in those areas which enjoyed appropriate ecological conditions, this production was not the subject of significant foreign trade. In the majority of Western Europe, these products were considered as exotic, arriving in the market in limited amounts.

However, the international trade in fruits and horticultural products enjoyed an extraordinary increase from the middle of the nineteenth century and the first third of the twentieth, with this implying an increase in its share of the total trade in agricultural products. This increase in the volume of trade was due to commodity market integration, what Kevin O'Rourke and Jeffrey Williamson define as globalization, and outward shifts in both the import demand and export supply curves[8].

The increase in the consumption of Mediterranean horticultural products in the countries that were more advanced in their industrialization process, with this increase coming about through a gradual change in their traditional diets, was key in explaining the export potential that had been made available to the producer countries. This

[7]   Redding and Venables, "Geography", pp. 1-2, define   country's 'foreign market access' as their location relative to sources of import demands.
[8]   O'Rourke and Williamson, "When did globalisation", pp. 25-26.

increase in consumption took place essentially as a consequence of the increase in income in these industrialising countries. This is made clear by the case of oranges in the UK, given the high income elasticity they exhibit, above all in the second half of the nineteenth century[9]. Thus, there was an evident displacement of the demand curve driven by an increase in income.

Furthermore, we argue that there was a coexistence in the displacements of both the supply and the demand curves, and that neither of them was independent of the other[10]. The consideration of the increase in demand on the part of the industrialised countries as a factor exogenous to the Mediterranean countries, although taken advantage of by them as a motor for their exports, is not sustainable if we take into account that the expansion of these exports required an allocation of factors to make it possible which, in some cases, implied important changes in the production function. These changes went much further than the re-allocation of factors to those products with a more solvent demand; rather, they implied a profound agricultural transformation on those areas that had a greater participation in international trade. Furthermore, this agricultural transformation process did not take place in an isolated manner with respect to the production directed towards the interior of these countries. Instead, it tended to incorporate similar processes of technological change, such as the introduction of irrigation to significant areas that were, up to that time, dedicated to dry farming, together with a more intensive use of new fertilisers, mechanisation, the fight against crop pests and blights, changes in crop varieties, etc.

This process of productive transformation also took place in a context of increasing competition in international markets. During a significant part of the second half of the nineteenth century competition was basically intra-Mediterranean, with this determining the distinct specialization amongst the different countries (the strong positions acquired by some countries in certain products, such as Spain with oranges, Italy with lemons and Greece-Turkey with raisins, were significant). However, from the end of the nineteenth century onwards the excellent trade expectations of these products increased the international competition in two ways: first, the progressive addition of "new Mediterranean countries" from within its geographical area (the North African countries or Mandatory Palestine) and, secondly, the addition of other countries from

---

[9] Pinilla and Ayuda, "Right shifts".

[10] On this theme for the Mediterranean countries, see Federico, "Oltre frontiera" and "Comercio exterior".

7

outside that area, located in temperate zones (the USA, Brazil, Australia, South Africa). Colonists of European origin played a determining role in the promotion of Mediterranean agriculture in all these areas. The competitor with the greatest capacity to threaten the relevant market position occupied by the long-standing Mediterranean producers was undoubtedly the USA and, more specifically, its Californian agricultural sector.

The main importing nucleus was made up of the more developed countries, with the UK clearly at the head of them and with the other main importers of fruits and vegetables being France, Germany, The USA, Canada, Belgium, Holland and Switzerland. The most outstanding change in the make-up of this group turns on the fact that the development of these crops in the US meant that it lost relevance as an importer, despite being the highest consumer of these products. The consequence of this development was that its internal market began to be supplied by Californian agriculture, as well as by other parts of the country that also tended to specialize in these kinds of crops. The combination of a modern and efficient agriculture, excellent marketing and significant protectionism had the effect of excluding from the US market a good part of the fruit and vegetables production coming from exporter countries. The available data on the international trade in these types of products suffers from the central drawback of starting in the twentieth century (indeed, at different dates according to the product) in such a way that it is difficult to capture what happened in the second half of the nineteenth century. In the light of the British foreign trade statistics, it appears reasonable to point to the most outstanding feature of this period as being the sharp increase that took place in the imports of these products[11]. It is also reasonable to indicate that as the nucleus of industrialized countries expanded, the UKs weight in this trade within Europe began to decrease.

The available data for a range of products (see Appendix, tables A-H) show that until the Second World War years Europe occupied a central position as the main importer of Mediterranean horticultural products, exceeding 75 percent of the world market in almost all of them. The evolution of this trade during the first third of the twentieth century was characterised by a number of novel aspects, with the most outstanding being the decline or disappearance of the US as an importer, and the

---

[11] Pinilla and Ayuda, "Right shifts".

emergence (real or only statistical, given that this trade was not previously recorded) of markets in Asia or South America, normally supplied by neighbouring producers.

As regards the exporters, it was initially the countries lying on the northern shore of the Mediterranean that tended to cover the international markets in these products. The expansion of Spanish or Italian exports clearly illustrates the point to which certain traditional producers took advantage of the opportunities that had been opened to them. With the passing of the years, and particularly from the beginning of the twentieth century, these countries had to face increasing competition from a significant number of countries lying outside Europe. However, this did not give rise to a serious collapse on the part of European exports. In absolute terms, they grew at a variable amount according to the general tendency that existed for each product (thus, during the period 1910-30, the European exports of oranges grew by 67 percent, of lemons by 1 percent and of table grapes by 34 percent). On the basis of the limited evidence available to us (that is to say, relating to only four products, albeit with citrus fruits, which represented by far the most important part of this trade, being included amongst them) it can be said that European exports increased in those products whose demand followed a more dynamic pattern of behavior, and levelled out or fell otherwise.

Turning from the analysis of the evolution of trade in absolute terms to that of world market shares, what is particularly noteworthy is the emergence of these new producers who, in general terms, caused the European participation to decline. The emerging exporters of oranges were the US, Brazil, South Africa, Japan and, above all, Palestine which, following Spain, was the second most important exporter at world level. With respect to lemons, only one European country, Spain, defied the Italian hegemony, so that continental participation was not affected. As regards table grapes, the increase of Algerian and US exports stands out, with this also being the case with the US and Australia for raisins.

However, this data hides the main impact that increasing competition had on the traditional Mediterranean producers, namely the loss of the US market, which began to be supplied in great part by its own agriculture[12]. This further implies that the figures we have cited undervalue the international trade in Mediterranean horticultural products, in that US imports tended to be substituted by internal trade, in such a way that the fall in these imports tended to be compensated by greater increases in exports to

other markets. Nevertheless, they also undervalue the damage caused to traditional exporters not by the fall in their exports (we have seen that, save for the case of raisins, this did not take place), or by the loss of relative participation (which was generally mild), but rather as a result the possibilities that would have existed of access to the biggest market in the world in the circumstances where US agriculture had not been successful in achieving a position where it could supply its own market.

SPECIALIZATION MODELS: BETWEEN HECKSCHER-OHLIN AND KRUGMAN

The aim of this section is to explain this increasing competition in the international markets, illustrating it with the cases of two highly competitive agricultural sectors, those of California and of Spain.

Our working hypothesis is that both these sectors adopted specialization models in the production of Mediterranean horticultural goods that were coherent with their endowment of productive factors and, therefore, of competitive advantages.

Thus, California compensated the relatively high costs of its labor with a lower costs of land and, above all, of capital, whilst Spain, with a lower relative endowment of land and, by contrast, abundant labor, had to contend with the central problem of the high cost of capital. Both types of specialization led to different orientations: whilst California placed emphasis on quality, understood above all as high product standardization, innovation in some of them, accredited brands and advanced marketing, Spain, although trying to follow the paths of technological change that had been introduced in California, could compete thanks to the enormous advantage it had in the price of the labor factor.

Paradoxically, the technological advantage enjoyed by California was not sufficient to achieve a competitive position in the majority of the international markets, especially in those of the more developed areas of Europe. By contrast, it captured almost all the US internal market, receiving significant support to that end from its strong protectionism, as well as the neighbouring Canadian market. In certain cases, for example that of oranges, the threat for Spain in markets such as the UK came more from other areas of the Mediterranean, which had had more success in imitating the Californian pattern and enjoyed a greater availability of capital, than from the other side

---

[12] See the fall of American imports in Morilla, Olmstead and Rhode, "Horn of Plenty".

of the Atlantic. In summary, the two main world producers of Mediterranean horticultural products followed models of specialization that led them to different competitive positions in function of the market segments they fed and the geographical location of those markets.

In mid-nineteenth century Spain, the production and export of Mediterranean horticultural products was insignificant. Even in the irrigated areas, the predominant crops were wheat, vines and olives. The main objective was to obtain regular production that was dependent to only a limited extent on rainfall which, in a country as arid as Spain, is very irregular. Logically, a secondary objective was also to increase production. Oranges and other fruit bearing trees were normally cultivated on the limits of the irrigated small-holdings, with regular orchard plantations being extremely rare. Furthermore, in some areas there were small market gardens dedicated to the summer production of vegetables, essentially for self-consumption, or to obtaining more commercial products, such as various textile fibres (hemp, flax or white mulberry leaves to feed silkworms).

The development of an agriculture that was commercial in nature and which specialized in Mediterranean horticulture required a significant number of changes with respect to the more traditional style of agriculture. This indicates that we are not considering simply a response to exterior stimulus, but rather a process in which the dynamism of supply, driven by the differential return of these crops with respect of the traditional ones, was crucial[13]. The first obstacle faced in Spain was water: without irrigation, hardly any of the crops in question are viable in the Iberian Peninsula. Thus, although expansion could take place in some zones through a change of land use in irrigated areas, it was also necessary to increase the supply of water so as to make possible the transformation from dry land to irrigated farming[14]. The increase in the supply of water was based on the public sector assuming the construction of significant regulation and distribution projects (reservoirs and canals), together with the digging of wells for water extraction. The very retarded character of any commitment to hydraulic civil engineering projects (the last decade of the nineteenth century), and the low level of investment on the part of the central government, limited its impact in those areas that were more specialized in Mediterranean horticulture. As a result, the key role was

---

[13] This is the opinion of Garrabou, *Fals dilema,* p. 107 for the case of the orange.

played by private initiative taking advantage of underground water using the available modern technologies and the energy derived from fossil fuels[15]. The characteristic pluri-crop farming gave way to farms that specialized in a more reduced number of products. However, and quite apart from water, the development of these products required a series of technical innovations, such as the more intensive use of fertilizers, first guano and later inorganic fertilisers, the introduction of new varieties, the fight against plant pests and diseases, etc.

The expansion of this form of agriculture took place above all in the areas closest to the Mediterranean littoral, given that these areas had the most appropriate ecological conditions for the cultivation of the crops in question. Furthermore, they enjoyed an advantageous geographical situation for access to the international markets. Its growth had already reached spectacular levels in the second half of the nineteenth century, although the absence of complete statistical data does not allow us to estimate this with precision. The main crop of this type, the orange, serves as an excellent example to gauge the early dynamism of this sector. In the Spanish provinces where the cultivation of oranges was particularly important, Castellón and Valencia, the area dedicated to this fruit increased from 1,249 hectares in 1860 (just ten years after the time when it is considered that its cultivation in regular plantations had begun) to 9,880 in 1890. In these two provinces, the figure had reached 36,705 hectares by 1922 and 58,773 hectares by 1932, whilst at this latter date there were almost 75,000 hectares under production in the whole of Spain. The production data, although available only for the second expansionary phase that started at the beginning of the twentieth century, is also illustrative: between 1902 and 1932 the production of oranges and almonds had doubled; that of lemons had multiplied by five; whilst that of peaches and apricots had doubled and quadrupled, respectively (since only 1910)[16]. Logically, in the totality of Spanish agricultural production (including livestock and the forestry sector) its relative importance had increased considerably: if in 1890 it had been estimated that the

---

[14] Up to 1900 the cultivation of the orange in onetime dry land areas that had been transformed into irrigated areas was much more important than its cultivation in the traditional market gardens.
[15] Calatayud and Martínez-Carrión, "Cambio técnico", p. 27, have shown that of the 29,443 irrigation motors that existed in Spain in 1932, some 76% used steam, generator gas, petrol, pyronaphtha or electric energy. In Valencia, the modernization of the traditional systems of irrigation ditches and the improvement of its management also had some importance. See Calatayud, "Regadío".
[16] Data of Garrabou, *Fals dilema* and Grupo de Estudios de Historia Rural, *Estadísticas Históricas*.

participation of fruits and horticultural products was 7.4 percent, in 1931 it had reached 14 percent, with productivity doubling in the same period[17].

The main comparative advantages of Mediterranean horticultural production in Spain were the low costs of the labor factor and a reasonable knowledge of cultivation techniques, given that the trees and plants in question, although they had not been the subject of systematic commercial exploitation, had been present in Spanish agriculture for centuries. The main problems were the capital-intensive needs and the high price of money. To this should be added the low capacity to organise the industry in a cooperative basis, which led to the external control of transport and commercialization, the high risk of the investment, the climatic risks, such as the frequency of frosts, and the low level of general economic development in Spain.

