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How to become a leader in an emerging new global market: The determinants of French wine exports, 1848-1938[1]

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Abstract

When studying the emergence of new global markets it is essential to consider how countries and companies compete to obtain advantageous positions. Our objective is to study how France obtained an initial leadership position in the new global wine market which it subsequently consolidated. We will also analyse the main determinants of its exporting success. In order to do this we have quantified its exports and examined its evolution and its principal export markets. We have also used a gravity model for both ordinary wine and high quality wine in order to establish the key variables that explain this evolution. The article highlights the great efforts made by the exporters to improve the quality of their products and increase their sales using modern marketing techniques. Our econometric results also show some significant differences between the determinants of exports for the two types of wine. However, the exports of both products suffered the strong impact of a series of major events, such as The First World War, the Russian Revolution, the Prohibition in the United States and the Great Depression. The case of wine shows that the collapse of the first globalisation was not the same for all types of product.

JEL classification: F14, N53, N54, N70, Q17

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I. Introduction

One of the fundamental elements of the first globalisation was the international integration of the goods markets and the rise in trade. This was due to the reduction in sea and land transport costs and the liberalisation of trade, mainly through the signing of bilateral trade agreements (Jacks, 2006; Jacks et al., 2011, Mohammed and Williamson, 2004). When new global markets emerge and trade increases, one of the fundamental aspects to study is how the countries and companies involved compete to obtain advantageous positions. Obviously, the initial conditions are not the same for all parties. The first globalisation was preceded by a long period during which the foundations for it were laid with the growth in the trade of some relevant products. However, due to the lack of integration we cannot talk about globalisation in the true sense of the word (O'Rourke and Williamson, 2002; Federico, 2012). The most dynamic players in international trade during the period preceding the first globalisation had certain advantages and they benefited from the strong growth that they experienced from the mid nineteenth century. Nevertheless, the first wave of globalisation gave rise to many opportunities, so we cannot assume that those who would become the leaders of the new integrating markets were previously determined. We know that Great Britain became the absolute leader in the trade of textiles thanks to its technological advantage, but its previous advantageous position in this market also favoured it. On the other hand, in the case of many agricultural products, the biggest winners were those countries or territories which, until the nineteenth century, were not particularly prominent in the trade of these products, such as the case of the new settler countries (Argentina, Australia, Canada, New Zealand and Uruguay). Until the beginning of the first globalisation, these countries were completely marginal in the international trade of agricultural products.

Therefore, it is crucial to analyse the intense competition that broke out in the new global markets to obtain leadership positions and to explain the causes that determined the success or failure of the different participants in these emerging markets.

Agricultural products represented a highly important part of international trade in the first globalisation, in fact, they accounted for approximately 40% of total trade until the First World War (Lewis, 1981; Aparicio et al., 2009). It is therefore essential to study this in order to understand the dynamics of economic integration of this period.

The international wine market has been analysed from several different perspectives (Pinilla and Ayuda, 2007; Ayuda, Aparicio and Pinilla, 1998; Pinilla and Ayuda, 2002; Pinilla and Serrano, 2008; Simpson, 2011; Anderson and Pinilla, 2018a). However, until now, there have been no studies that have specifically analysed the position within the global market of France, the most relevant country in terms of the trade of wine, from a quantitative point of view and with an econometric analysis of the determinants of its evolution.

Within this context, the objective of this article is to study in depth how France obtained an initial leadership position in this market, which it subsequently consolidated (and which it still maintains today). Furthermore, the principal determinants of its exporting success will also be analysed. To do this, using French foreign trade statistics, we will quantify its exports in terms of volume and value and we will analyse its evolution and the principal export markets. We will also use a gravity model to attempt to establish the key variables that explain this evolution. Our time frame begins at the onset of the first globalisation, in 1848, the first year for which data are available disaggregated in terms of quality and export destinations, and ends in 1938, just before the Second World War. Therefore, this study amply covers the first wave of globalisation, a period in which France's exporting success was consolidated and which also includes the turbulent period between the two world wars. Subsequently this globalisation collapsed and serious difficulties arose in the global wine market which came to a head in the 1930s and affected French sales which dropped considerably.

After this introduction, section 2 explains the integration process of the global wine market during the first globalisation wave. The article continues with a section that describes the evolution of French wine exports. Section 4 analyses the diverging trends of French exports of quality wines and ordinary wines. Section 5 assesses France's position in the global wine market. Subsequently, we will explain the econometric model with which we are going to work and the characteristics and source of the data used. Next we will present the results obtained. Finally, we will draw the main conclusions.

II. The integration of the global wine market

Although wine production began approximately 8,000 years ago on the lands and neighbouring regions of the current Republic of Georgia, it subsequently shifted west, particularly to the Mediterranean basin, until it was introduced in France by the Roman

invaders in around 600 B.C. (Unwin, 1991; Anderson and Pinilla, 2018b). Subsequently, due to climate and cultural reasons (particularly the Islamic expansion in the north of Africa and the Middle East from the eighteenth century), wine production and consumption only consolidated in the countries on the northern coasts of the Mediterranean. In the pre-industrial era, its international trade was quantitatively small, as the problems with conserving the product limited trade to short distances or to fortified wines, which, due to their higher alcohol content, withstood the longer journeys better. In the pre-industrial era, the three principal trade routes for European wine were in the Mediterranean, the Rhine valley communicating production in the south of the Germany with the north of the country and the Scandinavian countries and the route from western France, Portugal and Spain to the United Kingdom. This country was by far the largest importer of wine and over the centuries the composition and quantity of its imports depended not only on the changes in tastes of the British elite classes but also on the discriminatory tariffs applicable to wine from different countries and the excise duty on domestic sales ((Nye, 2007; Luddington, 2013 and 2018). Even so, the amount of wine marketed internationally was very modest. In the mid-nineteenth century, world trade in wine still did not reach 5% of production (Anderson and Pinilla, 2018c).

The emergence and formation of a global wine market occurred, therefore, mainly during the second half of the nineteenth century. From 1850, trade in wine grew significantly, reaching around 15% of world production, which had also increased significantly. An expanding production coupled with an even faster-growing trade coexisted with a consumption which, during the whole of the first globalisation, was limited mainly to the populations of the European Mediterranean area or the economic elite mainly, but not exclusively, in countries with advanced levels of industrialisation.

The formation of a new global wine market over these decades arose from the following circumstances: the increase in the consumption of high quality wines by the high income groups in European countries where wine was not a product of mass consumption (Great Britain, countries in northern Europe,...); the mass transatlantic migration which moved millions of Europeans from traditional producing countries to new lands, such as the United States, Canada, Argentina, Uruguay, Chile, Australia or New Zealand and who either continued their traditional consumption habits importing wine from their countries of origin or began to produce it in their new countries; the

phylloxera plague which blighted the European vineyards and obliged some countries, principally France, to import massive volumes of wine to maintain its growth in international markets and to supply its population; and, finally, France's colonial expansion which was also important as military personnel, civil servants and colonists moved and demanded wine from the mother country or, as in the case of the north of Africa, expanded vine growing. Furthermore the drivers of the first wave of globalisation were also the key drivers of this process: the liberalisation of trade and the reduction in transport costs.

However, wine was far from being a homogeneous product. Its heterogeneity is precisely one of its principal features. There are many different types of wine depending not only on colour or alcoholic strength but also on the enormous variety of vines that existed (Anderson, 2013). As well as being an industrial process, the results obtained are also very diverse. In the first globalisation, like the present day, this heterogeneity of the product was highly important[1]. We can group the wine produced into two main types (although the distinctions between them are sometimes blurred): bottled quality wine and ordinary wine sold in casks.

Low quality wine was completely integrated into the daily diet of the populations of the countries on the northern coasts of the Mediterranean, particularly in the west and of their emigrants who had settled in other continents. In countries such as France, Italy, Spain or Portugal it was by far the most consumed alcoholic beverage (Anderson, Nelgen and Pinilla, 2017). In non-producing western countries, wine did not become an alcoholic drink that was consumed regularly by wide segments of the population until much after the Second World War. It is not easy to explain why this was the case, although we can offer some hypotheses. The cultural tradition in the consumption of other alcoholic drinks and the logical preference for them when the trade of wine was still insignificant was, undoubtedly, an essential factor. Furthermore, according to the contemporary authors, the price of ordinary wine was much higher in non-producing countries than beverages with which it competed, such as beer or spirits, which may also have limited its expansion (Gouy, 1918).

