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THE AGRICULTURAL AND FOOD TRADE IN THE FIRST GLOBALISATION: SPANISH TABLE WINE EXPORTS 1871 TO 1935 – A CASE STUDY

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1. Introduction

The international economy has, for several decades, undergone an intensive process of integration, which has offered developing countries opportunities to increase their exports and, consequently, stimulate their economic growth. Although since the middle of the twentieth century, the greatest opportunities have emerged in the export of manufactured goods, for some countries primary products still constitute a substantial part of their foreign trade and the currency gained through trade. It is well known, however, that the development of such exports faces very diverse difficulties, such as the inelastic income demand for agricultural products, the low participation of these goods in intra-industrial trade or the serious institutional obstacles which exist, derived from the existence of protectionist policies, especially in the more developed countries, which limit their the possibilities of in this direction (Serrano and Pinilla, forthcoming).

The first phase of globalisation, which occurred between the mid-nineteenth century and the First World War, allows us to analyse, albeit in a different historical context, the principal factors which determine the possibilities of trade growth in the long term.

The debate regarding the causes which determined the growth of trade in the first phase of globalisation has notable similarities to that which currently exists with regard to the second phase, although the historical circumstances are obviously different. There is widespread agreement that the increase in incomes has, obviously, been a fundamental cause of its growth (Irwin, 2002; Estevadeordal *et al*., 2003; Jacks and Pendakur, 2007). In addition, trade liberalization and exchange rate stability have been very important (Jacks, 2006; Estevadeordal *et al*., 2003; López-Cordova and Meissner, 2001). By contrast, the debate regarding the role of the reduction of transport costs is by no means closed; certain authors believe that this was essential to explain the growth of trade (O'Rourke and Williamson, 1999; Jacks et al., 2008), while others find no evidence on this point (Jacks and Pendakur, 2007). Similarly, different positions exist between those who consider that the stock of immigrants in a country stimulated its trade with their country of origin (Dunlevy and Hutchinson, 1999) and those who believe that the effects of this circumstance were neutral (Jacks, 2005). Belonging to an empire, and therefore lower transaction costs or more favourable trade policies, has also been considered to encourage trade growth in this period (Mitchener and Wedenmier, 2008).

Within this context, the present study concentrates on trade in agricultural products, a group of products which played a central role in this period, maintaining from 1870 onwards a fairly stable participation of approximately 50% of international exchanges (Aparicio et al., 2008). However, very few studies have focused specifically on the determinants which stimulated trade in this type of products, and even less so on those which played such a role in this historical context.

To this end, the present study concentrates on a specific case i.e. trade in Spanish table wine. Wine was one of the key exports produced by Spanish farmers in the mid-nineteenth century. Together with cereals (especially wheat) and oil, it was one of the three key products of Mediterranean agriculture, occupying a significant part of cultivated land and agricultural production.

In the analysis of this case, the literature initially analysed the success of exports and their subsequent collapse as the exclusive consequence of the exceptional demand which existed in France between 1875 and 1891, due to the harm caused by the phylloxera plague in its vineyards (Carnero, 1980). Subsequently, certain wider visions explained the success of exports to France in the general context of the unequal advances of Spain in other markets (Pan-Montojo, 1994), or in the consideration of table wine as a product with low barriers to entry and therefore highly vulnerable to the entry of new producers; moreover, it encountered difficulties in penetrating the markets of non-producing countries (Simpson, 1995).

In recent years, various studies have attempted to study in depth the above-mentioned research lines, broadening them or employing different approaches with the help of econometric models which made it possible to empirically verify the proposed hypotheses. Most notable is the consideration of the harm caused by the French tariff policy (Pinilla and Ayuda, 2002) and the difficulties in penetrating the markets of high-income countries (Ayuda, Aparicio and Pinilla, 1998; Pinilla and Ayuda, 2007 and 2008).

Given this background, the objective of the present study is to analyze the overall trajectory of table wine exports and provide convincing explanations of the pattern. Thus, we employ an approach that takes all of the possible explanatory factors into account, instead of adopting a narrower approach which focuses on a single principal factor. The methodology employed consists of using a gravity model to explain trade flows in Spanish table wine.