From amongst all these, we are interested in highlighting the high price of money given that, in our view, this was probably one of the key aspects that differentiated the evolution of Mediterranean horticulture[18]. Account should be taken of the fact that the capital needs were high for the development of some of the most relevant crops[19]. In the most important of these, the orange, we should recall not only the initial investment in preparing the land, the purchase of the trees or the opportunity cost until these bore their first fruits, some five years, but above all the transformation of dry land into irrigated farming that was carried out in the majority of cases through the digging of wells. This, apart from being extremely costly, carried a high risk, in that it was possible not to strike water[20]. If around 1880 the time necessary to obtain the first profits was estimated at some ten years, we can evaluate the importance of the loans system and the cost of money in making possible the expansion of intensive agriculture[21]. From that time onwards, the differential of return with dry land farming

---

[17] Grupo de Estudios de Historia Rural, "Notas", pp. 243-251.

[18] This is also the opinion of Mateu and Calatayud, "Evolución", pp. 112-116, for oranges. In the same sense, see Palafox, "Expansión", p. 332 and "Tardía industrialización".

[19] The cultivation of oranges, when compared to that of cereals, vines, olives or vegetables, was less labor intensive and more capital intensive, above all because of the high cost of water extraction and preparation of the distribution infrastructure, as well as the cost of its maintenance. See Roncalés, "Propiedad", p. 191.

[20] Calatayud, "Economía", p. 177.

[21] Millán, "Inicis", pp. 142-143. This was also the crucial problem for the development of citrus fruits in southern Italy, where the necessary loans were also very expensive. See Lupo, *Giardino*, p. 80. Calatayud, "Expansió", pp. 48-53, has indicated how even during the second half of the nineteenth century the needs for the working capital (fertilisers) requirements of the export –based agriculture in Valencia were financed by recourse to usurious moneylenders.

was very important[22]. The low degree of economic development in Spain was reflected in the similarly insufficient development of a modern financial system. Whilst a modern banking system, albeit quite scattered, had began to operate in the cities from the 1850s, the presence of these institutions in the rural areas was practically nil. This determined a virtual monopoly for private moneylenders who established a system of informal credits in which the predominant features was usury, the oscillation of interest rates in function of the guarantees of the borrower, generally very high, and the personal character of the relationships between lenders and borrowers. The high rates of interest also led to the accumulation of land on the part of the moneylenders as a consequence of default in payment[23]. The limited supply of credit and the elasticity of demand in the credit market therefore determined very favourable conditions for the lenders.

The resulting high rates of interest and their oscillation in function of the net worth of the borrower acted as an incentive for the substitution of capital for labor when this was possible. More importantly, it erected significant entry barriers against those who were not capable of obtaining the necessary credit. In the case, for example, of the orange, this meant that the participation of the proprietors in their own expansion was conditioned by the size of their farms, with medium and large-scale properties predominating in this process. Small proprietors tended to participate more in the expansion of orange production within existing irrigated land than in the transformation from dry land to irrigated farming, given that the credit needs were higher in the latter. Even so, the high return of this type of crop ended-up by involving almost all the social sectors in its expansion, although this serious problem undoubtedly slowed down the expansion process itself[24].

From the beginnings of the twentieth century, the cooperative movement became the principal mechanism to support the participation of the small proprietors in this

---

[22] In 1881 the return per hectare in Valencia was 2.48 times higher than the average of all crops taken together and approximately double that of any other irrigation-based crop. See Roncalés, "Propiedad", pp. 186-197.

[23] Eloquent proof of the difficulties in gaining access to non-usurious credit in order to finance this transformation is provided by the practice of owners becoming indebted through a formula dating from the Ancient Regime and called "*ventas a carta de gracia*" or "*ventas con pacto de retro*" whereby they sold the land upon the maturity of the loan to the moneylender for the amount of loan received if this had not been previously repaid. See Calatayud, "Expansió" and Roncalés, "Propiedad". The percentage of cases in which the obligation to sell for non-payment was actually enforced could reach very high levels. For example, in the case of the region of Murcia, during the years 1900-1920, between 50 percent and 85 percent of such loans concluded in this fashion, whilst from 1920 onwards that percentage fell to between 20 percent and 50 percent. Note that the final sale value under this system was normally lower than the real market value. See Martínez-Soto, "Tela de araña", pp. 197-201) .

expansion, or to provide even more incentives to the medium and large-scale proprietors. Spanish cooperatives were orientated essentially in two directions: providing loans at interest rates that allowed for a break with the usury system, and the collective purchase of inputs, above all fertilisers. The creation of societies of small and medium-sized proprietors provided another opportunity for these to dig wells and, in this way, share the main capital investment necessary to develop orange production in old dry land farming areas[25]. The widely explained case of oranges was not at all atypical. In the table grape exporting area of Almeria, the non-existence of a modern credit system meant that the capital needs of the producers were covered by private moneylenders, exporting firms or shipping companies who provided payments in advance to the producers[26].

The weakness of any institutional activity to support the development of export-based agriculture should also be highlighted. This is so not only because of its low capacity to motivate the increase in irrigated lands through hydrological regulation projects, but above all, and in contrast to the US, because of the almost nil contribution to technological innovation in these types of crops made by the agricultural research centres[27].

This agricultural system was complemented by an industrial transformation in which the wholesaler purchased the crop from the farmers while it was still on the trees and became responsible for its collection, cleaning, classification and packaging. These wholesalers subsequently sold on to foreign intermediaries or shipping companies who financed the campaign through payments in advance[28]. Once the fruit was loaded on board, Spanish participation disappeared. Only in the case of sales to France were commission sales to the destination markets of any importance.

Turning to the situation in the US, the development of intensive agriculture in California followed different patterns and was motivated by somewhat different reasons. In this case, it was the fall in interest rates that determined its very significant

---

[24] Roncalés, "Propiedad", p. 202; Garrido, "Conreu".
[25] Garrido, *Treballar.*
[26] Sánchez, *Integración*, pp. 398-401.
[27] It is surprising that the main agricultural research centre in the area with the greatest specialization in exports (the Granja Escuela Experimental de Valencia) did not carry out any research into the cultivation of the orange. See Calatayud, "Economía", pp. 123 and 135.
[28] Palafox, "Estructura".

development between 1890 and 1914[29]. The key factor was the access to cheap credit generated through the capacity of local savings and, above all, to a modern banking system centred on San Francisco and which, had a branch network that covered an extensive area running from Seattle to Los Angeles. Growers of fresh fruit and vegetables also received production credit from cooperative associations, fertilizer companies and seed and plant dealers[30].

Success also rested on two other factors: access to a very extensive market and the complementary nature between agricultural development, on the one hand, and manufacturing, commercial and financial development, on the other[31].

The possibility of competing in the markets of the East received a decisive impulse from the fall in the costs of rail transport, as well as its improvement resulting from the more widespread use of refrigerated wagons[32].

Expansion was extremely rapid, in such a way that by 1919 production was exceeding the amount obtained in 1889 by between five and twenty times, depending on the type of product. This truly formidable increasing output took place not only through the expansion of the area under cultivation, but also as a result of similarly spectacular increases in productivity.

Another distinctive features of the expansion of Mediterranean horticulture on the US West Coast was the high degree of organization of its producers. Organizing in a cooperative manner and integrating with the California research centres, these producers were not only capable of leading technological change in terms of seeds or varieties, but also innovated in a decisive manner in the area of marketing through the establishment of selection processes, standardization, preparation and conservation of production which led to the creation of commercially accredited brands and the control of product distribution in the markets of the eastern US[33].

Modern publicity techniques were employed not only to achieve this increase in demand, but also to orientate consumers towards a preference for Californian

---

[29] Rhode, "Learning", p. 778.

[30] Federal Trade Commission, *Report*, pp. pp. 12-14 and 481-488.

[31] Carter, Randsome and Sutch, "Agricultura".

[32] In 1889 the transcontinental tariffs for fruits were only 35 percent of those of 1880. Very similar reductions had taken place for nuts and for dried fruits. See Rhode, "Intensificación", p. 135. The number of refrigerated railcars increased from 600 in 1891 to 33,644 in 1907 (Dimitri, "Contract", p. 194). On the economic impact of mechanical refrigeration in agricultural products in the US, see Goodwin and Craig, "Mechanical Refrigeration".

varieties[34]. The innovating character of Californian marketing was capable of displacing the demand curve, introducing new products such as raisin bread or orange juice into consumption habits.

The importance of producer associations was such that a total of just three orange co-operatives marketed oranges equal to 63 percent of the 1935 US production for fresh distribution (more than 90 percent of Californian production). The control of distribution on the part of producers was similarly important in the case of other fresh fruits[35].

The high degree of organisation amongst the producers also allowed them to apply intense collective action to achieve a substantial increase in US tariffs during the initial phases of development of their production. This had the effect of limiting or simply impeding the entry of imports that had traditionally supplied their markets and which were themselves undergoing a strong expansionary process. The degree of protection and its effects were not uniform, although its role has been considered as important in providing an impulse to Mediterranean agriculture in California. In general, it has been proposed as a case of infant industry protection. For Mediterranean exporters the cost of protection must have been very high, given that during the crucial expansionary years of US production the ad valorem rate normally increased to more than 65 percent in the case of almost all products[36].

Two such different types of agricultural development led to results that, although apparently paradoxical at first sight, are in fact perfectly understandable. Thus, we can maintain that whilst, in general terms, Californian production ended-up by triumphing in its internal market with respect to a significant number of Mediterranean horticultural products, and was similarly successful in the Canadian market, it had very limited success in the more competitive European markets, such as those of the UK, France or Germany. The type of product in which it specialized was directed, outside the US, to what might be considered as a very high quality market segment, that is to say, one that was characterised by a product with accredited guarantees, standardization, commercialisation through a significantly reduced number of well-known brands and a

---

[33] Morilla, Olmstead and Rhode, "Horn of Plenty", pp. 324-325.
[34] Faugeras, *Oranges*.
[35] Federal Trade Commission, *Report* , pp. 7-9, 30-32, and 663-667.
[36] Olmstead and Rhode, "Competencia", pp. 176-187; Morilla, Olmstead and Rhode, "Horn of Plenty", pp. 321-323; Bauer, "Foreign Production", p. 3.

very high price. From this perspective, success in the US market could also be understood on the basis of the high per capita income that was being achieved in that country. Tariff protection was essential for many products in their initial phases of capturing the internal market. In some cases, such as that of table grapes, in which foreign production continued to be very competitive, there was even recourse to a simply prohibition of imports between 1924-34, using the excuse of the presence of Mediterranean fly larvae in some consignments exported to New York[37].

By contrast, Spanish production continued to enjoy hegemony in those lines that had been developed in the markets of western Europe. Spanish oranges were not as standardised as those coming from California and could, in some cases, present defects but, in general, and at least until production and exports reached very high levels from 1926 onwards, they did not suffer from serious quality problems[38]. Their price was considerably lower than that of their Californian counterparts, in such a way that during the Spanish export season practically no Californian oranges reached the UK. Rather, they began to enter at the end of the Spanish season and during all the summer, thanks to the development of late varieties in California and good conservation techniques[39].

When from the mid-1920s onwards there was a deterioration in the quality of Spanish fruit as a consequence, first, of exporting consignments containing a high percentage of oranges that had been blighted by frost and, secondly, of the poor harvests of the 1930s, it was Palestine that began to compete strongly with Spain and take

---

[37] On this theme, see Sánchez, *Integración*, pp. 407-413. The ban on Spanish imports coincided with significant overproduction between 1922 and 1925 and a marked fall in prices. For Ritter and Guttfeld, "World Production", pp. 376-377, this ban formed part of the steps taken to stabilise markets and prices. Account has to be taken of the fact that until 1910 it had not been possible to achieve late varieties in California that were capable of competing with Spanish imports, and that from that time the producers intensified their campaign to obtain greater protection (Morilla, Olmstead and Rhode,"Horn of Plenty).

[38] The poor quality of European fruit was a traditional argument used by the protectionist lobbies in the USA and it was employed extensively in the US tariff hearings. Reference was essentially made to problems of cleanliness (the fruit was mixed with stems, soil and general dirt), the appearance of defective examples and insufficient classification (Morilla, Olmstead and Rhode, "International Competition", p. 213). Quality problems did not emerge in the public debate in Spain until the sharp increase in production, resulting from the expansion of the markets, probably gave rise to serious problems. In the case of oranges the quasi-monopoly situation enjoyed by Spain until the beginning of the century and the less than demanding attitude of the consumer meant that this problem was not relevant. Concern for the state of maturity of the exported oranges and for the effects of the frosts began to emerge in 1900. From the middle of the 1920s a regulation began to be established aimed above all at avoiding the export of frost-damaged oranges which, although sold at a cheaper rate, were affecting the consumers' image of exports in general (Abad, *Historia de la Naranja*, pp. 65-69 and 305-306; Intelligence Branch of the Empire Marketing Board, *Oranges*, p. 16). Some contemporary analysts have insisted that the quality problems of the exported oranges only arose in the middle of the 1920s as a consequence of the dramatic increase in exports and the good commercial opportunities (Font de Mora, *Comercio* , pp. 301-302)

[39] Font de Mora, *Comercio*, p. 258.

advantage of the situation[40]. The production of this country, which had been growing extremely rapidly since the 1920s thanks to the impulse provided by Jewish colonists and the availability of an impressive flow of external capital from the same source, had also benefited from its superior quality (thanks to better climatic conditions), and clear gains in competitiveness from the mid-1920s[41]. The system of imperial preferences established by the UK in 1932 basically benefited South Africa, given that Palestine was excluded. However, South African production did not compete with that of Spain to reach the UK summer market; rather, it competed with Brazilian production in the mid and lower markets segments, with the upper market segment being occupied by Californian production. When Spanish exports became difficult with the outbreak of the Spanish Civil War in 1936, Palestine enjoyed a better position to replace the shortfall [42].