[1]Gouy (1921) indicated that, on average, the difference in price between bottled wine and wine sold in casks was enormous. In France bottled wine cost around 10-15 francs per bottle and bulk wine 30 centimes per litre. In the case of higher quality wines the ratio was 1:1000.

On the contrary, high quality wine was restricted to the consumption of high income groups, particularly in European or western countries both in places where it was produced and, although to a lesser extent, in the rest. We can consider it as a luxury product[2].

The two markets emerged, integrated and grew in parallel throughout the first globalisation, although the widespread tariff liberalisation in the markets in the first wave of globalisation had a smaller scope in the case of wine.

The high tariff barriers imposed on the trade of wine constitute a crucial aspect. As we can see in Table 1, the tariffs applied to wine when entering very diverse countries were very high, for ordinary and high quality wine, and followed an upward trend from 1875 until the Second World War.

Insert table 1

There are two very different reasons to explain this heavy tax burden on wine. In producing countries, such as Argentina, Australia, Italy or Spain, the high tariffs were a simple defence barrier to ward of foreign competition, especially France. The case of Spain, one of the largest producers, is particularly illustrative. Wine protection was high until in 1879 a bilateral trade agreement with France opened the doors of this country to Spanish wine and, in return, Spain also liberalised wine imports, especially quality wines from France. In 1892, when France withdrew from the treaty and increased its protection slightly, Spain did the same (Pinilla and Ayuda, 2002). This Spanish protectionist policy not only gave rise to significant growth in the production of quality table wine, particularly from La Rioja, but in addition, a sparkling wine production industry emerged to replace the imports of champagne (Fernández and Pinilla, 2018).

In the non-producer countries, duties on wine were considered fiscal duties meaning that their main goal was to provide public revenue. Its consideration as a luxury product justified this revenue collection option.

Within this context, the starting point of France in order for it to go on to hold a prominent position in the market that was forming and growing was favourable for three

[2] 'Today, except in the wine producing countries, wine is a luxury beverage chiefly connected with the ritual of entertainment (Imperial Economic Committee, 1933: 10). 'In the US, with the possible exception of California, wine is generally considered a luxury, and its consumption is limited to special occasions' (US Tariff Commission, 1939: 286).

reasons: first, before 1850, France was the world's leading wine producer; second, there was also a highly relevant tradition of producing superior quality wines which were appreciated in the European courts and among the aristocracy and bourgeoisie, which was also the case for the incipient champagne production, the clarets of the Bordeaux region and the reds of Burgundy; finally, there was also an exporting tradition and France was by far the leading country in terms of the volume of its foreign sales.

III. The evolution of French wine exports, 1848-1938

If we analyse the evolution of French wine exports in terms of volume (Figure 1), we can observe that they grew significantly between 1848 and 1875, almost tripling. It was an authentic golden age for the French wine sector that took advantage of the tariff reductions that were implemented, especially the transcendent Cobden-Chevalier treaty of 1860 between France and Great Britain, in order to increase their exports to this country and to those with the highest incomes in northern Europe where wine was not a beverage of mass consumption. Furthermore, French wine exports also experienced significant growth in Latin America, with Argentina being the principal importer. If we break down the data by type of wine, we can observe that both the high quality and ordinary wines grew considerably, although the former quadrupled their sales starting from a significantly lower level while the latter doubled their sales.

Insert Figure 1

This enormous increase in exports stopped abruptly in around 1875 from when they experienced a sharp decline which was only interrupted in 1893. The main cause for this fall in exports was the arrival of the phylloxera plague to France, which resulted in a considerably lower production, particularly in the 1880s. The decrease in production therefore, forced a drop in exports when external demand was increasing notably. However, when we compare the evolution of the exports of the two types of wine, we can observe that they followed opposite trends.

On the one hand, ordinary wine exports dropped spectacularly. These exports, which had doubled in the third quarter of the century, decreased in the following twenty years down to a level similar to what they were before their huge growth in 1850. The losses were enormous in all markets, but much greater in those furthest away from France, such as America or Africa. They only increased in Oceania and Asia, which was due exclusively to the French colonial penetration during these years and the subsequent

demand by the civil servants and military personnel posted there. The huge fall in production obliged France to engage in mass imports from other countries, principally Spain, even to supply the domestic market. Furthermore, other countries took advantage of France's export weakness in two ways. First, the main European competitors, such as Spain or Italy, attempted to steal foreign markets from France, such as Latin America or some European countries. In low quality wines, France's principal rival was Spain whose exports increased formidably. The competitiveness of these Spanish exports was mostly based on their low prices (Pinilla and Ayuda, 2002; Gervais, 1904). France's loss of some of these markets or a strong fall in its exports to them was considerable. The Swiss market is a good example of this intense competition, where, in just a few years, France dropped from being the leading exporter of ordinary wine to the third position (Tallavignes, 1905: 608, pp. 149-154).

On the other hand, the emerging production of the new world countries, which was reaching significant volumes (Anderson, Nelgen and Pinilla, 2017) sought to conquer the domestic markets with the aid of strong tariff protection.

However, quality wine exports continued to grow until they peaked at the beginning of the 1890s even equalling the volume of ordinary wine exports. The quality wine exports to northern European countries grew, especially to the United Kingdom, which absorbed two-thirds of all the bottles exported to Europe. In the Latin American market, which had grown markedly until the end of the 1870s, the exports of this type of wine began to fall, first slowly and then at a faster pace from the 1890s due to the introduction of strong protectionist tariffs in countries such as Argentina, Brazil or Uruguay. Finally, the colonial market maintained a significant level of growth. In any event, we can observe that until 1914, French quality wine exports remained at high levels, although they grew slowly from the end of the nineteenth century.

The advances in the fight against phylloxera through the replantation of a substantial part of the vineyards enabled production to recover, and from 1900 output was reaching levels similar to those of the pre-phylloxera era. From this year, and with the exception of the years of the First World War, production grew slightly and therefore remained at high levels (Chevet et al., 2018). Within this context, total wine exports recovered considerably, although they did not return to the levels of the pre-phylloxera era. The First World War marked the beginning of a very turbulent period and put an end to the years of growth and high sales which plummeted to levels even

lower than the minimum levels of the phylloxera period. The end of the war gave rise to an ephemeral recovery to levels similar to those before the war[3], although the beginning of the crisis in 1929 with the high tariffs, which became widespread over the following decade, dealt a harsh blow to exports and generated a marked annual instability. In 1932, the lowest export levels of the post-war period were recorded and the recovery in subsequent years was modest.

The evolution of the exports of both types of wine behaved similarly during the first third of the twentieth century. The exports of quality wine grew more slowly during the early years of the century; they slowed during the war and fell even further during the post-war period. Their decrease was less sharp after the 1929 crisis.

In such a turbulent period, the causes of the reduction in exports were not the same in all markets and their effects were not similar.

The recovery of exports of ordinary wine after the phylloxera plague was based mainly on the European market. The American market declined significantly for two reasons: the protectionism of the new producers, such as Argentina, Australia, the United States or Uruguay which raised their tariffs substantially in order to protect domestic production. In Table 2, we can observe how the fall in sales to the United States or Argentina from the end of the century was spectacular. In the European market the drop in exports was concentrated (in addition to the years of the war) in the 1930s due to the depression, with a dramatic fall in sales in the German market.