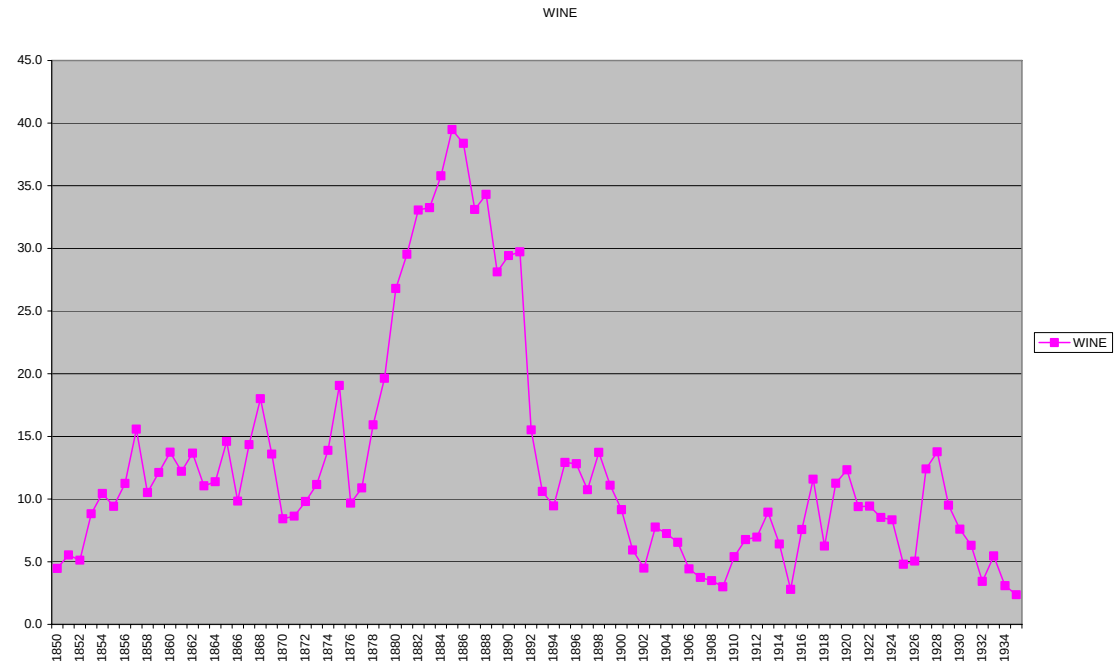
Our results highlight the key role of trade policies in the determination of export possibilities and the difficulties derived from the export of products which are characterised by the low or non-existent change in demand when income changes. These results may shed a little more light on the determinants of trade in the first phase of globalization.

Following this introduction, the next section briefly examines Spanish exports of table wine. Subsequently, the data used and the gravity model employed are explained. Next, an analysis is made of the results obtained from the econometric model. Finally, the article ends by providing some conclusions.

2. A stylized vision of the facts: the development of Spanish exports of table wine

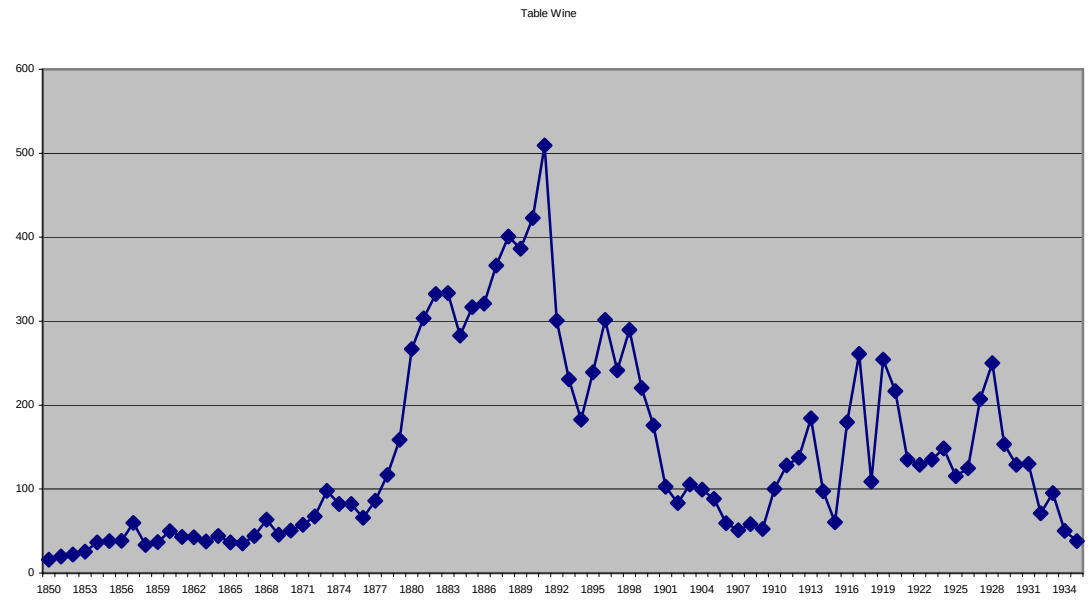
Table wine was an important part of Spanish trade, and exports reached extraordinarily high levels. This fact only underlines the importance of the product we analyze in this paper. As a consequence of the irregularity of export trends, the significance of table wine changed substantially over the period examined. Thus, in the mid-nineteenth century, it represented less than 10% of exported goods, but by 1890 this figure had increased to 40%. Subsequently, its importance fell to between 5 and 15% of total exports (figure 1).