However, not all products fit easily into the proposed scheme, that is to say, of low prices and low quality for Spain versus high prices and high quality for the US. Thus, for example, Spanish table grapes not only displaced the Italian product from the US market from the beginning of the twentieth century, but also maintained a strong position in the high quality segment of that market until the ban on its import in 1924. Its high quality derived from the special natural conditions for its cultivation found in the Almeria region of Spain, together with its capacity to be stored for lengthy periods and its good preparation for conservation, which allowed the exporting season to be extended for various months beyond the harvest. Something similar occurred in the case of onions where, despite their high price in the US market, they nevertheless sold well thanks to their superior quality. In this regard, we can also cite the case of paprika, whose triumph in the international markets was based on the quality of the Spanish product[43].

The relationships between exports and production for various countries in question provides very clear information on the above-mentioned results. In general, we can state that the leading countries in the international trade in the different

---

[40] Instituto Valenciano de Economia, *Economía Citrícola*, p.143
[41] Metzer, "Economic Growth".
[42] Neumark, *Citrus Industry*, p. 169; Wulfert, *Citrus* Fruits. The explosive growth in the production of oranges in Palestine is made clear by the fact that this represented just 11% of agricultural output in 1920-25, but no less than 50% in 1932-35. This country's adoption of modern Californian techniques was very important (Metzer, *Divided Economy*, pp. 145-149).
[43] For table grapes: Ritter and Guttfeld, "World Production", pp. 299-310; Chaminade, *Production*, p.186; Sanchez, *Integración*. For onions: (United States Tariff Commission, 1929, 30-31). For paprika: Martinez-Carrion, "Agricultores".

TABLE 1.TRADE SHARES (exports as percentage of production) (%)

	1909-1913	1925-1928	1929-1932	1933-1935		1929-1932
Oranges					Table grapes	
Spain	60.5	65.1	72.2	93.2	Spain	28.2
Italy	31.6	49.0	30.0	31.9	France	21.2
USA	5.9	7.8	8.7	6.8	Italy	19.4
Brazil	n.a.	n.a.	3.0	8.9	USA	3.4
Japan	7.3	8.2	7.8	12.3	Raisins	
Palestine[a]	n.a.	n.a.	77.0	77.0	Spain	21.1
Algeria	n.a.	28.7	23.5	37.4	Greece	56.3
South Africa	n.a.	n.a.	67.8	69.4	USA	31.6
Lemons					Persia	48.0
Spain	9.5	29.0	32.7	49.6	Turkey	20.5
Italy	71.1	60.0	53.4	63.6	Australia	54.1
USA	2.2	3.7	3.2	3.5		

[a]Oranges: Palestinian production : Instituto Valenciano de Economía, *Economía*, p. 48.

Source: Appendix. Tables A-H.

Mediterranean horticultural products had high rates of openness; that is to say, a very high relationship between exports and production or, stated in another way, a clear orientation towards the foreign sector (Table 1). By contrast, in the US, world leader in the production of some of these products, the percentage of exports with respect to production was very low, with the proximity of its enormous internal market and its difficulties in competing in foreign markets determining these result. If we subtract its exports to Canada, this export percentage would be insignificant in almost all cases[44]. Although by the 1930s the US had become the leading world producer of oranges, lemons and grapes, in no case did its exports of these products exceed 10 percent of production, whilst its competitors were achieving levels of more than 50 percent. Logically enough, this result was not determined exclusively by orientation to the foreign market. The internal consumption of each country was also a significant data, and in more backward countries it is understandable that this internal consumption was relatively much lower. Only in the case of raisins, the product which, as we stated earlier, enjoyed the greatest international success for Californian agriculture, could orientation to foreign markets outside the US be regarded as appreciable, although it

---

[44] Between 1922 and 1927 Canada accounted for 29 percent of the US exports of grapefruits, 70 percent of lemons, 73 percent of oranges and 90 percent of peaches. Cuba was the main destination for fresh vegetables (Hollingshead and Wakefield, *Handbook*, p. 7). In 1924-28, Canada accounted for more than 65 percent of the grape exports (Moriarty, *Foreign Trade*, p. 81)

was still somewhat lower than that of various of its main competitors, such as Greece or Australia.

In summary, we have seen how different endowments of productive factors also led to different forms of specialization, very much in line with that forecast by the Heckscher-Ohlin theory of international trade. However, this led to the opening-up of apparently paradoxical competitive possibilities. If a combination of high technology and innovative marketing, but with high prices, could not overcome a certain technology gap, clearly backward marketing techniques and low prices, then it is necessary to consider in greater detail precisely what had occurred. From our point of view, this essentially has to do with two variables: the structure of production costs of Mediterranean horticulture, and the degree of economic development and income levels of the countries that represented the main markets for this production.

Considering first the structure of production costs, we can count on evidence which, whilst limited, is sufficient for us to tentatively advance a hypothesis. The example of oranges exported to the UK market (Table 2) highlights that the Spanish advantage rested on lower cultivation costs, similar preparation costs despite a certain technological backwardness and, above all, much lower transport costs[45]. It would appear to be clear, therefore, that in the context of high volume and low unitary value products the transport costs were key and, in this sense, proximity to the consumer market is an advantage that is difficult to better[46]. If to this we add markedly lower labor costs, then the competitive position of Spain becomes even stronger[47]. Finally, the high

---

[45] Coinciding with this diagnosis was the opinion of a contemporary analyst, who also pointed to the efforts made in Spain during the 1920s and 1930s to introduce early and late varieties, as well as to extend the season and standardise production (Webber, *Citrus Fruits*, pp. 94-95)

[46] Although Italian orange production suffered from a weak competitive position compared to Spain in markets such as those of the UK and France, given its higher prices and worse productive and commercial structures, it had its main markets in neighbouring or proximate countries such as Switzerland, Austria or Germany (Instituto Valenciano de Economía, *Economía Citrícola*, pp. 87-93; Abad, *Historia de la Naranja*, p. 275)

[47] Between 1870 and 1913, U.S.A. real wages were 3.8 times higher than those of Spain (O'Rourke and Williamson, *Globalization*, p. 17). The use of wage-earning labor in the cultivation process was much lower in Spain than in California, given that the small size of Spanish farms meant that in many cases they could be worked exclusively by family labor. Many wage-earning laborers were at the same time small proprietors, which meant that their sustenance did not depend exclusively on working as employees for third parties. In the preparation and packaging of oranges, a task that was much more mechanized in California than in Spain (although in this latter country many Californian innovations were introduced in the 1920s and 1930s), it was the Spanish practice to essentially employ women who were paid much lower salaries than men (Calatayud,"Condiciones"). The presence of children, with even lower wages, helping their mothers to package fruits and vegetables has also been occasionally noted (Borras, "Trabajo infantil", p. 512). In the US it was considered that the high proportion of female and child labor was one of the reasons for the lower Spanish wage costs (Citrus Protective League,*Circular*). It is precisely these

yields obtained in Spain further strengthened its comparative advantages[48]. For their part, Californian producers had the possibility of gaining access to a superior segment of the market, with a product whose differential qualities justified the price difference. However, taking into account that these types of products were still in their very initial phase of expansion amongst the majority of the population, it was very difficult for many of these to show any willingness to pay almost double the price for the "same" product. And it is here that we can understand the success of exports from Palestine in the 1930s, a time when Spanish exports were facing problems of both quantity, as a result of bad harvests, and quality, with the export of fruit blighted by frosts. The Palestinian Jaffa orange had a very similar price, was of a better quality thanks to superior ecological conditions, was commercialised under a single brand name and adopted Californian methods with greater success.

TABLE 2. ORANGES. COST OF PRODUCTION PER BOX
DELIVERED TO THE UNITED KINGDOM (around 1934) (in shillings)

	South Africa	California	Brazil	Spain	Palestine
Cost of growing	2.50	2.75	1.33	1.00	2.00
Handling	2.75	2.17	2.67	3.00	3.50
Inland transport	1.25	0.67	0.83	[b]	[b]
Freight[c]	2.92	3.67	3.50	1.08	1.17
Other charges[a]	1.50	1.50	1.50	1.50	1.75
Total	10.92	10.76	9.83	6.58	8.42
Duty[d]	0.00	2.50	2.50	1-2,5	1-2,5
Grand total	10.92	13.26	12.33	7.58-9.08	9.42-10.92

[a]Other overseas charges,including commission at 5%.

[b]Inland railage and other inland charges included in Handling

[c]Freight includes insurance in California, Spain and Palestine.
[d]Oranges subjected to duty of 2.5 s. from 1st April to 30th December and to 10% ad valorem duty
 from 1st December to 31st March.
Source: Neumark, *Citrus Industry*, p. 113.

The case of the US market was quite different, in that the advantage in transport costs enjoyed by the Europeans in their proximate markets either reduced or disappeared, whilst the higher incomes of the population and the greater maturity in the

---

low wage costs that explain the limited incentives to mechanize the preparation of the fruit, a process which only began to make significant advances following the First World War when real wages began to rise significantly in Spain (Brown, *Production*, p. 17)
[48] Valencia also regarded its main strength to be the low wage and transport costs, together with the high productivity of the land (Instituto Valenciano de Economía, 1951)

diffusion of these products amongst consumers guaranteed a higher valuation of the "differential attributes" of the Californian fruit. Another option for California was to reduce labor costs to the maximum whenever possible through the use of intense mechanisation when the industrial transformation processes were relevant, as was the case with the raisin. Tariff barriers, although not yet decisive for some products, also helped to smooth the differential of production costs.

Transport costs, therefore, played a key role in explaining the competitive positions of the producers in different markets. This should come as no surprise. An extensive literature devoted to this theme has demonstrated the high elasticities of trade volumes with respect to transport costs. The case we are considering here, that of fruits and vegetables, fits well with the situation of those products whose transport costs are very large relative to the value added attributable to immobile production factors[49]. In this sense, the lines of specialization in Mediterranean horticultural production found in different countries would be determined by the interaction of two pairs of forces: the product's product transport intensity interacting with distance and the product's factor intensity interacting with countries' factor endowments[50].

Furthermore, consideration should also be given to the existence of increasing returns in Mediterranean horticultural productions, above all with respect to the preparation of fruit and its commercialization. Both the Californian experience in the commercialization of citrus fruits by the large co-operatives, as well as the Spanish case, where some traders first bought the fruit on the tree and later prepared it for sale to the large British intermediaries who controlled the final stages of distribution, give support to the realism of this supposition. Here, we are dealing with a situation where spatial competition has an imperfect character and where there is a certain degree of monopolistic power over the most proximate consumers, with the transport costs being a source of market power.

THE EXPORT OF MEDITERRANEAN HORTICULTURAL PRODUCTS AND ECONOMIC DEVELOPMENT IN SPAIN

In this paper we have analysed the globalization process that affected Mediterranean horticulture. The most outstanding features of this process were the increase in the consumption of its products in the more industrialized countries, where

---

[49] Henderson, Shalizi and Venables, "Geography", pp. 87-88.

they became part of the diet, the extension of their cultivation to areas in whose agriculture they had not traditionally formed a part and a marked expansion in their international trade.

Whilst globalization created opportunities, it also intensified competition and it can be supposed that at a certain point in time it came to represent a significant cost for the traditional producers.

From our point of view, it is important to place emphasis on the fact that the development and growth of specialized horticulture of this type in Mediterranean countries such as Spain is a process that is contemporary to globalization itself. Thus, if in the second half of the nineteenth century the new opportunities that arose as a consequence of rising per capita income in the more developed countries led the Mediterranean countries to increase their production within the framework of a new pattern of agriculture that was specialized and intensive in nature, the emergence in the first third of the twentieth century of important competitors such as California resulted in these Mediterranean countries, facing relevant costs. Having established that point, the rest of the paper has been dedicated to considering the case of Spain which, together with Italy, was one of the two powerhouses of Mediterranean horticulture in Europe, with our aim being to analyse and examine the impact of globalization on the traditional producers.

In the middle of the nineteenth century specialized Mediterranean horticulture had hardly begun to emerge in Spain, whilst its exports of these types of products were only incipient, except in some specific cases, such as raisins, in which certain areas had already been highly specialized for a number of years. As we explained earlier, the rest of Mediterranean horticulture basically took the form either of the cultivation of fruit trees around the edges of fields dedicated to cereals under irrigation, or of small market gardens located close to population centres and used to produce some fresh fruits and vegetables. When these market gardens lay close to the largest cities, there may have been a certain commercial orientation towards supplying the local markets. However, the high cost and low speed of transport in inland Spain severely limited the distance over which such trade could be conducted.

---

[50] Venables and Limao, "Geographical".