Insert Table 2

In the early years of the twentieth century, the strong growth enjoyed by quality wine exports to Great Britain stagnated (Table 3). There is no single explanation for this, although it could be due to the increasing sentiment of temperance and mistrust of consumers towards products which, during the years of the phylloxera plague had been the object of frequent fraudulent practices with respect to their quality in order to maintain export levels, particularly in the case of Bordeaux wines (Simpson, 2004; Tallavignes, 1905: 601, pp. 685-689). Quality wine exports behaved better in the

[3]The Treaty of Versailles shows how important it was for the French government to secure markets for its wines. Article 269 established provisions for wine that enabled the imports of French wine by Germany with a tariff which was more favorable than the one applied on 31 July 1914. Article 274 obliged Germany, in return, to respect the laws, regulations and judicial decisions regarding the designation of origins, particularly for wines and to ban imports and exports that did not comply with these regulations.

turbulent years between the two world wars, although initially they were hit hard by the prohibition of importing alcoholic beverages imposed by the United States which closed this country's market. Some of the exports were diverted to Canada from where part of them was smuggled into the neighbouring country. After the end of the Prohibition, quality wine exports recovered somewhat as they were subject to lower levels of protection than ordinary wine as this product did not compete with local wine, given the great differences in quality[4]. Also, the Russian Revolution in 1917, the civil war and the birth of the Soviet Union deeply affected quality wine exports which were subject to prohibitively high tariffs (see Table1).

Insert Table 3

In such a turbulent situation with so many difficulties for maintaining traditional markets it is interesting to observe how the colonial market was gaining weight in French wine exports (Figure 2). The exports of ordinary wines were always significant as they represented between 10 and 25%. During the Great Depression their share increased even more. In the case of quality wine exports, the colonial market was not significant before the First World War, representing usually less than 5% of the total export value. However, from the lead up to the First World War they began to increase and by the 1930s they accounted for around 20% of total exports of this type of wine, representing a remarkable change.

Insert Figure 2

IV. Quality wines vs. ordinary wines: two diverging trends

From a demand point of view, it is necessary to analyse the two types of wine separately. The demand for quality wine came mainly from the emerging bourgeoisie in the countries with the most advanced industrialisation processes. In general terms, wine was consumed by the economic elite classes of European countries or European settlers. French colonial expansion also gave rise to a demand for wines from the homeland in the new territories by the civil servants, military personnel and other people from Europe who had settled there. Consequently, the economic growth of Western Europe fuelled the demand of this type of wine considerably.

[4]Even during the years of the depression, French quality wine was able to access difficult markets such as North America, thanks to the bilateral agreements with this country in 1934 and 1936, which enabled exports to increase significantly (U.S. Tariff Commission, 1939: 260).

However, the demand for ordinary wine only grew in the Mediterranean countries where this type of wine was traditionally consumed or in countries where people of this origin emigrated to, but not in the rest. Wine did not become a mass-consumption product outside its traditional places of production, so increases in income did not translate into increases in consumption, contrary to what occurred with other Mediterranean horticultural products (Pinilla and Ayuda, 2008 and 2010).

From the perspective of supply, it is important to note the efforts made by quality wine exporters to increase their sales abroad. There are two fundamental aspects of these efforts. First, the most important, in the long term, was the work carried out to improve the quality of the product, the development of modern marketing techniques and strategies to ensure a good distribution of production. On the other hand, in the short term, it was necessary to compensate for the fall in production caused by the phylloxera plague just when sales were increasing substantially.

With respect to the improvement in quality, the exporters of the regions specialised in the higher quality wines were concerned about this issue early on. They modernised their production with the aid of modern oenology, seeking to undertake vine-growing processes with the most advanced techniques once this discipline had enabled them to understand the chemical and biological fundamentals. There was close interaction between producers and the new oenological laboratories (Paul, 1996). The science enabled producers to learn about the chemical and biological processes underlying the production of wine which gave rise to more refined techniques in their creation. Significant efforts to make improvements were also made in vine growing, particularly with respect to the fight against plagues. While modern chemistry found effective remedies for oidium and mildew fairly quickly, in the case of phylloxera, the fight was long and the only effective solution was finally to graft European plants to resistant rootstalks of vines native to the United States. In the end, it was the official science that found the definitive solution for phylloxera (Gale, 2011).

With respect to the marketing of the product it is important to highlight that fundamental work was developed in several directions. First, quality wine producers were concerned about the accreditation of the quality of their products. The classifications established in the mid nineteenth century in Gironde or Burgundy sought to accredit brands and guide consumers in a complex market, particularly abroad. In the case of champagne, the producers also sought to accredit their brands and these

companies were undoubtedly at the forefront of French wine exporters. In this case, their efforts were focused on the creation of brand-name identifications. This included the double identification of the region of origin and the product, usually with the name of the family of the company on the label (Guy 2003). The reputation of the producer was therefore a key element. They also used modern advertising techniques to promote their products and took great care in the design of the bottles and labels. They organised promotional shows, made extensive use of the printed press and from the beginning of the nineteenth century they began to communicate intensely with clients, organising wine-tasting events in their principal markets. Their greatest success was to establish champagne as an essential beverage in large social celebrations (launching ceremonies of ships and later planes, reception banquets for dignitaries or parties, cabarets...) and private events (christenings, weddings...). Establishing the status of champagne did not happen by chance. It was the fruit of the efforts to "distinguish" the consumers of this product from the rest of the population. In short, they managed to convert champagne into the 'obligatory adjunct' to the social rituals of the emergent bourgeoisie of Europe (Guy, 2003: 11). At the beginning of the 1880s, this symbolic character of champagne as the beverage of the emergent bourgeoisie had become firmly established (Vizetelli, 1882:109). They also set up modern sales networks with permanent representatives of the brands who carried out these marketing tasks and were in contact with the clients in order to identify their preferences. Subsequently, the producers adapted their sparkling wines to the individual tastes of each country. Furthermore, the producers organised themselves so as to ensure the reputation of their wine. In 1882, the *Syndicat du commerce du vin de Champagne* was formed by the most important producers in order to prevent imitations. Finally, in the twentieth century, they were able to establish a designation of origin in order to guarantee that the wines used came from a defined region (Simpson, 2011).

While in Champagne the large producers, through their brands, sought to ensure the quality of their production in an activity which required substantial capital, other exporting regions used alternative strategies. In Burgundy, the *millesime* (vintage) defined the quality of the finest wines, but there was also a remarkable promotion of the idea of the terroir which demanded the exact geographical location of the product. In Bordeaux, the chateaux were accredited as a guarantee of the quality of the wine. Therefore, the mentions of the chateaux on the bottles multiplied, increasing from 50 in

1850 to 1,000 in 1886, growing even more in subsequent years (Garrier, 2008, 244-245). The classifications of wines, such as Lavalle's of 1855 for Burgundy (Lachiver 1988: 73) or the many Bordeaux classifications carried out from 1800 show a careful management of the reputation and image of the wines. Many of them were based on the relative prices of the wines and were made to help merchants fix prices, which could be an indirect reflection of their quality (Phillips, 2016: 144-146). However, they also sought to inform the consumers about an enormously heterogeneous product whose quality was difficult to determine with precision.

It is important to point out that in the export business, and particularly in regions such as Champagne or Gironde, the principal role was played by the wine merchants rather than the producers. Not only did they market the wine but they also frequently bought the product from the wine-makers and mixed wines and bottled them. In the case of champagne, the high capital needs explain this division of functions between producers and merchants (Simpson, 2011). The concern about quality was important if we take into account the high prices of this type of wine. The laws of 1919, 1927 and 1935 which authorised and regulated the creation of the designation of origin, also responded to the request of the producers of these types of wine to reinforce the reputational capital of their products.

On the other hand, in the short term and during the phylloxera plague, maintaining a high volume of exports at a time of falling production generated special problems in many of the regions (Champagne was the exception due to the late arrival of the phylloxera). The exporters attempted to concentrate on their higher quality wines as the decrease in production obliged them to limit themselves to producing those products with the highest added value. Furthermore, it was inevitable that in some cases, such as in Gironde, wine from Spain was imported to maintain their export volumes.

Insert Figure 3

The two divergent trends of the exports of quality and ordinary wine led to a complete reversal of the composition of French wine exports. Until the arrival of the phylloxera plague, the value of ordinary wine exports was around 70% of total exports. In the last few years of the century the exports of the two types of wine accounted for the same share. The better behaviour of quality wine prices in the 1930s widened the gap between the two types of wine.