Figure 1. *Spanish exports of table wine as a percentage of total Spanish exports, 1850-1935*



The increasing integration of international markets favoured an increasing orientation to external markets of table wine. This was not an exceptional case, but instead similar to that occurring with other agricultural products and food, trade in which expanded notably in this period. From approximately 1855 to 1877 exports increased significantly; in the latter year the sales volume was five times that of 1850 (figure 2). This initial export takeoff may be explained by the simultaneous success of Spanish wine in two very different markets: the French market, where as a result of the oidium which affected its vineyards turned to Spanish imports, to which it gave more favourable tariffs than previously, and the Latin American market, where two independent republics, Argentina and Uruguay, and one of the last Spanish colonies, Cuba, in which were concentrated the increasing exports received by the continent.

Figure 2. Exports of Spanish Table Wine (volume index, 1910=100)



From 1878 onwards growth was so spectacular that the period from that year until 1891 has been called the golden age of table wine exports or the boom years of grape and wine-growing. Thus, in 1891, the year in which the export of table wine reached its maximum historical volume, export figures were 32 times greater than those of 1850 or six times those of 1877. This was almost exclusively the result of the tremendous increase in exports to France, since the other important destinations of Spanish table wine experienced practically no increase. In the case of France, in 1886-90 the almost seven million hectolitres of table wine exported by Spain were in sharp contrast to the approximately three hundred thousand at the beginning of the 1870s. This boom in exports to France, whose vineyards were attacked by the phylloxera plague, was made possible by the improved tariff treatment which France granted to wine imports and the impressive effort made by Spanish producers to increase production through the expansion of the land area dedicated to vineyards.

From 1891 onwards the fortune of Spanish exports changed dramatically. In the 1890s these were reduced by almost half, from the onset of the twentieth century they continued to fall, to levels similar to those of the early 1870s, prior to the “golden years”. From the commencement of the First World War until the beginning of the Second World War, exports fluctuated dramatically, from minimum levels similar to the 1850s to maximum levels which almost equalled the figures of the boom period. As a

whole, the results for the period were not only highly irregular, but also were notably lower than those of the final quarter of the nineteenth century.

From the point of view of the principal markets for Spanish wine, in the decades between 1891 and 1935, France continued to be the principal destination, while the rest of continental Europe became a secondary (but important) destination and the American continent virtually disappeared as a significant market for Spanish wines. This change of cycle may be attributed to the tariff barriers which Spain's principal trade partners erected against its imports.

In the case of France, following the recovery of its vineyards, replanted with American vines which were immune to phylloxera, the level of imports diminished slightly but remained high. From 1920 onwards there was a dramatic increase in the levels at the end of the nineteenth century. As a whole, between 1890 and 1938 imports represented between 10% and 25% of national production. However the Spanish quota of imports fell from a maximum of over 80% at the end of the XIX century to oscillate between 1% and 26% (i.e. highly variable levels) in the first third of the XX century, oscillating between 1% and 26% (Pinilla and Ayuda, 2007:189). High import/export levels were maintained partly because the replanting involved extremely productive hybrids which nevertheless produced wines of low proof grading and colour, and therefore it was necessary to mix them with wines of high alcoholic strength for them to be accepted by the wine drinking public. These changes must be viewed in the context of the development (from 1900 onwards) of mass wine production in Algeria; developed by French colonialists, Algerian wine clearly replaced Spanish wine in many cases; high tariffs were imposed upon foreign wine and the entry of Algerian wine (exempt from duty) was favoured, especially after 1884, when Algeria formed a customs union with metropolitan France[1].

Spanish wine was extremely competitive in the low-quality and medium-low quality sectors of demand; this, facilitated its expansion in certain non-traditional markets, such as those of the European continent, although low wine consumption in those markets placed enormous limits upon its possibilities for growth (Pinilla and Ayuda, 2002 and 2008). Wine cannot be considered to be a mass consumption product in those countries in this period.

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[1] See Isnard (1954) with regard to Algerian wine production. For French trade policy favouring it and its impact upon imports, see Pinilla and Ayuda (2002). There is abundant literature upon the problems of the wine-producing sector in France in the first third of the XX century; see, for example, Pech (1975), Lachiver (1988) and Simpson (2005).