The increase in foreign demand, which took place as a result of increases in per capita income in countries such as the UK, together with the significant fall in maritime transport costs and the onset of the free trade movement, acted as a very significant impulse which could translate into attractive commercial opportunities[51].

In order to carry out a more detailed analysis of Spanish participation in the international market for the period 1850-1935, we have carried out the following econometric analysis with the aim of specifying a demand-supply model.

First, and with our objective being to specify the most appropriate model, we have checked for the order of integration of the time series that we consider might form part of the demand-supply model. The order of integration is tested for by two different methods: the augmented Dickey-Fuller unit root test and the KPSS test[52]. The former asserts that the variable is I(1) in the null hypothesis, while the latter formulates the stationarity assumption as the null.[53]

Using the augmented Dickey-Fuller test, ADF, the null of non-stationarity is rejected in three out of seven variables, using the AIC criterion to select the number of lagged first differences in the test equation and at the 5 percent significance level.

As the Dickey-Fuller test has been found to suffer from low power against stationary alternatives, we have also used the KPSS test, which has stationarity as the null and a unit root as the alternative hypothesis. The use of both tests allows for an empirically more satisfying sorting of time series into stationary ones, ones containing a unit root and ones not having sufficient information to distinguish between these two cases.

The conclusions of the KPSS test, using the Andrews bandwidth and Parzen or Bartlett kernel, is that all the variables are stationary at a 5 percent significance level.

Given the discrepancy with respect to the order of integration of some variables, depending upon the criterion employed, the demand and the supply of the exports have been estimated as a bi-equational and multivariate model from an error correction mechanism model, ECM. However, the lack of economic significance of the estimations is such that we have chosen not to take these results into account. Therefore,

---

[51] On the fall in maritime transport costs, see Harley, "Transportation" and "Ocean freight rates"; Mohamedd and Williamson, "Freight rates"; North, "Ocean freight rates".)
[52] Dickey and Fuller, "Likelihood ratio statistics"; Kwiatkowski et al, "Testing the null hypothesis".
[53] This is the same methodology employed by Strauss, "Multivariate cointegration analysis".

and because all the variables are I(0) following the KPSS test, and because most of them are using the ADF test, we have estimated a bi-equational and multivariate model of export demand and supply which have been estimated simultaneously.

The world demand for Spanish exports is specified in log-linear form as:

$$\log X_t^D = a_0 + a_1 \log(PX / PXW)_t + a_2 \log YW_t + u_{1t}$$

where:

X^D is the world demand for Spanish Mediterranean horticultural products, measured as their annual volume of exports.

YW is the arithmetic mean of the GDPs of the UK and France (Spain's main customers for these types of products).

PX is the price of Spanish horticultural exports.

PXW is the Franco-UK consumer prices indexes as a proxy of the weighted average of the export prices of the UK and France[54].

Since the equation is specified in logarithms, a_1 and a_2 are the relative price and real income elasticities of export demand, respectively.

The supply of exports is specified as a log-linear function of the relative price of exports to domestic prices and of an index of the productive capacity with respect to Mediterranean horticultural products in Spain. Our main problem has been to find a series of this productive capacity, given that until 1929 no annual data was kept on surface area under cultivation or production for these types of products and neither was there any data on surface areas under irrigation in Spain. In an attempt to overcome this problem, we have tried to obtain series that give us an idea of the evolution of this productive capacity. To that end, we have estimated the evolution of surface area under irrigation, with truly precarious data, or the supply of water for irrigation. It should be noted, however, that for this purpose we have used only the capacity of reservoir-held water and without having any data on the water drawn from wells which, as we have already seen in this work, was fundamental for the expansion of Mediterranean

---

[54] We have used the arithmetic mean of the French and UK GDP as a proxy variable of the weighted average of the GDPs of all Spain's trading partners. Account has to be taken of the fact that between 1850

horticulture in Spain. Finally, we have also used the trend of agricultural production and the trend variable. This index of productive capacity has shown itself to be significant in only a few of the models estimated, which should come as no surprise given the poor quality of the data used to approximate to the variable that interests us. In those limited number of cases in which it was significant, the models were considerably worse, using the habitual selection criteria, than that finally chosen, as a result of which this variable has been eliminated from the final model.

$$\log X_t^S = \beta_0 + \beta_1 \log(PX/P)_t + \beta_2 \log C_t + u_{2t}$$

where:

X^S is the quantity of exports supplied.

P is the domestic price index .

C is an index of domestic Mediterranean horticultural productive capacity.

The equation can be normalized for price of exports PX_t, to yield:

$$log\, PX_t = b_0 + b_1\, log\, X_t^S + b_2\, log\, C_t + b_3\, log\, P_t + u_{2t}$$

Following Morris Goldstein and Mohsin Khan we make the assumption that the adjustment of export quantities and prices to the respective equilibrium values is instantaneous[55]:

$$X_t^D = X_t^S = X_t$$

The estimator used was Full-Information Maximum Likelihood (FIML) and the results of the selected model are the following:

$$\log X_t = \underset{(-25.8976)}{-\,5.2433} \underset{(-0.3330)}{-\,0.0593} \log(PX/PXW)_t + \underset{(44.8810)}{2.1570 \log YW_t} - \underset{(-3.4169)}{0.1848\, F_t}$$

$$R^2 = 0.97$$

and 1913 these two countries represented, according to the years, a minimum of 46.3 percent and a maximum of 68.1 percent of total Spanish exports (Prados de la Escosura, *Comercio exterior*, p. 48).
[55] Goldstein and Khan, "Supply and Demand".

$$\log PX_t = \underset{(5.2688)}{0.1273} \log X_t + \underset{(39.1967)}{0.8309} \log P_t - \underset{(-4.0387)}{0.2256} F_t - \underset{(-3.6413)}{0.1479} FX_t$$

$$R^2 = 0.71$$

where F_t is a Dummy variable with value 1 for First World War and zero otherwise and $FX_t = FF*logXt$ where FF is another dummy variable which tries to capture the special economic circumstances that prevailed during the 1932-1935 depression.

The results (table 3) make clear the important role played in the rise in exports by the increase in per capita income of the world's most developed countries (Spain's main trading partners), with a income elasticity of 2.16 and significance at 1 percent level.

In the previous section we have insisted on the point that the displacement of the demand curve is not sufficient to explain the agile response of supply. It is appropriate to recall that, quite apart from establishing a new system of specialized agriculture, it was also necessary to overcome the main obstacle for this type of agriculture in Spain, namely the scarcity of water. This formidable producing effort made possible the response on the part of supply and was reflected in the increasing participation of Mediterranean horticulture in Spanish agricultural production as a whole and, in our view, could be explained by the high returns that were obtained as compared with those of traditional products. The elasticity of supply with respect to price makes clear the sensitivity of this to the opportunities that existed at the time. Its value is probably overestimated as a consequence of not being able to find a good series for the productive capacity of Mediterranean horticulture. In some of the models estimated – finally rejected in function of the selection criteria- in which this variable was significant, the elasticity of supply with respect to price fell until reaching values of around 3.

The behavior of the export prices of Mediterranean horticultural products provides us with a clear insight into this incentive for the growth in supply. Until the First World War, the weighted prices index of Spanish Mediterranean horticultural exports grew considerably more than the implicit deflator of Spanish GDP, with the improvement in the prices of these exports with respect to this being almost 50 percent (Table 4). Although the First World War and its effects supposed a significant fall in

these prices, the subsequent recovery was important and their behavior during the depression era of the 1930s was outstanding.

TABLE 3. SPANISH HORTICULTURAL EXPORTS DEMAND AND SUPPLY ELASTICITIES		
	Export-Demand	Export-Supply
Price elasticity	-0.0593	7.8554**
Income elasticity	2.1570**	

** means significance at 1percent level

In this way, Spain became the main world exporter of these products. The evolution of its exports was truly impressive: in 1930-35 fruit exports were sixty times higher in volume than in 1850-59; that of nuts were almost seven times higher; whilst that of vegetables had multiplied by thirty. In their totality, the volumes exported had multiplied by eleven (Table 5). The more rapid growth in the exports of fresh fruits and vegetables meant that their weight within Mediterranean horticultural exports increased. In the case of fresh fruits, whilst this weight represented less than 15 percent of such exports in 1850, it had exceeded 60 percent by 1935 (Table 6).

TABLE 4. REAL PRICES INDICES OF SPANISH EXPORTS OF MEDITERRANEAN HORTICULTURAL PRODUCTS, 1910=100					
	Nuts	Dried fruits	Fresh fruits	Vegetables	Total
1850-59	50	103	93	81	81
1860-69	77	103	163	110	104
1870-79	67	114	117	76	100
1880-89	74	107	135	121	111
1890-99	96	111	143	121	122
1900-09	112	136	125	104	121
1910-19	99	99	99	99	99
1920-29	109	121	113	129	115
1930-35	104	142	149	136	137

[a]The prices of mediterranean horticultural products have been deflated with Spanish Price Deflator for GDP,

taken from Prados de la Escosura, *El progreso*. Source: Appendix. Tables I and J.

However, given the behaviour of Spanish export prices, the increase in value was much higher still, with the value of fruit exports rising by almost one hundred and seventy times, that of vegetables by ninety and that of nuts by almost twenty-five. When taken together, the value of these exports was more than thirty-free times higher than that of the mid-nineteenth century.

TABLE 5. EVOLUTION OF SPANISH EXPORTS OF MEDITERRANEAN HORTICULTURAL PRODUCTS. VOLUME INDEX (1850-1859=100) (1910 prices)

	Nuts	Dried fruits	Fresh fruits	Vegetables	Total
1850-59	100	100	100	100	100
1860-69	111	125	167	118	124
1870-79	152	212	371	203	208
1880-89	150	197	808	341	256
1890-99	242	193	1,481	951	390
1900-09	338	165	2,895	1,910	613
1910-19	410	130	3,235	2,876	699
1920-29	530	110	4,610	3,230	907
1930-35	689	79	6,285	3,068	1,137

Source: Appendix. Table I.

As a consequence of this dramatic expansion, the part represented by the exports of Mediterranean agricultural products in the total of Spanish exports of food, agricultural, livestock and forestry products (transformed and non-transformed) rose substantially, from less than 15 percent in 1850-59 to almost half in 1930-35. If we take into account that the exports of agricultural and food products at this latter date was 76.6 percent of total Spanish exports, we can appreciate the point to which Mediterranean horticulture was key to the financing of the imports necessary for a country passing through the industrialization process, which was precisely the case of Spain during that epoch[56].

In this context, it is difficult to think that the globalization of Mediterranean horticulture contributed to a supposed "prolonged crisis of Mediterranean agriculture", or that increasing competition from California had the eventual effect of implying a progressive transfer of productive factors from the new agriculture of the Old World to that of the New. Rather, Mediterranean horticulture was over the long-term by far the most dynamic sector of Spanish agriculture, progressively concentrating an increasing

---

[56] Pinilla, "Cambio agrario", p. 155.

volume of productive factors and making an essential contribution to the Spain's export trade.

TABLE 6. BREAK DOWN OF SPANISH EXPORTS OF MEDITERRANEAN HORTICULTURAL PRODUCTS					
	Nuts	Dried fruits	Fresh fruits	Vegetables	Total
% at 1910 prices					
1850-59	37.0	47.6	11.5	3.9	100
1860-69	33.0	47.8	15.5	3.7	100
1870-79	27.1	48.5	20.6	3.9	100
1880-89	21.7	36.6	36.4	5.3	100
1890-99	23.0	23.6	43.8	9.6	100
1900-09	20.4	12.9	54.4	12.3	100
1910-19	21.7	8.8	53.3	16.2	100
1920-29	21.6	5.8	58.5	14.0	100
1930-35	22.4	3.3	63.7	10.6	100
% at current prices					
1850-59	22.6	59.6	13.8	3.9	100
1860-69	24.9	46.5	24.7	3.9	100
1870-79	18.0	54.9	24.1	3.0	100
1880-89	14.4	35.4	44.4	5.8	100
1890-99	18.2	21.1	51.4	9.4	100
1900-09	18.8	14.6	55.9	10.7	100
1910-19	23.0	9.2	51.5	16.2	100
1920-29	20.5	5.9	58.2	15.5	100
1930-35	16.6	3.5	69.4	10.6	100

[a]The composition of exports for each period has been calculated as an average of the annual composition

for the corresponding years.

Source: Appendix, tables I and J.

Only in the case of dried fruit does this "pessimistic" vision of the impact of the globalization of European Mediterranean horticulture fit at all well. Here, both the long-term fall in exports and the less than dynamic behavior of it supply are evident. However, we should note that even in its moment of greatest international vigour, namely the second half of the nineteenth century, the importance of this group of products in total Spanish exports was small, never reaching even 10 percent. Therefore, the damage caused to raisin producers and exporters alike, although locally significant given that its production was concentrated in two small areas (Malaga and Denia), was not serious either for the totality of Spanish exports or for its agricultural sector.

Globalization, therefore, had a clearly positive effect for a producer such as Spain. This country took advantage of the increase in demand coming from the industrialized countries to expand its Mediterranean horticultural production, which was

by far the most dynamic sector of its agriculture until the outbreak of the Second World War. Its exports also increased very significantly, coming to represent an essential pillar of its foreign trade.