The growing weight of quality wine exports also qualifies the perspective that we have given on the evolution of French wine exports, calculated at fixed 1910 prices. This picture of total figures in terms of volume seems to lead to the conclusion that a resounding dynamism achieved early on was cut short abruptly due to the phylloxera plague and only partially recovered until the catastrophe of the inter-war period. However, a disaggregation of these exports by type of wine according to their quality reveals that there was an enormous continuity in the dynamism of quality wine exports, a segment which focused on the French exporting sector and whose boom was only interrupted by a series of exogenous shocks: the First World War, the Russian Revolution, the Prohibition in the United States and the Great Depression in the 1930s. On the contrary, the dynamic phase of ordinary wine exports only lasted until 1875 and after the onset of the phylloxera plague they began a downward secular trend, illustrating how France progressively abandoned this market segment, as opposed to other more competitive countries with respect to these products, such as Spain. France focused its efforts on the high price and high quality wines.

If we examine the evolution of total wine exports in terms of value instead of volume, deflating the series in current values by the French wholesale price index, the image which we obtain is very different[5]. In this case, we can observe a rapid and fairly sustained growth of exports until a maximum level in around 1890. These high values remained stable until the collapse caused by the First World War. Subsequently, the recovery was very modest which is explained by the poor behaviour of wine prices and the effect of the Great Depression and the other previously mentioned external shocks.

Insert Figure 4

V. France's position in the global wine market

If we compare the evolution of French exports with that of global exports, we can gain a complete picture of the position achieved by this country in the international market.

[5]Using deflated current values implies the acceptance of the official valuations or price per hectolitre used by the French external trade statistics to determine the value of exported amounts. The annual adjustments to the price variations were not automatic so these data should be treated with caution in the short term. We believe that they illustrate the trend well in the long term. For problems regarding the valuation of wine in the French external trade statistics see Tallavignes (1905: 595, pp.514-516).

Global wine exports (in volume) had an enormously expansive first phase from the mid nineteenth century until approximately1890. They remained stable until the mid 1920s and subsequently began to grow again, with two severe circumstantial dips caused by the First World War and the Great Depression in the 1930s. However, the picture changes substantially if we do not consider the exports of its colony of Algeria to France as international trade[6]. There are no differences in the first expansive phase in which exports more than tripled. But from the beginning of the 1890s, international trade contracted significantly, reducing by approximately one third and remaining at this level until the crisis of 1929, when it plummeted to levels of the mid-nineteenth century (Anderson and Pinilla, 2018 a)[7]. In other words, global wine exports only grew appreciably during the second half of the nineteenth century. All subsequent expansion was due exclusively to the exports of the French colony Algeria to the mother country.

Insert Figure 5

International wine trade, therefore, grew in the second half of the nineteenth century, driven by demand from northern European countries, the emigrant communities in the New World, the European officials and military personnel in the colonies and the demand from France to compensate for the fall in production due to the phylloxera plague (in the final years of this period). From the beginning of the 1890s, France's substitution of Spanish imports for Algerian wine to compensate for the fall in production due to the phylloxera plague led to a decrease in international wine trade, if we do not consider the French-Algerian flow as international. Furthermore, the protectionist policies of the producing countries of the American continent or Australia also contributed to this decrease (Anderson, 2018; Mateu and Stein, 2018). Subsequently, the stagnation of the demand from industrialised Europe and other markets maintained exports relatively stable, but they grew strongly from the mid 1920s due to the sharp increase in Algerian exports to France. Apart from this flow which maintained its vitality during the 1930s, the rest of international wine trade suffered a slight decrease during this decade.

[6] As well as being a French colony, Algeria also formed a customs union with Metropolitan France and to all intents and purposes, was French territory organised into departments (which was not the case of the other French colonies in northern Africa). Practically all of the Algerian exports had France as their destination. See Isnard (1954), Pinilla and Ayuda (2002) and Meloni and Swinen (2018).

[7] An analysis of this market in Pinilla and Ayuda (2008).

Within this context, if we examine France's position in the global market we can observe that, in terms of its share of the volume of world trade, France quickly achieved a dominant position in a market that expanded rapidly from the mid-nineteenth century. The phylloxera plague reduced this share slightly. If we do not take into account the France-Algeria flow of wine and we subtract it from the world total, we can see that after the recovery of production in mainland France, its share in the global market recovered considerably, although it contracted once again during the inter-war period.

Insert Figure 6

The analysis of international wine trade in terms of value is more interesting as we have seen that France progressively specialised in high quality wines. In this case, France's hegemony in this market is much clearer. Even taking the France-Algeria trade into account in the world total, France's position in the global market was enormously solid and completely hegemonic thanks to its overwhelming dominance in quality wines.

Insert Figure 7

We can conclude by remarking that once the international wine market had begun to form, from the outset France obtained a dominant position driving the integration of this market. The formation of the global wine market was mainly driven by its exporting dynamism. The arrival of the phylloxera plague to France reinforced the role of this country in the wine market. As well as being the principal exporting country it also became the leading importer in order to complement its shrinking production. Spain initially supplied the wines that France needed. However, from the beginning of the 1890s, the French colonial policy, interested in settling colonists in Algeria and providing then with a viable economy, promoted the expansion of vine growing and the duty-free import of its production to the mother country. Within this context, Metropolitan France specialised preferably in producing high quality wines for exporting or low quality wines for the domestic market. Imports from Spain, or principally Algeria, provided wines with a high alcohol content and intense colour to mix with wine produced from hybrids resulting from the replantation which had a low alcohol content and pale colour and was not appreciated by the French consumers. To some extent we could say that a part of the metropolitan production was relocated to Algeria, although from the mid 1920s the high volume of imports from this territory

generated serious problems for the wine makers in the mother country (Pinilla and Ayuda, 2002).

Most interesting, perhaps, is how a series of opportunities and problems aroused an intense effort by the French wine-makers to specialise in the production of wines in the high quality segment. First, the opportunities to be had in a market in full expansion from the mid-nineteenth century were taken advantage of by producers interested in offering a product which the high income groups of other countries, particularly in Europe, demanded. There were three regions which adopted this strategy: Champagne, Gironde and Burgundy (Chevet et al., 2018). The phylloxera plague gave rise to the most dangerous moment in the French wine-making sector. As no other country had previous experience in combating this plague, France went to great lengths to find the most suitable remedy and the role of its scientists was fundamental. The replantation, with its high costs, further reinforced the specialisation of some French wine-makers in the high quality segment. The high costs involved drove those regions specialised in high quality wines to reinforce this orientation, improving their production technology and investing in marketing to obtain the best possible distribution of their production. Throughout the first third of the twentieth century, this would be the principal direction in the evolution of the French exporting sector as in the low quality sector, competing with other countries with lower costs, such as Spain, was becoming increasingly more complicated. However, the improvement in quality, the accreditation of brands or public intervention to protect this high quality production through the creation of the apellations of origin, was not sufficient to overcome a series of external shocks, which in the 1930s placed the producers in an enormously difficult situation: the First World War, the Soviet Revolution and the loss of the Russian market, the Prohibition in the United States and the Great Depression successively hit the French wine export sector with extreme harshness.

VI. Explaining the export trajectory: Theoretical framework, econometric model and data

In this section, our objective is to analyse the determinants of the evolution of French wine exports with a panel data set over the period 1848-1938. In this analysis, we should take into consideration not only the changes with respect to France's supply

of exportable wine but also the changes in international demand and global wine market integration, especially the reduction in transport costs and the liberalisation of trade.

Furthermore, bearing in mind that, as previously mentioned, the exported volumes of the different classes of wine evolved differently, we believe that in addition to a general model for all of France's wine exports, it is important to also consider a model for each of the two classes of wine which we previously defined: ordinary wine (wine in casks) and high quality wine (bottled wine). In this way, we will be able to confirm whether the determinants of the growth in trade were the same in both types of wines.

We use a gravity model to estimate trade flows across France and its trading partners due to its highly effective capacity to explain trade volumes between countries and the stability of the results obtained.