In Argentina, table wine constituted 80% of imports from Spain in 1880-82, represented in 1927-29 less than 1% in 1927-29. This drastic contraction is explained by the extreme increase in tariffs. An *ad valorem* protection of 25% was raised to 40% in 1876. The termination in 1885 of the railway line which linked the principal production zone, Mendoza, to the Buenos Aires market, once more raised tariffs; between 1890 and 1930 *ad valorem* duties normally exceeded 80%[2] (Fernández, 2004: 107-108). Consequently, production increased by 850% between 1895 and 1925, while imports disappeared to all intents and purposes [3].

In Uruguay as well, where wine imports met an overwhelming part of demand, the reinforcement of protection in 1903 strongly stimulated the national industry Wine production increased from under 35,000 hectolitres to almost 500,000 in 1930, while imports, which exceeded 300,000 hectolitres at the end of the XIX century, virtually vanished (Baptista, 2007: 120-126).

3. Data and model

In order to determine which factors determined Spanish exports of table wine, we shall estimate a gravity equation, using data for Spanish table wine exports to its principal trade partners between 1871 and 1935, constant 1910 prices are employed to formulate a series which reflects the evolution in volume of such exports. The sample includes exports to 19 countries[4], whose trade flows were highly representative of Spanish table wine exports. Normally, the exports in our sample exceeded 70% of those performed, with the exception of six years in the period 1871-76, in which this figure was 50% and 70%. The database, accordingly, consists of a "balanced data panel", comprising exports to 19 destination countries, multiplied by 63 years, giving a total of 1,197 observations[5].

The specification of the gravity equation employed in this paper largely follows the studies of Feenstra *et al.* (1998), Bergstrand (1985,1989) and Anderson and van Wincoop, (2003). These studies provide a detailed description of their theoretical bases and thus the

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[2] Of the 20 principal products exported by Spain to Argentina only bottled cider enjoyed similar protection. All other products paid considerably lower *ad valorem* duties (Fernández, 2004: 138).

[3] The decline of Spanish and Italian exports to Argentina is quite similar, at almost equivalent levels in 1890 until their virtual extinction prior to the Second World War.

4 These were France, Germany, Italy, Great Britain, the United States, Switzerland, Argentina, Canada, Japan, Austria, Belgium, Brazil, Denmark, Finland, the Netherlands, Norway, Portugal, Sweden and Uruguay.

[5] For the years 1923 and 1924 export flows disaggregated by country do not exist.

present paper merely provides a simple description of the variables and result expected. Its functional form, applying logarithms, is:

$$ln\, X_{sjt} = \beta_1 + \beta_2\, ln(Y_{st}) + \beta_3\, ln(Y_{jt}) + \beta_4\, ln(Ypcp_{st}) + \beta_5\, ln(Ypcp_{jt}) + \\ + \beta_6\, lnDist_{sj} + \beta_7\, Lans_{sj} + \beta_8\, Barrier_{sj} + \varepsilon_t \qquad (1)$$

Where:

$\boldsymbol{X_{sj}}$ represents Spanish table wine export flows to 19 countries, by volume, from Spain to country j

$\boldsymbol{Y_s}$ $\boldsymbol{Y_j}$ is the real GDP of both Spain and the importing country, in 1990 US dollars

$\boldsymbol{Ypcp_s}$ $\boldsymbol{Ypcp_j}$ is the GDP per capita of both Spain and the importing country, in 1990 US dollars

$\boldsymbol{Dist_{sj}}$ is the distance between the capital of Spain and those of the importing countries

$\boldsymbol{Lang_{sj}}$ is a dummy variable which takes the value of 1 if the countries have a common language and 0 otherwise

$\boldsymbol{Barrier_{sj}}$ is a dummy variable which takes into account the changes in the commercial policies of the importing countries (France, USA, Argentina, Uruguay).

The separate interpretation of the variables ($\boldsymbol{Y_s}$ $\boldsymbol{Y_j}$) allows us to observe the export potential of a country, which depends on its market size, as measured by GDP. Foreign demand for these products will depend on the expansion of the size of the external market. As Feenstra *et al*. (1998) and Fidrmur (2004) show, trade in table wine forms part of a trade pattern of homogeneous products. This theoretical basis is coherent with trade models of national product differentiation or reciprocal dumping[6]. It is logical, therefore, that the coefficient of the market size of the importing country is greater than that of the exporting country.