The highest cost of globalization was the impossibility of growing in the US market. The limited presence in a market enjoying the most dynamic rate of growth in the world was undoubtedly a significant cost, as has already been suggested, not only from the point of view of the lost opportunities that lay there, but also given the impact that the increasing US production had on prices. José Morilla, Alan Olmstead and Paul Rhode have argued that in 1910 the citrus revenue lost to the Mediterranean countries due to US production would have been sufficient to support about 312,000 people in these lands. When including other Mediterranean horticultural products, they estimate this figure to increase by around half a million more. Indeed, depending on the assumption with respect to the inelasticity of demand, this impact could have been even greater[57].

We can try to be even more precise as regards the cost that US competition supposed for Spain. To that end, we have followed the same methodology employed by Morilla, Olmstead and Rhode to calculate the increase in revenue that would have taken place in Spain in the counterfactual case of the non-existence of US citrus fruit production. However, we have tried to make more precise the results that these authors offer for distinct market distributions between the different producers and a wide range of possible elasticities.

The ratio of Spain "counterfactual" to "actual" revenues will be:

$$\theta^{(-(\sigma+1)/(\sigma-\delta))} - 1$$

where:

θ is the non-US market share, that we have estimated from Appendix E and F[58]

δ is the price elasticity of demand, from Table 3

σ is the price elasticity of supply, from Table 3

---

[57] Morilla, Olmstead and Rhode, "Horn of Plenty", pp. 343-345.
[58] Using North-American prices, the percentage represented by the US in the value of the world production of citrus fruits during the period 1909-13 was 21.4 percent. The use of other prices changes the final result only marginally: thus, using 1910 Spanish prices, we obtain the value 21.0 percent.

We find that the percentage increase in "counterfactual" to "actual" revenues for non-US producing countries would be 29.1 percent. With the assumed elasticities, this means that non-US producers would gain $1.14 for every dollar that US producers lost.

This result is very close to the different estimations made by Morilla, Olmstead and Rhode. If the added net revenue for the traditional citrus producing countries would have been around $ 50.16 millions in 1910[59], and we estimate the Spanish share of it as 30.3 percent (from Appendix, Tables E and F), then the "counterfactual" Spanish GDP would be some 0.8 percent higher that in the "actual" case[60].

All this serves to emphasize the scale of the lost opportunities, bearing in mind that if, in addition to citrus fruits, we also add other products with similar situations, the effect would have been even greater. Furthermore, the increasing importance of US production up to the outbreak of the Second World War highlights the growing cost of this competition (Appendix, Tables E, F, G, and H).

CONCLUSIONS

From the mid-nineteenth century onwards the nascent process of globalization of the world's economies gave rise to important consequences which, during recent years, have come to be regarded as a priority area of research in economic history. In this paper, we have focussed on analyzing the process of globalization and its consequences in the production and trade of Mediterranean horticultural products.

We have first placed emphasis on how the countries lying on the northern shore of the Mediterranean took advantage of the sharp increase in demand for these types of products coming from the more industrialized countries, above all from the United Kingdom, to increase their production and exports. By the closing years of the nineteenth century, these producer countries had consolidated solid positions in the international markets for these products. However, these were to come under threat from the process of globalization of production which followed that of consumption. It was, above all, Californian agriculture which, with its modern technology and innovative marketing, supposed the greatest threat for the European producers. Whilst

---

[59] Morilla, Olmstead and Rhode, "Horn of Plenty", p. 345, estimate that the added net revenue for the traditional citrus sector would equal roughly $44 million per year. This calculation has been made on the basis of a gain for the non-US producers of $1 for each $1 lost by the US producers.

[60] Agricultural production would have been 2.7 percent higher and with the per capita income of this year it would have been possible to maintain 149,768 more people. GDP data of Prados de la Escosura, *Progreso*.

these producers lost large sections of the North American market, in part as a consequence of the protectionist trade barriers raised there, they nevertheless maintained their solid positions in their remaining markets, in such a way that Mediterranean horticulture continued to be a source of agricultural progress and growth for these countries.

We have tried to analyze the lines of specialization developed by the two most important producers, California and Spain. In order to explain them it is necessary, from our point of view, to draw both on the theory of international trade and on the arguments that the new economic geography provides in order to better understand the competitive possibilities of different countries. In this way, we find that the specialization responded well to the Heckser-Ohlin approach, with California taking advantage of the relatively low cost of capital to compensate for its high wage costs and Spain, by contrast, using the labor factor more intensively, taking full advantage in this case of its low relative cost and the high cost of capital. However, the technological leadership enjoyed by California could not triumph over Spanish production in the European markets, where Spain also benefited to a great extent from its geographical location which allowed it to support much lower transport costs.

We have used the Spanish situation to carry out a case study that sheds light on the effects of the globalization process. In this way, we have seen how globalization in the second half of the nineteenth century led to the development in Spain of a new and dynamic agriculture specializing in Mediterranean horticultural products. Competition from California did not detain this expansion, which continued throughout the first third of the twentieth century, in such a way that between 1850 and 1936 the exports of these products underwent a truly spectacular growth. In an attempt to explain this, we have estimated a bi-equational demand-supply model and a multivariate model in which the prices and quantities have been determined jointly for Spanish exports of Mediterranean horticultural products during the period 1850-1935. Their results make clear the importance that both the increase in income of the populations of the more developed countries and the changes in the prices of these products had for the growth of these exports. The behavior of these prices, in turn, highlights that their positive evolution was crucial for the expansion of supply.

Finally, and having appreciated that Mediterranean horticulture was the most dynamic sector of Spanish agriculture, we have tried to measure the impact of

Californian competition. To that end, we have analyzed the counter-factual situation of the non-existence of this competition for the case of citrus fruits, with the results revealing a significant cost estimated at 0.7% of Spanish GDP in 1910.

REFERENCES

Abad, Vicente. *Historia de la Naranja (1781-1939)*. Valencia: Comité de la Gestión de la Exportación de Frutos Cítricos, 1984.

Bauer, Walter. "Foreign Production, Trade, and Government Aid in the Raisin and Currant Industry.*" University of California-Experiment Station Bulletin,* 566 (1933): 45-84.

Borrás, José M. " El Trabajo Infantil en el Mundo Rural Español (1849-1936).Género, Edades y Ocupaciones."In *El Nivel de Vida en la España Rural, Siglos XVIII-XX*, edited by José M. Martínez-Carrión, 497-547. Alicante: Publicaciones de la Universidad de Alicante, 2002.

Brown, W. Robertson. *The Production of Oranges in Spain*, Calcutta, 1930.

Calatayud, Salvador. "Condiciones de Trabajo en la Agricultura Naranjera (1914-1936)". *Saitabi* 36 (1986): 269-288.

------------------------. "L'Expansió Citrícola Valenciana. Producció i Propietat de la Terra a la Ribera del Xúquer (1860-1930)."*Recerques* 22 (1989): 95-116.

------------------------. "El Regadío ante la Expansión Agraria Valenciana: Cambios en el Uso y Control del Agua (1800-1916)". *Agricultura y Sociedad* 67 (1993): 47-92.

------------------------. "Economía en Transformación. Agricultura e Industria en la Época Contemporánea", In *De la Revolución Liberal a la Democracia Parlamentaria. Valencia (1808-1975)*, Edited by Paul Preston and Ismael Saz, 163-200. Madrid: Biblioteca Nueva y Universitat de Valencia, 2001.

Calatayud, Salvador and José M. Martínez-Carrión. "El Cambio Técnico en los Sistemas de Captación e Impulsión de Aguas Subterráneas para Riego en la España Mediterránea". In *El Agua en los Sistemas Agrarios. Una Perspectiva Histórica*, edited by Ramón Garrabou and José M. Naredo, 15-40. Madrid: Fundación Argentaria, 1999.

Carter, Susan B., Roger L. Randsome and Richard Sutch. "Agricultura, Ahorro y Crecimiento: Conjeturas sobre las Experiencias Mediterránea y Californiana". In *California y el Mediterráneo: Estudios de la historia de dos agriculturas competidoras*, edited by José Morilla, 19-52. Madrid: Ministerio de Agricultura, Pesca y Alimentación,1995.

Chaminade, Roger. *La Production et le Commerce des Raisins de Table*, Paris, 1933.

Citrus Protective League Circular, no. 3, 1911.

Dickey, David A. and Wayne A. Fuller. "Likelihood ratio statistics for autoregressive time-series with a unit root". *Econometrica* 49, no. 4 (1981): 1057-1072.

Dimitri, Carolyn." Contract Evolution and Institutional Innovation: Marketing Pacific-Grown Apples from 1890 to 1930." *Journal of Economic History* 62, no. 1 (2001): 189-212.

Faugeras, Jacques. *Oranges, citrons, pamplemousses. Leur culture et leur commerce en Floride et en Californie*, Paris: Dunod, 1931.

Federal Trade Commission. *Report of the Federal Trade Commission on Agricultural Income Inquiry. Part II.- Fruits, Vegetables, and Grapes*, Washington: GPO, 1938.

Federico, Giovanni. "Oltre Frontiera: L'Italia nel Mercato Agricolo Internazionale. In *Storia dell'Agricoltura Italiana in etá contemporanea, vol. III Mercati e Istituzioni"*, edited by Piero Bevilacqua, 189-222, Venezia: Marsilio Editor, 1991.

------------------------------. "El comercio exterior de los países mediterráneos en el siglo XIX". In *El desarrollo económico en la Europa del Sur: España e Italia en perspectiva histórica*, edited by L. Prados de la Escosura and V. Zamagni, 269-292. Madrid: Alianza Editorial, 1991.

Findlay, Ronald and O'Rourke, Kevin H. "Commodity Market Integration, 1500-2000", in *Globalization in Historical* Perspective, edited by Micahel D. Bordo, Alan M. Taylor and Jeffrey G. Williamson, 13-64, Chicago: The University of Chicago Press, 2003.

Font de Mora, Rafael. *Comercio de los Agrios Españoles*. Valencia: Tipografía Moderna, 1938.

Garrabou, Ramón.. *Un Fals Dilema. Modernitat o Endarreriment de l'agricultura Valenciana, 1850-1900*. Valencia: Institutició Alfons el Magnanim, 1985.

Garrido, Samuel. *Treballar en Comú: El Cooperativisme Agrari a España (1900-1936)*.Valencia: Edicions Alfons el Magnànim, 1996.

--------------------- . "El conreu del taronger a la Plana de Castelló: Agricultura Comercial, Propietat Pagesa i Treball Assalariat (1850-1930)". *Estudis d'Història Agrària* 13 (2000): 201-227.

Goldstein, Morris and Khan, Mohsin S. **"**The Supply and Demand for Exports: A Simultaneous Approach", *Review of Economics and Statistics*, 60, 2 (1978): 275-286.

Goodwin, Barry K.; Grennes, Thomas S. and Craig, Lee A. "Mechanical Refrigeration and the Integration of Perishable Commodity Markets", *Explorations in Economic History*, 39 (2002): 154-182.

Grupo de Estudios de Historia Rural. "Notas sobre la producción agraria española, 1891-1931", *Revista de Historia Económica*, año 1, nº 2 (1983),: 185-252.

-- . *Estadísticas Históricas de la Producción Agraria Española, 1850-1935*. Madrid: Ministerio de Agricultura, 1991.

Harley, C. Knick. "Transportation, the World Wheat Trade, and the Kuznets Cycle, 1850-1913", *Explorations in Economic History*, 17 (1980), 218-250.

----------------------. "Ocean freight rates and productivity, 1740-1913: the primacy of mechanical invention reaffirmed", *Journal of Economic History* 48 (1988), 851-876.

Henderson, J Vernon.: Shalizi, Zmarak and Venables, Anthoni J. "Geography and Development", *Journal of Economic Geography* , no. 1 (2001), 81-105.

Hollingshead, S. Robert and Roberta P. Wakefield. *Handbook of foreign tariffs and import regulations on agricultural products, I. Fresh fruits and vegetables*, Washginton, 1929.

Instituto Valenciano de Economía. *Economía Citrícola*. Valencia: Sindicato Nacional de Frutos y Productos Hortícolas, 1951.

Intelligence Branch of the Empire Marketing Board. *Oranges. World Production and Trade*. London, 1929.

International Institute of Agriculture. *Annuaire International de Statistique Agricole*. Rome, 1909-1939.

Kwiatkowski, Denis et al. "Testing the Null hipótesis of Stationarity Against the Alternative of a Unit Root", *Journal of Econometrics* 54, no. 1-3 (1992): 159-178.

Lupo, Salvatore. *Il Giardino Degli Aranci. Il Mondo Degli Agrumi Nella Storia del Mezzogiorno*. Venecia: Marsilio editore, 1990.

Martínez-Carrión, José M. "Agricultores e Industriales en el Negocio del Pimentón, 1830-1935."*Revista de Historia Económica*, 17, no. 1(1999): 149-186.

Martínez-Soto, Angel P. "La 'tela de araña'. Mercados informales de financiación agraria, usura y crédito hipotecario en la Región de Murcia (1850-1939)", *Áreas*, no. 21 (2001), pp. 185-220.