Gravity model studies have achieved great empirical success in explaining various types of international trade flows since it was first developed in Tinbergen (1962) and Pöyhönen (1963a, 1963b). The basic gravity model was based on Isaac Newton's original law of gravitation. The underlying foundation stems from the idea that bilateral trade flows are directly proportional to the economic mass of the exporting and importing countries, and inversely related to the geographical distance between them.

Despite being extensively used with relative success by applied researchers, this approach has been widely criticised, mainly because of its lack of a robust underlying economic theory and several econometric issues concerning specification and estimation methods. Many recent advances have been developed to deal with these issues[8]. We will take into account the latest refinements in order to conduct our analysis.

Our extended gravity model specification for each of the three models can be written as follows:

$$\ln X_{ijt} = \beta_1^* + \beta_2 \ln GDP_{jt} + \beta_3 \ln Y_{it} + \beta_4 \ln Y_{jt} + \beta_5 TC_{ijt} + \beta_6 French\ Colony_{jt} + \beta_7 WWI_t + \beta_8 Dep30_t + \beta_{10} Soviet\ State_{jt} + \beta_{11} USA\ Prohibition_{jt} + \varepsilon_{ijt} \quad (1)$$

with $\beta_1^* = \ln \beta_1$ and ε_t is assumed to be identically and independently distributed. Below we offer a brief description of the variables.

[8] Anderson and van Wincoop (2003), Baier and Bergstrand (2007) and Egger and Nelson (2010).

The dependent variable X_{ijt} is the volume of annual wine traded between France (subscript i) and its 33 trade partners[9] (subscript $j = 1,2, \dots ,33$) in French francs at 1910 prices at year t[10]. Our data panel, therefore, covers in total 3,003 observations from 1848 to 1938, implying an impressive 86.1 % of French wine exports, which enables us to draw sufficiently representative conclusions.

GDP_{jt} represents the importer's GDP at period t (Maddison project, 2013). With this variable we want to see whether the potential foreign demand for French wine depends on the size of the importer's market (GDP); Y_{it} represents the production of wine in France and enables us to observe France's capacity to offer (export) wine depending on its harvest size, measured by production; Y_{jt} reflects the size of the trade partners' wine production and it is used to capture the so-called "home bias" as in Dal Bianco et al (2016). TC_{ijt} captures the evolution of the real transport costs of wine between France and its trading partners. Alternatively, we have also replaced the cost of transport with the distance to approximate transport costs[11].

Given that we do not have a variable that accurately measures the variations in the level of tariff protection, we have included a set of dummies to proxy the impact of some political and economic situations that had a relevant direct impact on international trade. Thus, WWI_t takes value 1 for the years during the First World War; and 0 otherwise; $Dep30_t$takes value 1 during the years of the Great Depression, 0 otherwise; $Soviet\ State_t$ takes value 1 for Russian/Soviet union from 1917[12]; and, $USA\ Prohibition_t$ takes value 1 for North America for the period in which the Prohibition was active, 0 otherwise[13]. According to contemporary analysts, all of these events considered in our model specification had a dramatic impact on French wine

[9] See appendix for the trade partners.

[10] See appendix for this series construction.

[11] See appendix.

12 It should be remembered that the elite classes of the Russian empire used to be characterized as relevant consumers of French wine and the disruption of the empire's economic power and the reduced participation of the new state in the international trade might have affected wine imports. In Table 1 we can observe that the tariffs for wine imports in the new Soviet state rose until prices reached unaffordable levels.

13 The prohibition of alcohol forced the wine imports to be reduced to almost zero, except for the sacramental wine and the wine for medicinal purposes.

exports (Douarché, 1930).

$French\ Colony_{jt}$, which takes value 1 when the importer was a French colony, and 0 otherwise, reflects, on the one hand, that the French military personnel and officials in the colonies wanted to maintain their consumption of a product which formed part of their basic diets and, on the other hand, that the trade between the mother country and the colonies was carried out under preferential conditions, normally with very low tariffs and sometimes without tariff protection (as in the case of Algeria that formed a customs union with France). So, we could expect, *a priori,* a higher level of trade between France and its colonies, *ceteris paribus*.

Finally, we have included a dummy variable for each trade partner to capture the so-called 'multilateral resistance terms' to account for the unobserved trade barriers between each country and all of its trading partners so that the omitted relevant variables problem is addressed when the effects on trade flows are evaluated. Furthermore, this also prevents the model from producing biased results. This dummy also controls for the so-called "unobservable bilateral heterogeneity" In this way, in our specific case of a single product, the inclusion of a variable with a different value for each pair which is constant over time would control for both "multilateral resistance" and "unobservable heterogeneity". Therefore, we have included importer´s fixed effects as in Cardamome (2011) and Dal Bianco et al. (2016) to control for the possible bias caused by the omission of relevant variables and for the endogeneity of the institutional variables, but not country-time fixed effects. The inclusion of the latter would imply that our model would not be estimable because there would be more variables than observations. The importer´s fixed effects also account for the endogeneity of the institutional variables.

To estimate the model, we have used the method proposed in Santos Silva and Tenreyro (2006, 2011), the Poisson pseudo maximum-likelihood (PPML) estimator. This PPML estimator has the advantage of producing more efficient estimates of the regression in (1) than the OLS method, because it takes into account the presence of zero values in the dependent variable[14] as it specifies the dependent variable at levels. This method also produces robust estimates to heteroscedasticity (Sören and Bruemmer, 2012; Staub and Winkelmann, 2013 and Kareem and Kareem, 2014; Piermartini and

[14] See appendix for the number of zeros.

Yotov, 2016).

We have estimated several models for each type of wine, depending on the variables included in the models: a first set of models using the total exports of French wine, (Table 4); a second set of models for wine exports in bottles (high quality), (Table 5) and a third set of models, for wine exports in casks (low quality) (Table 6.)

VII. Results and discussion: The determinants of wine exports

Table 4 depicts the results of the models estimated for the total exports of French wine. The first column presents the name of the variables, the rest of the columns report the estimates of the four alternative PPML estimates depending on the variables included[15]. In particular, the second column contains the results for the model with the trade cost variable (TC_{ijt}); the third column shows the model with trade costs and importer's fixed effects; the fourth column shows the model replacing the trade costs with the distance between France and each of its trading partners, and, finally, the last column contains the results with only the importer's fixed effects. The last rows in the table show the number of observations used in each model, the usual goodness of fit measure, R^2, the RESET p-value to test a correct specification and, finally, whether we have included fixed effects in the model.

From our point of view, model (2), that includes transport costs and fixed effects, outperforms. Also, a comparison of model (1) with models (3) reveals the robustness of the estimate of transport costs, because when we replace it with the proxy distance, its behaviour is similar.

Insert Table 4

The results for total wine exports show that exports had a positive relationship with the volume of wine production in France. It is natural to think that the volume of the harvest partially conditioned export possibilities and in this sense the phylloxera plague suffered in France was a key factor, as the strong fall in production seriously affected the volume of exports. The production of the importing countries is also a significant variable and in this case has a negative sign. The interpretation is clear: when France's trading partners had abundant harvests or were important wine producers, their

[15] Reporting alternative models with different variables may be useful to analyse the robustness of the estimated results.

imports were low, either due to sufficiently severe tariff instruments to prevent their entry or the simple preference of their consumers for the national product due to its lower price or characteristics. The level of income of the importers positively affected the volume demanded, although this effect is not significant in the models with fixed effects. In this case, this was because in the majority of the importing countries, wine was not consumed by the masses but by a small elite group, usually high income earners. In this way, the afore-mentioned changes in income did not affect imports. With respect to transport costs, as we would expect, they are significant and have a negative sign which implies that on the one hand exports were greater in closer destination (with lower costs) and furthermore, when transport costs fell (rose) exports increased (decreased). In our case, we have clear evidence that overall during the first wave of globalisation, the reduction in maritime fleets favoured market integration and the growth of trade.