Moreover, following Bergstrand (1989), the equation includes national GDP per capita ($\boldsymbol{Ycpc_s}$,$\boldsymbol{Ycpc_j}$) which allows us to characterize trade in different types of goods. Bergstrand argues that the interpretation of the coefficient of the per capita income of the exporting country may be taken to be an approximation of its endowment factors,. The

[6] In the period studied a considerable part of Spanish table wine exports was wine in bulk, used largely to mix with other wines which required greater alcoholic strength and colour in France. Thus, to a considerable degree, it was a largely undifferentiated raw material.

coefficient is positive in the case of capital-intensive goods and negative for labour-intensive goods. The coefficient of per capita income of the importing country is useful to characterize the type of good, and will display a positive sign for goods that are 'luxury' goods and a negative sign for basic 'necessities'.

As is common in gravity models, the geographical distance among countries ($\boldsymbol{Dist_{sj}}$) is taken as an approximation of transport costs and is generally presented as an obstacle to trade. Thus, a negative sign is to be expected.

The equation also includes a variable, $\boldsymbol{Lang_{sj}}$, which represents cultural proximity (such as the existence of cultural or historical ties between trade partners). Presumably, its sign will be positive, as a result of immigrants' preference for goods produced in their home countries. Thus, a market for such goods is created when these exist in sufficient numbers, when the market is well understood and, lastly, when there exist 'ethnic networks' among immigrants and their home countries (Dunlevy and Hutchinson, 1999). In the present case, it is a question of taking into account those countries which have either been Spanish colonies or, in addition, are receiving significant numbers of immigrants from the country in question[7].

With regard to the institutional context, many studies have refined/modified/adjusted the specification of the gravity equation, to take into account the factors which may limit or bottleneck trade. Somewhat surprisingly, few pieces of research have introduced trade policies into the gravity equations. Their inclusion in the model is difficult, owing to scarce or non-available data. Nevertheless, many studies have introduced dummy variables to try and resolve this question. We have introduced four institutional-type dummy variables, to measure the effect of the implementation of trade policies which could potentially have harmed Spanish exports.

Firstly, we included a dummy variable which takes the value of 0 for the set of the period for France and the value of 1 between 1878 and 1891, when the Franco-Spanish treaties provided good access to Spanish exports. The sign of the coefficient will presumably be positive, since trade liberalization from 1878-1891 should have stimulated imports. Furthermore, we have included a dummy variable (FRA92-98) for France, in case the authorisation of the French government to create special customs warehouses

[7] The two countries with this characteristic in our sample were Argentina and Uruguay. Spanish exports to Argentina were heavily concentrated in "Food and drinks', which represented a maximum of 96% of the total exports to this country in 1880-82 and a minimum of 63.6% in 1933-35 (Fernández, 2004, p.84).

which were given permission to import Spanish wine free of duties, to mix it with French wine and subsequently re-export it, mitigated the fall in exports from 1892 until 1898.

To estimate the impact of the trade policies of new producer countries in the New World, interested in increasing their national production, we have included two dummy variables: one for Argentina and another for Uruguay. In the case of Argentina the variable takes the value of 0 between 1871 and 1889 and the value of 1 between 1890 and 1935, when this country established a strict tariff system with regard to imports. In the case of Uruguay the dummy variable takes the value of 0 between 1871 and 1902 and the value of 1 between 1903 and 1935, when a policy with similar objectives was adopted. In both cases coefficient is expected to be negative, as such policies, in all logic, reduced imports.

Furthermore, to observe the effect of the North American effect of Prohibition, we introduced a dummy variable which takes the value of 1 between 1920 and 1933 i.e. those years in which Prohibition was in effect. Although in this case the objective of this measure was not to stimulate national production, but rather to prevent the consumption of alcoholic drinks, it may have had an impact upon Spanish exports. However the protectionist measures which had been introduced since the end of the XIX century had already converted it into an insignificant market for them. In this case, we also expect a negative coefficient for this variable.

Lastly, in order to isolate the effect of the First World War with regard to the behaviour of the remaining variables of the model, we introduced a dummy variable which takes the value of 1 between 1914 and 1918 and 0 for the remaining years. Obviously, we expect a negative coefficient.

4. Estimation and results

The panel data estimation technique was employed, which permitted both the variation between the observation units and the time variations to be taken into consideration. Three types of panel data estimation are employed: firstly, the estimation of ordinary least squares (OLS) with the pooled panel; the second and third take into account the time variation, via the election of the random effects model (REM) and the fixed effects model (FEM), respectively, in the model.

To determine which of the three models is the most efficient, we firstly employed the LM Breech-Pagan test for random effects, to permit us to choose between the OLS

estimation and the estimation with random effects. Subsequently, it was concluded that the random effects are important, and thus it is preferable to use this estimation rather than the pooled panel; the results are included in Column 2 of Table 1.