Mateu, Enric and Salvador Calatayud. "La Evolución de la Agricultura Valenciana: Algunos Aspectos (1840-1930)." In *De la Sociedad Tradicional a la Economía Moderna. Estudios de Historia Valenciana Contemporánea*, Edited by Joaquín Azagra, Enric Mateu and Javier Vidal, 101-124. Alicante: Instituto de Cultura Juan Gil Albert, 1996.

Metzer, Jacob. *The divided economy of Mandatory Palestine*. Cambridge: Cambridge University Press, 1998.

------------------.. "Economic Growth and External Trade in Mandatory Palestine: A Special Mediterranean Case". In *The Mediterranean Response to Globalization Before 1950*, edited by S. Pamuk, and J. G. Williamson, 363-380. London: Routledge, 2000.

Millán, Jesús. "Els Inicis Revolucionaris de la Societat Valenciana Contemporánia. Revolució, Canvi Social i Transformacions Econòmiques, 1780-1875". In *De la Sociedad Tradicional a la Economía Moderna*, edited by Joaquín Azagra, Enric Mateu and Javier Vidal**, 125-162. Alicante: Instituto de Cultura Juan Gil-Albert,1996.

Mitchell, B.R. *International Historical Statistics. Africa and Asia*. London: Macmillan, 1986.

Mitchell, B.R. *International Historical Statistics. Europe, 1750-1988*. London: Macmillan, 1992.

Mitchell, B.R. *International Historical Statistics. The Americas, 1750-1988*. New York: Stockton Press, 1993.

Mohammed, Saif I. Shah and Jeffrey G. Williamson. "Freight rates and productivity gains in British tramp shipping 1869-1959" *Explorations in Economic History*, 41 (2004), 172-203.

Moriarty, Daniel J. *Foreign Trade in Fresh Fruits*. Washington: Department of Commerce, 1930.

Morilla, José, Alan L. Olmstead and Paul W. Rhode. " 'Horn of Plenty': The Globalization of Mediterranean Horticulture and the Economic Development of Southern Europe, 1880-1930." *Journal of Economic History* 59, no. 2 (1999): 316-352.

---.. "International Competition and theDevelopment of the Dried-Fruit Industry, 1880-1930". In *The Mediterranean Response to Globalization Before 1950*, edited by S. Pamuk, and J. G. Williamson, 199-232. London: Routledge, 2000.

Neumark, S. D.. *The Citrus Industry of South Africa*. Johannesburg: Witwatersrand University Press, 1938.

North, Douglas C. "Ocean freight rates and economic development 1750-1913." *Journal of Economic History* 18 (1958), 537-555.

O'Rourke, Kevin H. "The European Grain Invasion, 1870-1913." *Journal of Economic History* 57(1997), no. 4: 775-801.

O'Rourke, Kevin H. and Jeffrey G. Williamson. *Globalization and History: The Evolution of a Nineteenth-Century Atlantic Economy*. Cambridge: The MIT Press, 1999.

---. "When did globalisation begin?", *European Review of Economic History* , vol. 6,part 1 (2002), 23-50.

Olmstead, Alan and Paul W. Rhode. "La Competencia Internacional en Productos Mediterráneos y el Auge de la Industria Frutícola Californiana, 1880-1930". In *California y el Mediterráneo: Estudios de la historia de dos agriculturas competidoras*, edited by José Morilla, 173-232. Madrid: Ministerio de Agricultura, Pesca y Alimentación, 1995.

Palafox, Jordi. "Estructura de la Exportación y Distribución de Beneficios. La Naranja en el País Valenciano (1920-1930)." *Revista de Historia Económica*, año 1, no. 2 (1983): 339-351.

------------------. "Expansión de las Exportaciones, Crecimiento, Diversificación Industrial e Industrialización". In *De la sociedad tradicional a la economía moderna. Estudios de Historia Valenciana Contemporánea*, edited by Joaquín Azagra, Enric Mateu and Javier Vidal, 321-345. Alicante: Instituto de Cultura Juan Gil Albert, 1996.

------------------. "La tardía industrialización de la economía valenciana." In *Historia Económica Regional de España. Siglos XIX y XX, edited by* Luis Germán et al., Barcelona: Editorial Crítica, 390-412, 2000.

Pinilla, Vicente. "Cambio Agrario y Comercio Exterior en la España Contemporánea." *Agricultura y Sociedad* 75 (1995): 153-179.

Pinilla, Vicente and María-Isabel Ayuda. "The Political Economy of the Wine Trade: Spanish Exports and the International Market, 1890-1935". *European Review of Economic History* 6, part.1 (2002): 51-86.

37

--. "Right shifts of the demand curve and international trade in Mediterranean agricultural products, 1850-1935", mimeo, 2004.

Prados de la Escosura, Leandro. *Comercio Exterior y Crecimiento Económico en España, 1826-1913: Tendencias a Largo Plazo*. Madrid: Banco de España, 1982.

-------------------------------------- . *El progreso económico de España (1850-2000)*, Madrid: Fundación BBVA, 2003.

Ramon-Muñoz, Ramon."Specialization in the International Market for Olive Oil Before World War II." In *The Mediterranean Response to Globalization Before 1950*, edited by S. Pamuk, and J. G. Williamson, 159-198. London: Routledge, 2000.

Redding, Stephen and Anthony J. Venables: "Geography and Export Perfomance: External Market Access and International Supply Capacity", //econ.lse.ac.uk/staff/ajv/research_material.html, 2003.

Rhode, Paul W.. "Learning Capital Accumulation, and the Transformation of California Agriculture", *Journal of Economic History* 55, no. 4 (1995): 773-800.

----------------------. "La Intensificación de la Agricultura Californiana". In *California y el Mediterráneo: Estudios de la Historia de dos Agriculturas Competidoras*, edited by José Morilla, 87-148. Madrid: Ministerio de Agricultura, Pesca y Alimentación, 1995.

Ritter, Kurt and Martin Guttfeld. "World Production of And World Trade in Table Grapes", *Monthly Bulletin of Agricultural Economics and Sociology*, no, 9-10-11-12 (1932): 285-299, 303-316, 339-349, 373-383.

Roncales, Vicente. "Propiedad y Riesgo en los Inicios de la Expansión Citrícola Valenciana Durante el Último Tercio del Siglo XIX". *Historia Agraria* 16 (1998): 183-208.

Sánchez, Andrés. *La integración de la economía almeriense en el mercado mundial (1778-1936)*. Almería: Instituto de Estudios Almerienses, 1992.

Strauss, Hubert. "Multivariate Cointegration Analysis of Aggregate Exports: Empirical Evidence for the United States, Canada and Germany", *Kiel Working Paper* 101 (2002).

Tracy, Michel. *Agriculture in Western Europe*. New York: Frederick A. Praeger Publisher, 1964.

United States Tariff Commission. *Onions. Report of the U.S. Tariff Commission to the President of the United States*, Washington, 1929.

Venables, Anthoni J. and Limao, Nuno. "Geographical disadvantage: a Heckscher-Ohlin-von Thünen model of international specialization", *Journal of International Economics*, vol. 58 (2003), pp. 239-263.

Webber, Herbert J. and L. Dexter Batchelor. *The citrus industry*, Berkeley, 1943.

Wulfert, M.A. *Citrus Fruits . World Production and Trade*. Washington, 1940.

APPENDIX. TABLE A. WORLD TRADE IN ORANGES (1909-1938)

	1909-1913	1925-1928	1929-1932	1933-1935	1936-1938	1909-1913	1925-1928	1929-1932	1933-1935	1936-1938
Exports	Thousands of quintals					%				
Spain	5.079	7.277	9.034	8.543	n.a.	65,6	59,3	61,0	48,9	n.a.
Italy	1.201	1.289	1.019	1.086	1.279	15,5	10,5	6,9	6,2	7,3
Europe	6.313	8.987	10.533	9.926	6.216	79,2	73,3	71,2	56,8	35,3
United States	380	965	1.391	1.289	1.565	4,9	7,9	9,4	7,4	8,9
N&C America	666	1.012	1.598	2.076	2.457	8,4	8,2	10,8	11,9	14,0
Brazil	1	120	314	1.019	1.778	0,0	1,0	2,1	5,8	10,1
South America	256	474	421	1.315	2.064	3,2	3,9	2,8	7,5	11,7
Japan	147	258	258	511	660	1,9	2,1	1,7	2,9	3,7
Palestine	438	754	945	1.822	2.878	5,7	6,1	6,4	10,4	16,3
Asia	607	1.270	1.459	2.894	4.734	7,6	10,4	9,9	16,6	26,9
Algeria	126	224	129	271	576	1,6	1,8	0,9	1,6	3,3
South Africa	5	232	494	662	959	0,1	1,9	3,3	3,8	5,4
Africa	131	492	748	1.151	1.997	1,6	4,0	5,1	6,6	11,3
Aust. & Oceania	0	34	41	108	142	0,0	0,3	0,3	0,6	0,8
World exports	7.974	12.269	14.798	17.470	17.611	100	100	100	100	100
Imports	Thousands of quintals					%				
Germany	1.307	2.172	2.764	2.583	1.493	18,1	19,3	19,1	14,8	8,8
Belgium	242	311	636	751	839	3,3	2,8	4,4	4,3	4,9
France	988	1.150	1.816	2.998	2.330	13,6	10,2	12,6	17,2	13,7
U.K.	2.876	3.985	4.981	5.464	5.556	39,7	35,4	34,5	31,3	32,6
Netherlands	221	631	810	636	738	3,0	5,6	5,6	3,6	4,3
Europa	6.937	9.805	13.113	15.013	14.033	95,8	87,1	90,7	86,0	82,3
Canada	n.a.	609	723	778	980	n.a.	5,4	5,0	4,5	5,7
N&C America	138	960	770	1.085	1.361	1,9	8,5	5,3	6,2	8,0
S. America	12	21	2	498	433	0,2	0,2	0,0	2,9	2,5
Asia	39	288	320	656	914	0,5	2,6	2,2	3,8	5,4
Africa	98	141	92	74	49	1,4	1,2	0,6	0,4	0,3
Aust. & Oceania	16	41	107	133	193	0,2	0,4	0,7	0,8	1,1
World imports	7.240	11.256	14.455	17.466	17.058	100	100	100	100	100

[a]Palestine exports in 1925-28 includes lemons; Japan exportsalways includes lemons; Belgium
imports always includes lemons; USA imports from Hawai are not included.
Source: International Institute of Agriculture, *Annuaire* and Mitchell, *International Historical Statistics* .

APPENDIX. TABLE B. WORLD TRADE IN LEMONS (1909-1938)

	1909-1913	1925-1928	1929-1932	1933-1935	1936-1938	1909-1913	1925-1928	1929-1932	1933-1935	1936-1938
Exports	Thousands of quintals					%				
Spain	33	147	182	273	n.a.	1,2	5,5	6,2	9,1	n.a.
Italy	2.670	2.353	2.510	2.455	1.990	97,6	88,2	86,1	81,8	76,1
Europe	2.703	2.502	2.728	2.752	2.194	98,8	93,9	93,6	91,7	83,9
United States	21	85	80	105	188	0,8	3,2	2,7	3,5	7,2
N&C America	21	85	90	145	254	0,8	3,2	3,1	4,8	9,7
S. America	12	4	3	8	6	0,4	0,2	0,1	0,3	0,2
Asia	n.a.	71	86	83	135	n.a.	2,6	3,0	2,8	5,2
Africa	n.a.	4	7	11	23	n.a.	0,1	0,2	0,4	0,9
Aust. & Oceania	n.a.	0	0	2	3	n.a.	0,0	0,0	0,1	0,1
World	2.736	2.666	2.914	3.001	2.615	100,0	100,0	100,0	100,0	100,0

	1909-1913	1925-1928	1929-1932	1933-1935	1936-1938	1909-1913	1925-1928	1929-1932	1933-1935	1936-1938
Imports	Thousands of quintals					%				
Germany	375	550	701	702	645	18,3	23,5	26,1	24,2	25,5
France	90	275	378	302	280	4,4	11,7	14,0	10,4	11,1
United Kingdon	437	633	724	794	543	21,4	27,1	26,9	27,4	21,5
Europe	1.416	1.837	2.286	2.634	2.249	69,2	78,5	85,0	90,8	89,1
Canada	n.a.	92	125	128	132	n.a.	3,9	4,7	4,4	5,2
United States	624	366	173	41	59	30,5	15,7	6,4	1,4	2,3
N&C America	624	459	301	174	196	30,5	19,6	11,2	6,0	7,8
S. America	0	0	27	17	17	0,0	0,0	1,0	0,6	0,7
Asia	2	7	47	45	33	0,1	0,3	1,8	1,6	1,3
Africa	n.a.	30	23	22	19	n.a.	1,3	0,8	0,8	0,7
Aust. & Oceania	3	6	6	8	11	0,2	0,3	0,2	0,3	0,4
World	2.044	2.339	2.690	2.900	2.525	100,0	100,0	100,0	100,0	100,0

Source: International Institute of Agriculture, *Annuaire* .