It is important to note that the dummies introduced to capture the impact of specific economic or political shocks are all significant and have the expected effect. So, the First World War slowed French wine exports, which is natural given the complications that the war implied for trade. The 1930s Depression with the wide range of protectionist instruments that were used, as we can see in Table 1, also caused French wine exports to fall. Furthermore, the birth of the new Soviet state also had a significant impact on exports, reducing them, as a consequence of the prohibitive tariffs that were imposed and the monopoly of foreign trade by the State. As expected, the Prohibition in the United States significantly and negatively affected French wine imports. Finally, and predictably, being a French colony positively influenced the imports of French wine received for reasons that we have already explained.

We consider the estimates of the econometric models used to explain the evolution of wine exports in accordance with their quality to be of great interest. We can see them in Tables 5 and 6.

Insert Table 5 and Table 6

First we can observe that the variations in French production positively affected ordinary wine exports (Table 6) but not quality wine exports (Table 5). As we explained above, during the phylloxera plague, ordinary wine exports plummeted due to the difficulties encountered by France to supply its own domestic market. In contrast, the lucrative high quality wine market remained stable. When the harvest diminished, the

best part was reserved for exports and producers resorted to mixing French wine with imported wine in order to maintain exports or they marketed wines from previous years which they had in stock taking advantage of higher prices (Roudié, 1988). Furthermore, one of the principal exporting regions, Champagne, did not suffer the phylloxera plague until just before the First World War, when it was widely known how to tackle the plague and exports were suffering serious difficulties due political reasons or the war.

On the other hand, the wine harvest of importing countries only influenced ordinary wine imports, with a negative and significant coefficient. In the case of quality wine, the coefficient has the expected sign; it is not significant (except in the models with the distance variable) as French quality wine did not usually have very much competition in this segment, although in some countries where it had gained market share, such as Spain, a trade war beginning in 1891 gave rise to considerable increases in tariffs and a partial replacement of the French wines with domestic production (Fernández and Pinilla, 2018).

The importer's GDP was significant and positive for quality wine. In this case, improvements in income implied increases in demand, probably because the higher income of the economic elite enabled them to consume more of this luxury product. This association between higher incomes and an increase in consumption was already notable in the United States at the end of the 1930s:

'As might be expected, therefore, the correlation between per capita consumption and fluctuations in business conditions and consumer incomes has been remarkably close for the past sixty years, comparatively large consumption occurring in periods of large consumer income' (US Tariff Commission, 1939:286).

On the other hand, the relationship is negative and significant for low quality wine, in model (2) in Table 6, although this variable is not significant in the rest of the estimated models. The reason for this may be that increased incomes meant that the minority who consumed wine in the northern European countries replaced low quality wines for high quality products.

The reduction in transport costs throughout the first wave of globalisation only significantly influenced trade in the case of quality wine whose exports increased. However, it was not significant for low quality wine although it has the expected sign.

When we use the standard variable in the distance gravity models instead of the evolution of the fleets, the result is significant and negative for both types of wine.

As in the case of the model for total exports, in both types of wine, we can observe that being a French colony had a positive effect which was even greater in the case of high quality wines.

With respect to the variables which we introduced to verify the impact of the afore-mentioned external political and economic shocks, in this case no significant differences are observed between the exports of the two types of wine, which were negatively affected by them in both cases. However, it should be highlighted that the negative effect of the First World War and the 1930s Depression was greater in low quality wines than in the high quality products.

VIII. Conclusions

In this study we have established that when the global wine market began to emerge during the first wave of globalisation, France, which clearly had a favourable starting point due to its level of production, trade or technology, quickly gained a leadership position. In this emerging and expanding market, the wine producers and merchants went to great lengths to provide consumers with a product that was perceived as having a high quality and also to "invent" new traditions that would stimulate their economic activity such as the case of champagne and its conversion into a beverage for celebrations. In this way, during the first decades of the first globalisation, exports grew rapidly and France's leadership position was strengthened. However, an unexpected event was to give rise to serious difficulties, obliging the French export sector to re-orientate itself to some degree.

The arrival of the phylloxera plague to France and its subsequent significant impact on its production led to two types of important consequences. First, the high demand for wine in France to supply the domestic market and to maintain its level of exports gave a fundamental boost in the formation of the global wine market. France became the world's leading wine importer, fostering the development of the sector in other countries, first Spain and later Algeria. However, at the same time, the French weakness enabled other producing countries in Europe to compete with French wine in foreign markets and the emerging production in the New World to develop.

Consequently, France significantly redirected its exports towards the higher quality segment in which, until the First World War, trade increased even more. In the ordinary wine segment, although exports began to grow again after the phylloxera plague, they did not recover their pre-plague levels or their hegemonic position in the global market. Our econometric model highlights that the increases in production in different countries harmed the export possibilities of French wine, particularly in the low quality segment. Furthermore, it illustrates how the variations in French production only affected the exports of low quality wine. The model also shows that the fall in transport costs boosted wine exports.

After the First World War, a series of serious events significantly harmed the exports of all types of wine from France. In addition to the war, the loss of the Russian market after the Bolshevik Revolution, the North American Prohibition and finally, the Great Depression of the 1930s with its harsh measures to restrict imports, dealt a harsh blow, not only to the exports of French wine, but also to the very functioning of the wine sector as an integrated market.

In short, the case of wine has shown us that the collapse of the first globalisation was not exactly the same in all types of product, and that, in this case, when the final collapse occurred with the Great Depression, this market was already seriously injured. As wine could be considered as a luxury product in many countries, it was particularly sensitive to regulations (Prohibition, protectionist measures during the Depression of the 1930s) or political shocks (World War, Russian Revolution).

TABLES AND FIGURES

Table 1. Calculation of ad valorem tariffs on wine (1875-1938) (%)

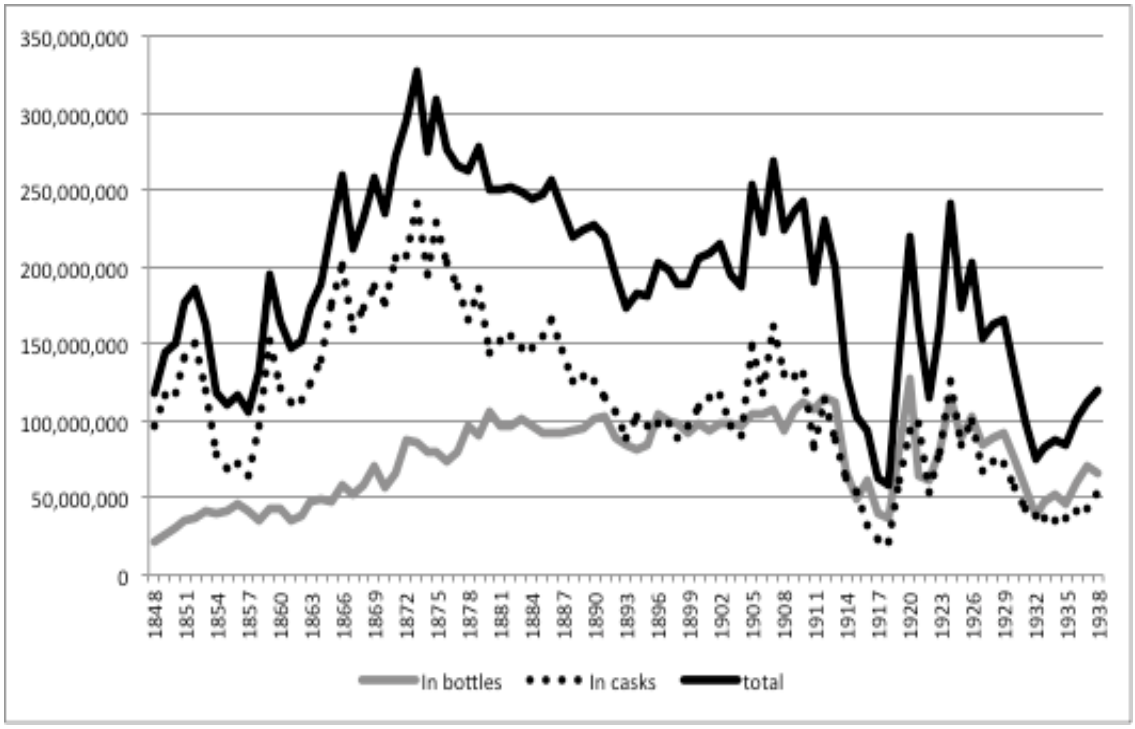
	ORDINARY WINE IN CASKS							
	1875	**1885**	**1900**	**1910**	**1927**	**1929**	**1935**	**1938**
Argentina	n.a.	n.a.	53	61	64	65	101	123
Australia	n.a.	n.a.	n.a.	n.a.	51	415	441	658
Austria	36	n.a.	66	108	40	33	55	123
Belgium	41	27	27	29	11	14	25	39
Brazil	n.a.	n.a.	53	85	74	43	50	63
Canada	n.a.	n.a.	45	29	51	33	24	38
China	n.a.	n.a.	n.a.	n.a.	83	78	80	80
Denmark	50	33	37	41	133	112	92	139
Germany	36	36	33	43	112	106	264	83
Italy	9	n.a.	8	18	35	33	89	85
Japan	n.a.	n.a.	n.a.	n.a.	15	22	19	29
Norway	20	18	20	79	72	57	66	50
Russia	100	141	146	140	1,705	312	n.a.	n.a.
Spain	96	n.a.	66	73	47	32	73	67
Sweden	n.a	24	106	127	55	51	48	73
Switzerland	n.a.	n.a.	5	14	31	26	43	47
The Netherlands	75	50	56	61	57	54	135	113
United Kingdom	49	33	37	51	98	89	121	183
United States	98	81	64	70	Proh.	Proh.	182	n.a.