Similarly, to demonstrate that the fixed effects estimation is a more appropriate method than that of OLS, we performed the F-test (Greene, 2000) regarding the significance of fixed effects. This test (see Column 3, Table 1) indicates that the FEM estimation is more appropriate than the OLS estimation. Moreover, the Hausman test showed that the estimators of random and fixed effects have significant differences and that the random effects model provides a better explanation of the sources of variation and, thus, is more appropriate than the fixed effects model.

It is important to emphasise at this point, that despite having modelled the time and spatial heterogeneity, our model, according to Wald's test (Green, 2000), displays problems of heteroskedascity and, according to the Wooldridge test (Wooldridge, 2001), problems of autocorrelation (see the final rows of Column 2 of Table 1). Lastly, the Breusch-Pagan test of contemporary correlation, heteroskedascity and autocorrelation confirms the need to correct this problem. The above-mentioned problems of contemporary correlation, heteroskedascity and autocorrelation may be solved jointly and were resolved by the estimation of Panel-Corrected Standard Errors (PCSE) (Column 4, Table 1).

The correct functioning estimation of the gravity equation was checked; all the variables displayed the expected sign and the relevant variables are statistically significant. In general, and as predicted, countries with large market size, geographically proximate, with a shared language and a trade policy open to the entry of this product were the principal destination of the exports of Spanish table wine.

In our view, the principal result is that all the dummy variables used to assess to what extent Spanish exports were affected by the trade policies of various important trade partners are significant. They display the predicted signs and high coefficients (see $\boldsymbol{FRA_{77\text{-}1}}$, $\boldsymbol{USA_{20\text{-}33}}$, $\boldsymbol{ARG_{90\text{-}35}}$, $\boldsymbol{URU_{02\text{-}35}}$ in Column 4 of Table 1).

Table 1

Results of the gravity equation of Spanish trade in table wine

	OLS **(1)**	**REM** **(2)**	**FEM** **(3)**	**PCSE** **(4)**
lnY_s	0.725 (0.824)	-1.660 (0.523)	0.458 (0.865)	-0.084 (0.979)
lnY_j	1.633*** (0.000)	-0.237 (0.587)	-2.017*** (0.001)	1.593*** (0.000)
$lnYpcp_s$	-2.221 (0.679)	-0.495 (0.901)	-2.879 (0.474)	-0.460 (0.906)
$lnYpcp_j$	-0.073 (0.768)	4.999*** (0.000)	7.400*** (0.000)	-0.949 (0.126)
$lnDist_{sj}$	-1.981*** (0.000)	-0.850 (0.373)	drop	-2.100*** (0.000)
$Lang_{sj}$	11.846*** (0.000)	6.366** (0.030)	drop	9.723*** (0.000)
$FRA_{77\text{-}91}$	4.550*** (0.000)	2.587*** (0.001)	2.966*** (0.000)	1.536*** (0.009)
$FRA_{92\text{-}98}$	4.017*** (0.002)	1.710* (0.078)	1.918** (0.047)	0.846 (0.153)
$ARG_{90\text{-}35}$	-4.801*** (0.000)	-4.244*** (0.000)	-3.284*** (0.000)	-1.871*** (0.000)
$URU_{02\text{-}35}$	-3.367*** (0.000)	-2.375*** (0.000)	-1.399** (0.039)	-0.982* (0.061)
$USA_{20\text{-}33}$	-4.753*** (0.000)	-4.102*** (0.000)	-3.802*** (0.000)	-1.926*** (0.002)
WWI	-0.907** (0.039)	-0.918*** (0.003)	-0.872*** (0.005)	-1.674*** (0.000)
Constant	-16.463 (0.758)	42.780 (0.304)	29.285 (0.482)	-1.139 (0.983)
Number of obs	1.197	1.197	1.197	1.197
R-squared	0.420	0.158	0.130	0.141
Root MSE	3.337	---	---	---
Prob>chi2	---	0.000	---	0.000
LM Breush-Pagan	---	0.000	0.000	---
Prob>F	---	---	0.000	---
F test	---	---	0.000	---
Hausman test	---	0.092	---	---
Wooldridge test	---	0.000	---	---
Wald test	---	0.000	---	---

Note: (OLS) estimation of ordinary least squares, with the pooled panel. (REM) is the estimation of panel data with random effects and the estimation of panel data with fixed effects is (FEM). The Prais-Winsten PCSE Estimation has the standard errors corrected. All the variables are in logarithms, except for binary variables. ***, ** and * denote 1, 5 and 10 %, respectively, of the level of statistical significance.

This result coincides with that obtained by Pinilla and Ayuda (2002). They estimated that between 1874 and 1934 in France, each 1% increase in the customs tariff caused a long-term decrease of 1.8% in the quota of foreign wine (as Algerian wine was not classified as "foreign") in the French market. Thus, there occurred a replacement of Spanish imports by imports from Algeria which in 1925-29, reached a volume comparable to that of the Spanish boom years in 1885-89, and even exceeded it in subsequent years.