APPENDIX. TABLE C. WORLD TRADE IN TABLE GRAPES (1903-1938)

	1903-1908	1909-1913	1914-1920	1921-1924	1925-1928	1929-1932	1933-1935	1936-1938	1903-1908	1909-1913	1914-1920	1921-1924	1925-1928	1929-1932	1933-1935	1936-1938
Exports	Thousands of quintals								%							
Spain	429	444	323	391	373	493	483	n.a.	34,4	33,0	63,1	48,2	25,8	25,7	25,9	n.a.
France	251	229	16	104	305	255	59	89	20,1	17,1	3,2	12,8	21,0	13,3	3,2	4,6
Italy	275	291	56	168	277	386	279	261	22,0	21,7	10,9	20,7	19,1	20,1	15,0	13,4
Europe	1.179	1.183	457	705	1.194	1.586	1.442	1.295	94,6	88,0	89,2	86,8	82,5	82,7	77,4	66,6
USA	0	0	1	66	167	175	157	303	0,0	0,0	0,2	8,2	11,5	9,1	8,5	15,6
N&C America	0	0	1	66	167	176	158	303	0,0	0,0	0,2	8,2	11,6	9,1	8,5	15,6
S. America	0	0	0	2	17	51	69	98	0,0	0,0	0,0	0,3	1,2	2,7	3,7	5,1
Asia	0	5	5	3	13	21	24	40	0,0	0,4	0,9	0,4	0,9	1,1	1,3	2,0
Algeria	67	156	50	36	57	79	97	84	5,4	11,6	9,7	4,4	3,9	4,1	5,2	4,3
Africa	68	156	50	36	57	79	170	192	5,4	11,6	9,7	4,4	3,9	4,1	9,1	9,9
Aust.& Oceania	0	0	0	0	0	0	3	15	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,8
World	1.247	1.345	512	813	1.447	1.918	1.862	1.943	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

	1903-1908	1909-1913	1914-1920	1921-1924	1925-1928	1929-1932	1933-1935	1936-1938	1903-1908	1909-1913	1914-1920	1921-1924	1925-1928	1929-1932	1933-1935	1936-1938
Imports	Thousands of quintals								%							
Germany	438	348	n.a.	137	538	678	599	681	38,3	29,1	n.a.	14,7	35,4	34,8	32,3	36,5
France	66	88	60	47	78	161	141	101	5,8	7,4	10,6	5,1	5,1	8,3	7,6	5,4
UK	373	311	275	355	387	433	468	391	32,6	26,0	48,9	38,0	25,4	22,2	25,2	20,9
Europe	1.052	905	387	715	1.218	1.674	1.555	1.521	92,0	75,5	68,9	76,5	80,2	85,8	83,8	81,4
Canada	10	25	31	43	97	107	83	131	0,9	2,1	5,6	4,5	6,4	5,5	4,5	7,0
USA	n.a.	166	100	86	13	24	44	42	n.a.	13,9	17,8	9,2	0,8	1,2	2,4	2,3
N&C America	13	197	136	136	134	147	142	196	1,2	16,4	24,2	14,5	8,8	7,5	7,7	10,5
S. America	0	18	12	11	60	24	34	35	0,0	1,5	2,2	1,2	3,9	1,2	1,8	1,9
Asia	0	1	1	1	0	4	29	45	0,0	0,1	0,1	0,1	0,0	0,2	1,5	2,4
Africa	78	78	26	71	107	100	90	62	6,8	6,5	4,6	7,6	7,0	5,1	4,9	3,3
Aust. & Oceania	0	1	0	1	2	3	6	8	0,0	0,1	0,0	0,1	0,1	0,2	0,3	0,4
World	1.143	1.199	562	935	1.520	1.952	1.857	1.868	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: International Institute of Agriculture, *Annuaire* .

APPENDIX. TABLE D. WORLD TRADE IN RAISINS (1903-1938)

	1903-1908	1909-1913	1914-1920	1921-1924	1925-1928	1929-1932	1933-1935	1936-1938	1903-1908	1909-1913	1914-1920	1921-1924	1925-1928	1929-1932	1933-1935	1936-1938
Exports	Thousands of quintals								%							
Spain	270	240	172	152	177	142	110	n.a.	18,9	9,8	10,8	6,9	6,4	5,2	3,8	n.a.
Greece	1.077	1.063	803	1.038	949	845	954	1.061	75,5	43,3	50,7	46,9	34,3	30,9	32,8	32,5
Europe	1.385	1.548	1.012	1.322	1.173	1.018	1.089	1.189	97,1	63,0	63,8	59,8	42,4	37,2	37,4	36,4
USA	32	85	263	340	766	600	448	600	2,2	3,5	16,6	15,4	27,7	22,0	15,4	18,4
N&C America	32	85	263	340	767	600	448	600	2,2	3,5	16,6	15,4	27,7	22,0	15,4	18,4
S. America	1	1	2	3	2	3	5	9	0,1	0,0	0,1	0,2	0,1	0,1	0,2	0,3
Turkey	n.a.	489	n.a.	330	351	417	588	593	n.a.	19,9	n.a.	14,9	12,7	15,3	20,2	18,2
Persia	n.a.	299	245	88	216	196	108	n.a.	n.a.	12,2	15,4	4,0	7,8	7,2	3,7	n.a.
Asia	n.a.	819	271	436	605	686	730	761	n.a.	33,3	17,1	19,7	21,9	25,1	25,1	23,3
Africa	0	0	9	35	22	20	41	64	0,0	0,0	0,6	1,6	0,8	0,7	1,4	2,0
Australia	7	5	27	74	198	352	566	602	0,5	0,2	1,7	3,4	7,2	12,9	19,4	18,4
Aust.& Oceania	8	5	27	75	198	353	566	602	0,5	0,2	1,7	3,4	7,2	12,9	19,4	18,4
World	1.426	2.459	1.585	2.212	2.767	2.732	2.911	3.264	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Imports	Thousands of quintals								%							
Germany	386	346	n.a.	137	385	442	576	718	15,1	13,3	n.a.	6,4	14,3	15,6	19,7	22,8
UK	962	1.000	890	1.164	1.264	1.270	1.288	1.295	37,5	38,5	56,4	54,1	46,8	44,9	44,1	41,2
Europe	2.175	2.184	1.216	1.687	2.202	2.353	2.534	2.705	84,7	84,2	77,1	78,4	81,6	83,2	86,7	85,9
Canada	110	154	160	187	205	197	172	191	4,3	5,9	10,1	8,7	7,6	7,0	5,9	6,1
USA	193	179	133	190	77	44	34	25	7,5	6,9	8,5	8,8	2,9	1,6	1,2	0,8
N&C America	308	336	296	378	289	249	216	229	12,0	12,9	18,8	17,6	10,7	8,8	7,4	7,3
S. America	6	11	7	9	14	17	15	12	0,2	0,4	0,4	0,4	0,5	0,6	0,5	0,4
Asia	0	4	11	13	14	19	40	37	0,0	0,1	0,7	0,6	0,5	0,7	1,4	1,2
Africa	6	15	12	27	34	37	29	26	0,2	0,6	0,8	1,2	1,2	1,3	1,0	0,8
Aust. & Oceania	72	44	36	36	49	52	50	57	2,8	1,7	2,3	1,7	1,8	1,8	1,7	1,8
World total	2.566	2.594	1.579	2.151	2.697	2.828	2.922	3.148	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: International Institute of Agriculture, *Annuaire* .

APPENDIX. TABLE E. ORANGES AND MANDARINS, WORLD PRODUCTION

	Thousands of quintals				%			
	1909-13	1925-28	1929-32	1933-35	1909-13	1925-28	1929-32	1933-35
Spain	8.395	11.177	12.517	9.161	29,2	32,3	24,1	16,8
Italy	3.796	2.632	3.396	3.408	13,2	7,6	6,5	6,3
Europe	n.a.	13.965	16.044	12.779	n.a.	40,3	30,8	23,5
Brazil	1	115	10.365	11.415	0,0	0,3	19,9	21,0
United States	6.500	12.393	15.967	19.008	22,6	35,8	30,7	34,9
America	8.061	14.356	28.199	31.984	28,0	41,4	54,2	58,8
Japan	2.004	3.158	3.304	4.142	7,0	9,1	6,4	7,6
Palestine	n.a.	787	1.060	1.873	n.a.	2,3	2,0	3,4
Asia	n.a.	4.483	5.552	6.457	n.a.	12,9	10,7	11,9
Algeria	n.a.	780	549	725	n.a.	2,3	1,1	1,3
South Africa	n.a.	251	729	953	n.a.	0,7	1,4	1,8
Africa	n.a.	1.182	1.442	2.337	n.a.	3,4	2,8	4,3
Australia&Oceania	n.a.	663	780	870	n.a.	1,9	1,5	1,6
WORLD	28.756	34.648	52.017	54.428	100,0	100,0	100,0	100,0

[a]Palestinian production is exports. Production from South Africa and Brazil until 1933 are exports.
Soviet Union and China productions are not included.
Source: International Institute of Agriculture, *Annuaire.* Spanish production (1903-13) from Grupo de Estudios
de Historia Rural, *Estadísticas Históricas*, p. 1195.

APPENDIX. TABLE F. LEMONS, WORLD PRODUCTION, 1909-1938

	1909-13	1924-28	1928-32	1933-35	1936-38	1909-13	1924-28	1928-32	1933-35	1936-38
	Thousands of quintals					%				
Spain	350	507	556	550	n.a.	6,6	7,0	6,3	6,0	n.a.
Italy	3.756	3.922	4.704	3.861	2.915	70,9	54,1	53,5	42,1	36,6
Europe	4.107	4.488	5.328	4.532	3.053	77,5	61,9	60,6	49,4	38,3
United States	925	2.292	2.503	2.968	3.009	17,5	31,6	28,5	32,3	37,8
America	1.194	2.567	3.022	3.253	3.305	22,5	35,4	34,4	35,4	41,5
Asia	n.a.	4	241	245	264	n.a.	0,1	2,7	2,7	3,3
Egypt	n.a.	n.a.	n.a.	955	1.199	n.a.	n.a.	n.a.	10,4	15,1
Africa	n.a.	78	77	1.011	1.236	n.a.	1,1	0,9	11,0	15,5
Oceania	n.a.	113	117	141	109	n.a.	1,6	1,3	1,5	1,4
World Total	5.300	7.250	8.785	9.182	7.966	100,0	100,0	100,0	100,0	100,0

Source: International Institute of Agriculture, *Annuaire*.

APPENDIX. TABLE G. TABLE GRAPES, WORLD PRODUCTION, 1929-1932		
Thousands of quintals		%
Spain	1.745	10,4
France	1.204	7,2
Greece	471	2,8
Hungary	333	2,0
Italy	1.988	11,9
Europe	6.483	38,7
USA	5.207	31,1
America	5.675	33,8
Cyprus	416	2,5
Japan	545	3,2
Syria/Lebanon	1.336	8,0
Turkey	1.106	6,6
Asia	3.551	21,2
French Morocco	485	2,9
Africa	923	5,5
Australia	137	0,8
World	16.768	100,0

Source: International Institute of Agriculture, *Annuaire* .

APPENDIX. TABLE H. RAISINS, WORLD PRODUCTION, 1929-1932		
Thousands of quintals		%
Spain	673	9,2
Greece	1.500	20,5
Europe	2.215	30,3
USA	1.901	26,0
America	1.901	26,0
Persia	408	5,6
Turkey	2.040	27,9
Asia	2.496	34,2
Africa	44	0,6
Australia	651	8,9
World Total	7.307	100,0

Source: International Institute of Agriculture, *Annuaire* .