	TABLE WINE IN BOTTLES				CHAMPAGNE (BOTTLES)			
	1927	**1929**	**1935**	**1938**	**1927**	**1929**	**1935**	**1938**
Argentina	67	68	52	113	30	61	42	92
Australia	206	174	112	115	144	114	124	123
Austria	35	30	30	(*) 57	29	23	74	64
Belgium	14	19	16	31	9	16	25	39
Brazil	22	19	10	15	72	59	67	41
Canada	16	11	5	10	85	69	21	71
China	65	63	78	68	55	50	67	99
Denmark	208	196	30	59	141	124	98	150
Germany	51	52	82	132	42	19	56	75
Italy	22	22	18	13	41	8	155	(*) 61
Japan	18	25	14	26	18	22	37	28
Norway	42	38	27	22	71	60	18	27
Russia	799	767	n.a.	n.a.	362	n.a.	n.a.	n.a.
Spain	19	13	19	(*) 19	85	56	123	(*) 53
Sweden	36	34	20	39	94	83	38	29
Switzerland	14	18	19	26	22	16	29	32
The Netherlands	38	26	38	10	0	16	28	10
United Kingdom	53	49	38	72	80	73	75	101
United States	Prohib.	Prohib.	n.a.	75	Prohib.	Prohib.	n.a.	92

Notes: a Calculated as the percentage of customs duties on the value of imported wine. Specific tariffs have been obtained from the sources listed below. These are in French francs per hectolitre of wine in the case of wine in barrels or in French francs per bottle for bottled wine and champagne. For the price of wine we have used the unit value of exports obtained from French external trade statistics: the arithmetic

average of Gironde wine in barrels and wine in barrels from other parts of France exported in the corresponding year for ordinary wine; for bottled wine we have taken the arithmetic average of Gironde's bottled table wine and exported bottled table wine from the rest of France; for champagne we have done the same.
b (*) 1937 data.
c n.a.= not available
d Prohib. means Prohibition, when imports were not allowed.
Sources: 1875-1910, Degroully, 'Essai historique', p. 331; 1927-1938, Office International du Vin, *Annuaire*.

Figure 1. French exports of wine by volume (French francs 1910)



Notes: a We have multiplied the quantities exported in hectolitres of each type of wine by its unit value in 1910.
Sources: Own calculation based on Direction General des Douanes, *Tableau General*.

Table 2. Destination of French exports of wine in barrels (thousands of French francs at 1910 prices))

	1847-49	1850-59	1860-69	1870-79	1880-89	1890-99	1900-09	1910-19	1920-29	1930-38
United Kingdom	1,271	1,714	8,176	15,059	15,288	14,209	10,612	7,083	6,184	4,074
Germany	15,189	11,670	13,617	28,777	19,286	17,122	21,304	11,257	19,411	2,563
The Netherlands	4,591	4,882	5,119	7,542	6,366	5,489	5,697	3,723	3,499	1,361
Belgium	6,524	7,178	10,058	14,491	12,817	12,710	15,438	9,377	17,357	7,748
Suisse	8,406	6,931	18,627	34,016	16,855	9,088	20,153	6,616	12,591	7,974
Rest of Europe	12,941	24,282	17,574	7,515	5,599	3,333	5,274	3,173	2,577	1,617
EUROPE	48,921	56,657	73,171	107,399	76,211	61,950	78,478	41,229	61,618	25,336
United States	8,922	10,913	9,386	10,057	3,472	1,289	762	596	0	14
Canada	0	0	12	20	0	0	1	37	311	185
NORTH AMERICA	8,922	10,913	9,398	10,077	3,472	1,289	763	633	311	199
American French Colonies	4,428	3,291	4,390	4,215	4,292	4,401	4,058	2,153	1,847	3,232
Argentina	1,481	2,879	12,871	22,720	23,315	8,495	5,164	3,622	383	99
LATIN AMERICA	12,347	13,121	33,281	46,143	39,048	18,165	13,240	7,848	3,117	3,610
Asian French Colonies	46	110	74	0	683	2,407	5,334	2,735	3,628	2,457
ASIA	274	397	316	329	2,383	2,987	6,392	2,949	4,550	2,684
African French Colonies	25,978	19,767	22,860	21,995	13,345	6,648	7,023	4,705	6,138	7,411
AFRICA	30,665	23,122	28,753	26,366	15,427	7,877	7,948	5,390	6,894	7,594
Oceanian French Colonies	0	0	0	0	1,332	1,683	1,988	1,025	803	232
OCEANIA	0	33	410	897	1,332	1,683	1,988	1,025	803	232
Not assig.	1,096	1,972	5,857	8,327	8,870	7,775	12,885	8,094	7,639	3,178
WORLD	102,225	106,214	151,185	199,537	146,743	101,725	121,693	67,168	84,932	42,833
French Colonies	30,451	23,168	27,324	26,210	19,651	15,482	19,868	11,218	13,055	14,207

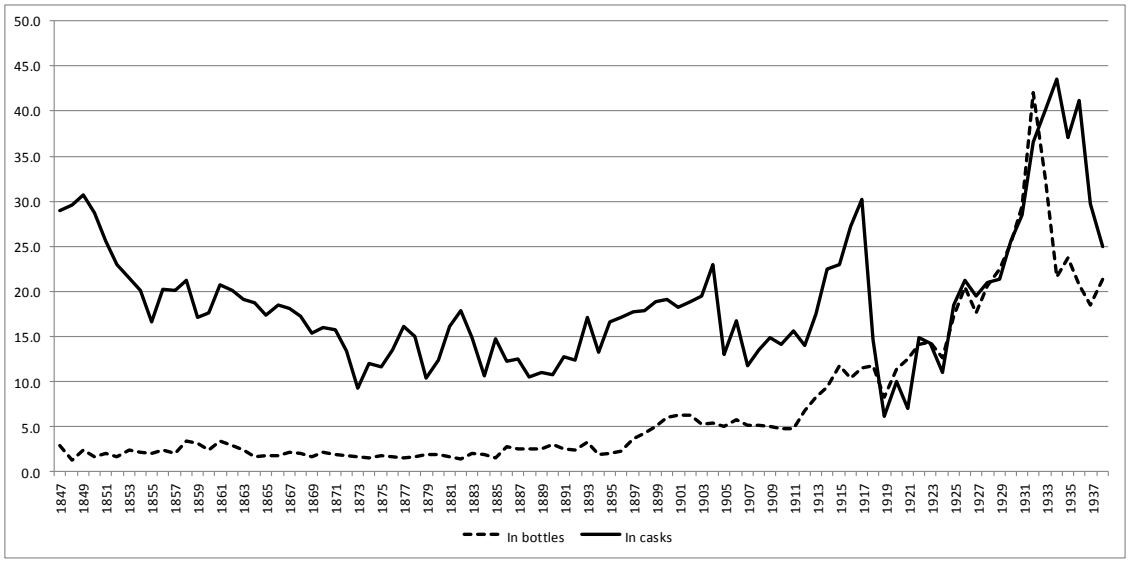
Notes: a We have multiplied the quantities exported in hectolitres of each type of wine by its unit value in 1910.
Sources: Own calculation based on Direction General des Douanes, Tableau General.