Furthermore, the dummy variables introduced to capture whether tariff increases introduced by Argentina and Uruguay were notable, significant and as predicted. This demonstrates the importance of the measures aimed at protecting the emerging wine-growing activity in these countries, which changed from being significant wine importers to self-sufficient.

As was also expected, the dummy variable introduced to check the effects of Prohibition in the USA had the predicted negative sign and is statistically significant. Only the variable introduced to test whether the temporary authorization to introduce into France during part of the 1890s shipments of Spanish wine free of duties is not statistically significant; however, it displays the expected sign.

The per capita income variable of the destination country is not significant (see $\boldsymbol{Ypcp_j}$. in Column 4 of Table 1). That is to say, the increase in per capita income in the countries to which Spanish wine was destined did not, in general, lead to a rise in wine imports. This result fully coincides with those obtained in other studies which demonstrated the low diffusion of wine consumption in that period, outside the Mediterranean countries (Pinilla and Ayuda, 2007).

Moreover, econometric analysis of the relationship in Great Britain between wine consumption and rising incomes demonstrates that in the period 1870-1935 a long-term relationship did not exist between the two variables; thus the large increase in per capita income did not result in a parallel increase in wine consumption (Aparicio, Ayuda and Pinilla, 2002: 686-688)[8].

Even in the case of France, where this relationship has been confirmed, demand elasticity between 1860 and 1938, with regard to long-term income was low, since it had

[8] Simpson (2004) emphasises the problems for trade expansion related to the difficulties consumers experienced in understanding their different qualities.

a coefficient of 0.8 (Ayuda, Aparicio and Pinilla, 1998: 7). In conclusion, both Spanish and other exporters were required to tackle a market in the developed countries in which wine did not become a product enjoyed by the masses until several decades after the Second World War (principally for cultural reasons). Consequently, rising incomes in developed countries did not stimulate an increase in wine exports.

This result is related to the dummy $\boldsymbol{Lang_{sj}}$, which determines the effect of cultural proximity as a result of a common language. In this case the variable is both significant and positive. This may mean that ex-Spanish colonies or, we believe is more important, with significant contingents of Spanish immigrants (e.g. Argentina and Uruguay), tended to import more Spanish wine. Our result confirms that the strong growth of wine consumption in Argentina was linked to the arrival of thousands of Spanish or Italian immigrants from 1880 onwards (Mateu and Stein, forthcoming)[9].

As is common in any exercise using the gravity equation, the positive sign of the coefficient and the significance of income ($\boldsymbol{Y_j}$), implies that the growth of the size of the foreign market was also a key factor in stimulating the increase in Spanish exports throughout that period. As expected, this coefficient exceeds that of the size of the exporting country $\boldsymbol{Y_s}$ (Spain), and this trade pattern may be included in a theoretical model of national product differentiation.

Finally, and as foreseen, the First World War seriously harmed Spanish table wine exports; this is clear from the high coefficient obtained and its statistical significance. This result is both unsurprising and coincides with the recent study by Glick and Taylor (2005), which emphasises the significant impact that the two World Wars had upon trade, between both warring and non-warring nations.

5. Sensitivity analysis of period samples

To analyse in greater depth the factors determining Spanish exports of table wine, we shall estimate gravity models for two sub-periods, using the same method and the same specification employed in the previous section. The first of these is 1871-1891, when the boom in Spanish table wine exports occurred; the second is 1892-1935, in which a dramatic fall occurred at first, followed by a tendency to fluctuate. This exercise

[9] Dunlevy and Hutchinson (1999) also found empirical evidence of the existence of a direct immigrant-import trade nexus for the United States in the period 1870-1910. However, for exactly the same period, Jacks (2005), also for the case of the United States, concludes that the effect was neutral and that it is impossible to empirically validate this impact of immigration upon trade with the country of origin of the immigrants.

has dual objectives: not only does it permit the comparison of the sensitivity of our results to sample variations, it also facilitates a deeper analysis of the factors which determine the irregular trajectory of Spanish table wine exports.

This section also uses the methodology employed above, concerning the functional form of the gravity equation, the sources and the selection process; we therefore do not consider it necessary to reiterate the detailed explanation of the process undertaken. As before, the estimation method selected was that of a panel with PCSE. Table 2 presents the results of the gravity equation for the above-mentioned trade flows. We conclude, firstly, that Spanish wine exports in both periods (see Columns 2 and 3) were principally destined to countries with large and expanding markets and nearby countries (both geographically and culturally). For both periods the coefficients of the variables *Yj*, $Lang_{sj}$, and $Dist_{sj}$ display a highly significant coefficient, the variations between the two periods were fewer than expected, especially concerning the effect of the geographical distance between markets, as an approximation of transport costs. As we stated in the introduction, this question is still open to debate.