	Nuts	Dried fruits	Fresh fruits	Vegetables	Total	Index
	APPENDIX. TABLE I. SPANISH EXPORTS OF MEDITERRANEAN HORTICULTURAL PRODUCTS. VOLUME INDEX (1910 prices in pesetas), 1850-1935					

	Nuts	Dried fruits	Fresh fruits	Vegetables	Total	Index
1850	7.298.789	8.796.401	1.822.161	679.062	18.596.413	11
1851	6.690.712	12.604.075	2.491.584	815.293	22.601.664	14
1852	8.746.244	8.488.578	1.737.067	486.734	19.458.623	12
1853	4.742.195	9.810.963	2.278.346	833.659	17.665.164	11
1854	7.914.307	8.909.734	1.975.965	696.168	19.496.175	12
1855	7.096.525	7.925.318	2.408.809	892.770	18.323.423	11
1856	8.879.458	9.285.690	3.524.323	826.935	22.516.406	14
1857	7.252.522	9.457.548	2.292.285	1.077.411	20.079.766	12
1858	9.152.370	12.713.341	2.770.316	1.158.824	25.794.851	16
1859	10.491.699	12.734.789	3.080.306	883.048	27.189.842	17
1860	5.288.563	13.806.656	4.886.981	861.274	24.843.475	15
1861	7.638.222	9.932.190	3.061.625	2.003.873	22.635.909	14
1862	7.008.336	11.075.195	4.867.072	2.186.291	25.136.894	15
1863	7.226.501	11.839.565	3.819.417	593.739	23.479.223	14
1864	7.564.512	10.855.435	3.456.682	676.656	22.553.285	14
1865	8.821.875	14.312.770	3.002.241	779.774	26.916.661	16
1866	9.282.352	14.093.010	3.229.345	559.504	27.164.212	17
1867	10.334.377	13.059.642	4.534.415	557.452	28.485.886	17
1868	12.969.488	14.884.324	4.625.666	742.804	33.222.282	20
1869	10.766.108	11.986.776	5.256.354	889.390	28.898.628	18
1870	8.494.562	20.248.325	5.037.102	1.119.173	34.899.162	21
1871	13.584.460	18.484.561	7.593.925	2.028.467	41.691.414	25
1872	13.055.744	25.369.145	8.129.640	1.475.958	48.030.487	29
1873	16.461.358	19.641.642	8.457.941	1.453.489	46.014.430	28
1874	8.592.055	22.176.057	8.676.131	1.603.527	41.047.770	25
1875	12.788.398	18.375.553	6.456.015	1.806.810	39.426.777	24
1876	9.810.399	24.131.373	8.965.766	1.920.095	44.827.633	27
1877	13.021.583	21.421.782	10.930.414	2.030.123	47.403.902	29
1878	9.246.137	24.343.712	13.234.006	1.802.143	48.625.999	30
1879	13.914.597	18.890.696	13.066.127	1.749.425	47.620.845	29
1880	12.964.448	17.853.851	15.036.497	2.660.016	48.514.813	30
1881	11.502.446	21.504.775	13.048.613	2.205.781	48.261.616	29
1882	12.956.429	24.192.695	23.893.960	2.184.522	63.227.607	39
1883	11.370.536	20.580.659	20.795.143	2.488.987	55.235.325	34
1884	9.926.169	16.947.861	19.907.661	2.217.550	48.999.241	30
1885	10.939.960	18.769.381	16.011.270	2.616.183	48.336.793	29
1886	7.997.411	21.773.267	20.657.837	3.089.475	53.517.990	33
1887	13.683.380	22.817.876	21.145.442	3.051.904	60.698.602	37
1888	12.515.904	17.643.250	23.201.090	3.466.658	56.826.902	35
1889	13.928.024	16.293.244	23.233.114	4.490.374	57.944.756	35
1890	10.405.092	29.011.441	27.733.524	5.266.033	72.416.090	44
1891	17.583.662	16.739.514	20.724.099	5.511.952	60.559.227	37
1892	16.618.637	21.457.746	21.956.998	4.657.710	64.691.091	39
1893	18.223.454	15.807.293	26.918.998	8.189.013	69.138.757	42
1894	15.448.765	18.831.588	33.463.468	7.714.382	75.458.204	46
1895	19.105.316	16.489.991	42.529.945	8.459.139	86.584.391	53
1896	20.876.991	17.299.744	39.422.278	9.462.441	87.061.455	53
1897	24.378.589	18.207.045	47.564.876	8.631.683	98.782.194	60
1898	23.668.702	20.300.599	44.320.053	9.702.692	97.992.046	60
1899	23.057.990	20.726.734	56.522.359	11.783.611	112.090.694	68
1900	14.996.389	21.030.252	51.145.439	11.557.728	98.729.808	60
1901	19.263.513	18.403.672	55.346.402	13.260.172	106.273.759	65
1902	24.553.705	16.805.709	66.260.968	12.698.686	120.319.068	73
1903	30.283.637	17.959.466	75.929.973	16.243.823	140.416.899	86

1904	34.042.293	15.503.117	76.100.705	17.494.143	143.140.258	87
1905	26.952.314	17.210.674	62.594.543	15.473.395	122.230.926	75
1906	24.217.256	12.058.641	70.143.676	15.663.658	122.083.230	74
1907	28.381.133	15.656.446	88.477.440	19.381.105	151.896.124	93
1908	25.553.792	15.172.416	79.022.328	18.623.162	138.371.699	84
1909	36.585.485	16.861.730	80.895.854	19.049.614	153.392.682	94
1910	32.029.263	16.243.433	92.442.763	23.282.938	163.998.397	100
1911	36.821.168	17.107.381	83.646.594	26.376.887	163.952.029	100
1912	29.647.217	10.742.235	100.484.254	25.573.183	166.446.889	101
1913	35.434.336	11.923.156	102.492.785	26.081.625	175.931.902	107
1914	21.968.258	9.006.843	84.562.658	23.536.974	139.074.733	85
1915	31.433.364	9.977.879	73.668.353	23.911.338	138.990.935	85
1916	24.551.481	12.908.681	84.256.157	25.656.612	147.372.931	90
1917	23.094.549	9.536.514	49.978.223	26.252.995	108.862.281	66
1918	34.362.671	13.180.455	45.931.413	17.636.972	111.111.511	68
1919	51.522.065	19.840.782	71.226.699	21.792.592	164.382.137	100
1920	30.173.480	17.967.760	61.243.874	23.729.189	133.114.303	81
1921	32.881.292	12.254.486	79.837.214	25.474.266	150.447.258	92
1922	31.844.478	10.311.849	83.633.316	21.031.095	146.820.737	90
1923	38.092.442	8.054.757	91.419.872	24.688.076	162.255.147	99
1924	50.510.856	11.139.697	123.113.792	29.767.104	214.531.449	131
1925	40.192.854	11.008.571	126.848.735	28.726.371	206.776.530	126
1926	39.251.308	11.613.342	127.151.276	29.126.361	207.142.287	126
1927	44.994.503	11.177.178	116.289.182	26.972.380	199.433.244	122
1928	51.827.012	8.715.827	158.339.978	29.226.802	248.109.620	151
1929	55.262.575	9.031.342	156.043.303	30.990.171	251.327.392	153
1930	42.508.991	9.355.986	190.003.153	30.051.608	271.919.739	166
1931	53.639.127	9.262.146	144.931.388	23.851.848	231.684.509	141
1932	45.730.004	8.648.869	154.577.477	28.595.258	237.551.608	145
1933	48.742.639	6.141.999	157.299.198	24.377.702	236.561.539	144
1934	60.427.585	7.210.499	153.124.795	25.225.251	245.988.130	150
1935	72.535.572	6.990.307	119.413.686	21.585.672	220.525.237	134

Source: Estadística del Comercio Exterior de España.

	Nuts	Dried fruits	Fresh fruits	Vegetables	Total
	APPENDIX. TABLE J. SPANISH EXPORTS OF MEDITERRANEAN HORTICULTURAL PRODUCTS (current prices in pesetas), 1850-1935				
1.850	4.090.538	8.315.284	1.633.994	654.833	14.694.650
1.851	2.670.413	10.089.346	2.175.306	656.838	15.591.904
1.852	4.050.947	5.590.544	1.195.343	355.999	11.192.834
1.853	2.555.771	11.139.389	1.753.103	855.067	16.303.330
1.854	2.305.167	5.760.668	954.024	345.199	9.365.059
1.855	4.661.915	10.743.995	2.340.698	750.975	18.497.584
1.856	7.736.139	18.322.365	6.842.240	1.055.739	33.956.482
1.857	5.753.752	17.711.821	3.742.438	1.222.682	28.430.694
1.858	5.415.028	16.853.567	3.383.945	1.022.893	26.675.434
1.859	7.801.902	19.374.905	4.702.854	1.155.427	33.035.087
1.860	3.940.658	21.570.824	6.437.445	959.741	32.908.668
1.861	7.088.537	15.026.916	4.992.595	2.290.726	29.398.774
1.862	6.429.961	15.472.121	10.942.809	2.925.204	35.770.094
1.863	7.681.650	17.891.629	8.294.406	770.722	34.638.408
1.864	6.599.700	15.731.931	6.555.483	908.943	29.796.057
1.865	6.306.152	12.858.203	5.270.856	1.066.729	25.501.940
1.866	8.468.007	11.922.219	6.021.854	672.409	27.084.488
1.867	12.233.856	15.005.913	12.669.268	879.657	40.788.694
1.868	14.416.995	17.322.231	10.368.328	1.132.051	43.239.605
1.869	13.116.446	18.541.006	14.202.742	1.755.191	47.615.386
1.870	6.031.285	23.138.614	4.877.836	792.695	34.840.429
1.871	12.033.568	24.830.589	9.765.803	1.752.097	48.382.056
1.872	9.776.680	35.562.559	10.504.154	1.164.397	57.007.789
1.873	12.303.780	24.853.806	10.995.870	1.257.873	49.411.329
1.874	7.076.752	30.798.678	13.481.692	1.526.084	52.883.206
1.875	10.945.334	27.842.654	11.114.443	1.758.330	51.660.760
1.876	6.855.997	31.184.867	12.994.739	1.571.231	52.606.834
1.877	10.184.295	30.069.684	16.578.739	1.902.965	58.735.683
1.878	7.480.372	32.167.097	17.543.755	1.879.148	59.070.373
1.879	10.429.135	23.054.978	16.896.104	1.745.664	52.125.880
1.880	10.439.899	24.085.919	20.652.980	2.686.470	57.865.268
1.881	9.442.045	28.861.855	17.129.476	2.268.481	57.701.857
1.882	9.455.993	28.662.562	37.252.535	1.989.575	77.360.665
1.883	10.759.339	25.982.485	36.149.485	3.655.889	76.547.198
1.884	8.475.020	19.769.198	35.478.092	3.626.557	67.348.866
1.885	8.940.621	22.469.272	23.849.429	3.940.470	59.199.792
1.886	6.787.557	26.878.803	31.715.843	4.792.261	70.174.464
1.887	10.724.292	24.171.084	29.782.014	4.539.681	69.217.071
1.888	10.261.725	19.034.045	33.829.653	5.129.678	68.255.100
1.889	11.351.408	17.268.918	30.998.586	5.955.921	65.574.834
1.890	8.717.990	27.625.115	34.095.113	6.136.795	76.575.012
1.891	16.106.062	15.926.154	26.758.356	6.601.732	65.392.303
1.892	19.132.630	25.968.278	36.616.550	6.727.315	88.444.773
1.893	20.395.176	22.101.847	37.610.091	11.717.660	91.824.774
1.894	17.130.623	27.694.402	57.467.118	11.668.950	113.961.093
1.895	18.539.812	18.838.874	67.890.305	10.332.704	115.601.696
1.896	19.806.099	19.220.579	66.978.838	11.251.448	117.256.965
1.897	23.635.115	20.924.584	90.919.631	10.731.661	146.210.990
1.898	28.936.471	26.610.004	56.573.353	13.614.879	125.734.706
1.899	25.047.379	23.847.521	82.914.204	12.795.005	144.604.109
1.900	20.922.760	36.122.090	86.189.176	14.542.848	157.776.873

1.901	27.726.198	31.616.172	93.705.329	16.773.145	169.820.844
1.902	32.895.053	26.236.673	103.440.211	14.659.420	177.231.357
1.903	38.200.335	28.492.688	110.600.245	17.632.141	194.925.409
1.904	44.616.874	25.544.591	115.750.509	19.740.717	205.652.691
1.905	36.781.001	29.620.393	101.423.618	18.427.252	186.252.264
1.906	34.504.021	21.449.273	106.807.083	22.141.206	184.901.583
1.907	41.526.860	28.815.260	134.408.777	27.188.087	231.938.984
1.908	30.824.638	22.998.054	92.755.673	26.340.010	172.918.375
1.909	40.842.366	18.823.667	90.308.442	21.168.749	171.143.223
1.910	37.372.934	18.953.441	107.865.651	27.167.397	191.359.424
1.911	46.677.593	21.686.748	106.037.422	33.437.802	207.839.565
1.912	39.045.852	14.147.692	132.339.345	33.734.189	219.267.078
1.913	46.034.983	15.490.125	133.162.657	33.943.501	228.631.267
1.914	21.973.247	9.008.888	84.581.869	23.582.077	139.146.081
1.915	37.698.047	11.966.476	88.350.490	28.720.266	166.735.279
1.916	26.991.301	14.191.492	92.629.509	28.278.245	162.090.547
1.917	43.968.101	18.155.808	95.149.901	49.969.347	207.243.157
1.918	78.281.504	30.026.357	104.585.653	40.173.058	253.066.572
1.919	115.135.522	44.337.875	159.169.156	48.700.921	367.343.475
1.920	50.475.505	30.117.137	102.655.546	38.493.609	221.741.796
1.921	73.667.598	43.830.914	199.105.995	89.333.208	405.937.715
1.922	56.270.356	29.826.550	190.213.245	64.284.363	340.594.515
1.923	87.085.515	25.453.689	208.091.431	75.938.132	396.568.767
1.924	128.345.954	37.475.750	304.042.268	100.146.193	570.010.165
1.925	125.160.490	26.302.013	382.393.894	86.594.719	620.451.115
1.926	117.645.778	27.021.437	383.419.050	88.455.643	616.541.908
1.927	111.140.144	22.030.352	269.491.586	58.849.203	461.511.285
1.928	127.823.150	18.038.600	384.770.824	69.149.091	599.781.665
1.929	124.311.254	26.253.568	417.011.133	83.482.644	651.058.598
1.930	111.168.826	32.848.637	636.669.087	100.197.457	880.884.008
1.931	155.524.970	37.103.850	594.398.935	87.224.404	874.252.159
1.932	100.292.960	22.587.215	513.186.536	79.562.286	715.628.997
1.933	92.912.013	17.946.187	449.190.979	60.089.817	620.138.995
1.934	109.046.787	18.018.060	402.526.106	66.210.668	595.801.620
1.935	123.740.046	15.823.361	303.040.363	47.732.522	490.336.293

Source: Estadística del Comercio Exterior de España.