Secondly, the key factor for the understanding of each period and explaining the trends in Spanish table wine is the trade policy of its principal partners. Between 1871 and 1891, the favourable Franco-Spanish treaty and the moderation protection practised by other important markets (the USA, Argentina and Uruguay) meant that export success was notable. Moreover, between 1892 and 1935, the imposition of high tariffs in Argentina, Uruguay and France, and Prohibition in the USA, caused a significant fall in Spanish wine exports. Consequently, we believe that the principal cause of the different evolution between periods is based on the changes in the trade policies of the countries, especially France, which were the principal markets for Spanish table wine.

Table 2

Results of the gravity equation for the Spanish table wine trade (by periods):

	1871-1935 **(1)**	**1871-1891** **(2)**	**1892-1935** **(3)**
lnY_s	-0.084 (0.979)	0.442 (0.931)	-0.287 (0.948)
lnY_j	1.593*** (0.000)	2.059*** (0.000)	1.460*** (0.000)
$lnYpcp_s$	-0.460 (0.906)	0.865 (0.873)	-2.360 (0.686)
$lnYpcp_j$	-0.949 (0.126)	-1.113* (0.050)	-0.526 (0.460)
$lnDist_{sj}$	-2.100*** (0.000)	-2.150*** (0.000)	-2.115*** (0.000)
$Lang_{sj}$	9.723*** (0.000)	13.321*** (0.000)	9.113** (0.000)
$FRA_{87\text{-}91}$	1.536*** (0.009)	2.587*** (0.001)	---
$FRA_{92\text{-}98}$	0.846 (0.153)	---	1.184 (0.145)
$ARG_{90\text{-}35}$	-1.871*** (0.000)	-0.943** (0.011)	-2.625*** (0.000)
$URU_{02\text{-}35}$	-0.982* (0.061)	---	-0.986 (0.113)
$USA_{20\text{-}33}$	-1.926*** (0.002)	---	-1.966*** (0.004)
WWI	-1.674*** (0.000)	---	-1.682*** (0.000)
Constant	-1.139 (0.983)	-18.586 (00.826)	6.096 (0.934)
Number of obs	1.197	399	798
R-squared	0.141	0.364	0.176
Prob>chi2	0.000	0.000	0.000

Note: Prais-Winsten Estimation with PCSE.
All the variables are in logarithms, except for binary variables. ***,** and * denote 1, 5 and 10% of the level of statistical significance, respectively.

4. Conclusions

The objective of this article has been to analyse the long-term determinants, between 1871 and 1935, of Spanish table wine exports, which became a key element in its foreign trade. We believe that this case study may be useful for the understanding of which variables explains the evolution of primary product exports for developing countries.

In general, the results of the gravity equation show that Spanish table wine was exported to countries with large growing markets that were close both culturally (especially countries with many Spanish immigrants) and geographically. Another key feature is the importance of the tariff barriers wine exports faced. The trade policies of countries such as France, Argentina, Uruguay and the United States seriously affected Spanish exports. Finally, and in line with the findings of other studies, the fact that wine consumption was largely limited to the Mediterranean countries was a significant factor. In general, rising per capita income in export markets did not produce overall increase in exports.

Perhaps the most important result of the model estimated is the fundamental role played by the trade policies of the countries which were the principal markets for Spanish wine. This result fits well within the existing literature upon the effect of trade liberalization during the two periods of globalization. If studies such as those by Estevadeordal *et al*. (2003) and Jacks (2005) for the first wave of globalization or Krugman (1995) and Baier and Bergstrand (2001), for the second wave, have emphasised the importance of trade policies aimed at facilitating trade expansion, our study has underlined the extreme vulnerability of these exports when faced with sudden changes in trade policies, intended to stimulate national (or colonial) production.

A second important result is the inelasticity of income demand with regard to agricultural products; this is generally seen as a serious obstacle to a greater dynamism of trade in such items. In our case, however, the problem is even greater when the object of trade is table wine, which during the first wave of globalization was only an item of mass consumption in the countries of the north shore of the Mediterranean ; this limited yet further growth in its trade. Only in those countries which received many Mediterranean/European immigrants (e.g. Argentina or Uruguay) was it possible to expand exports.

Lastly, and in line with various recent studies, for both the first globalization (Jacks and Pendakar, 2007) and the second (Hummels, 1999), our results show that throughout this period the wine trade benefited from a substantial reduction in transport costs.

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