Table 3. Destination of French exports of bottled wine (thousands of French francs at 1910 prices)

	1847-49	1850-59	1860-69	1870-79	1880-89	1890-99	1900-09	1910-19	1920-29	1930-38
United Kingdom	4,553	6,278	14,846	29,914	41,197	41,273	29,232	22,805	22,026	13,144
Germany	3,362	3,341	3,300	6,100	5,287	5,207	5,826	2,440	2,983	334
The Netherlands	268	361	319	903	596	1,158	995	1,145	3,009	1,708
Belgium	1,445	3,364	3,821	8,292	13,726	16,133	27,203	13,265	18,149	5,535
Suisse	216	281	367	519	733	742	1,135	1,482	1,404	722
Rest of Europe	3,835	4,946	4,443	7,359	5,454	4,493	7,701	8,174	6,737	3,718
EUROPE	13,679	18,571	27,096	53,088	66,994	69,006	72,093	49,312	54,310	25,162
United States	4,411	10,773	8,111	7,859	8,096	7,928	7,026	6,449	296	7,501
Canada	0	0	0	0	0	10	294	480	1,895	1,022
NORTH AMERICA	4,411	10,773	8,111	7,859	8,096	7,938	7,320	6,930	2,191	8,523
American French Colonies	156	290	327	567	451	359	368	477	1,541	2,112
Argentina	228	417	1,158	2,014	2,051	1,066	3,540	4,835	2,602	1,158
LATIN AMERICA	3,858	5,994	7,724	11,135	10,166	6,041	6,791	8,550	8,083	4,307
Asian French Colonies	0	0	0	0	126	580	1,249	869	2,887	1,973
ASIA	548	940	1,353	1,465	992	997	2,450	1,914	5,748	3,513
African French Colonies	414	672	772	805	1,414	1,612	3,000	4,330	9,315	9,327
AFRICA	488	1,070	2,149	2,010	2,121	1,953	3,653	5,181	12,247	10,221
Oceanian French Colonies	0	0	0	0	0	9	10	3	113	39
OCEANIA	0	122	139	104	0	223	41	182	256	59
Not assig.	742	1,772	3,537	4,071	8,076	7,939	7,912	6,371	8,039	4,929
WORLD	23,727	39,243	50,109	79,732	96,445	94,098	100,261	78,439	90,874	56,715
French Colonies	529	892	1,067	1,372	1,992	2,865	5,545	6,175	14,819	14,279

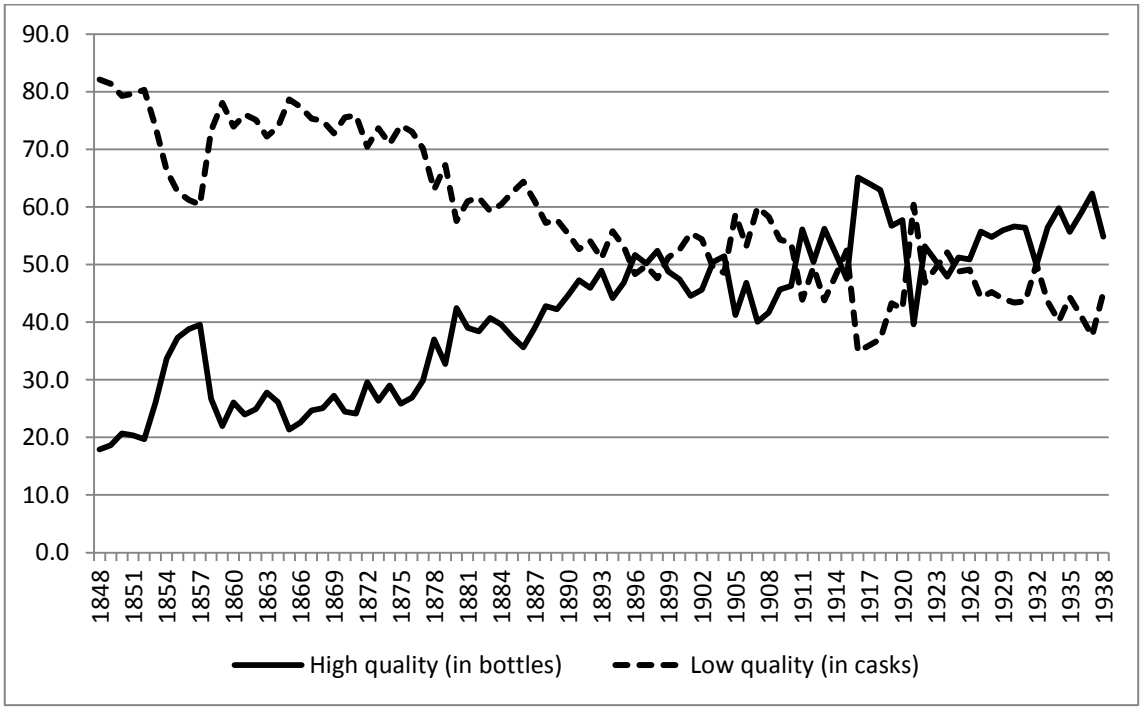
Notes a We have multiplied the quantities exported in hectolitres of each type of wine by its unit value in 1910.
Sources: Own calculation based on Direction General des Douanes, Tableau General.

Figure 2. Wine exports to colonies over French total wine exports



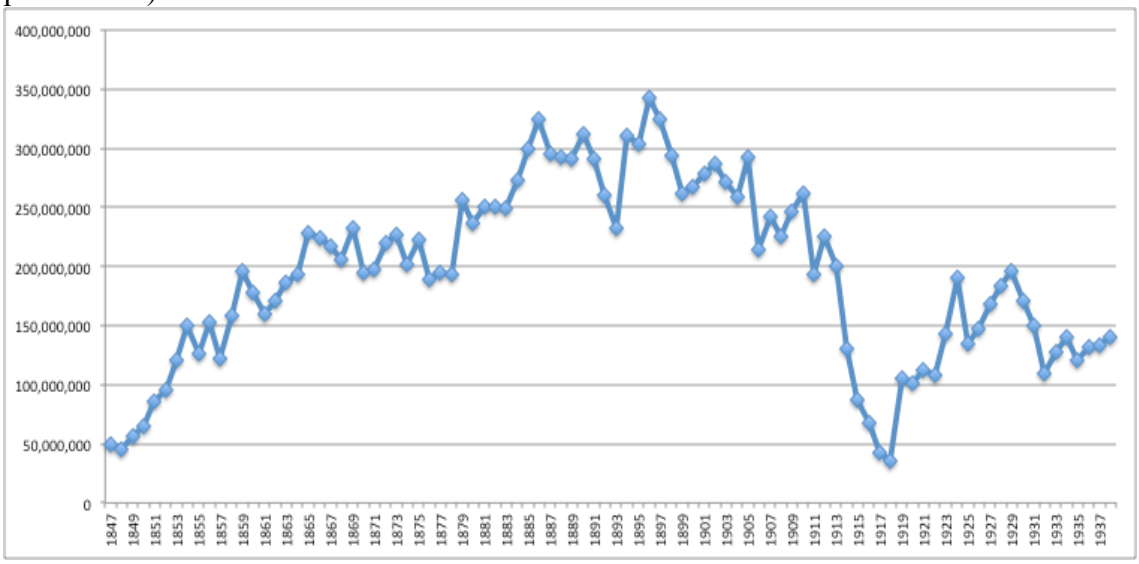
Sources: Own calculation based on Direction General des Douanes, Tableau General.

Figure 3. Export composition (% on current values)



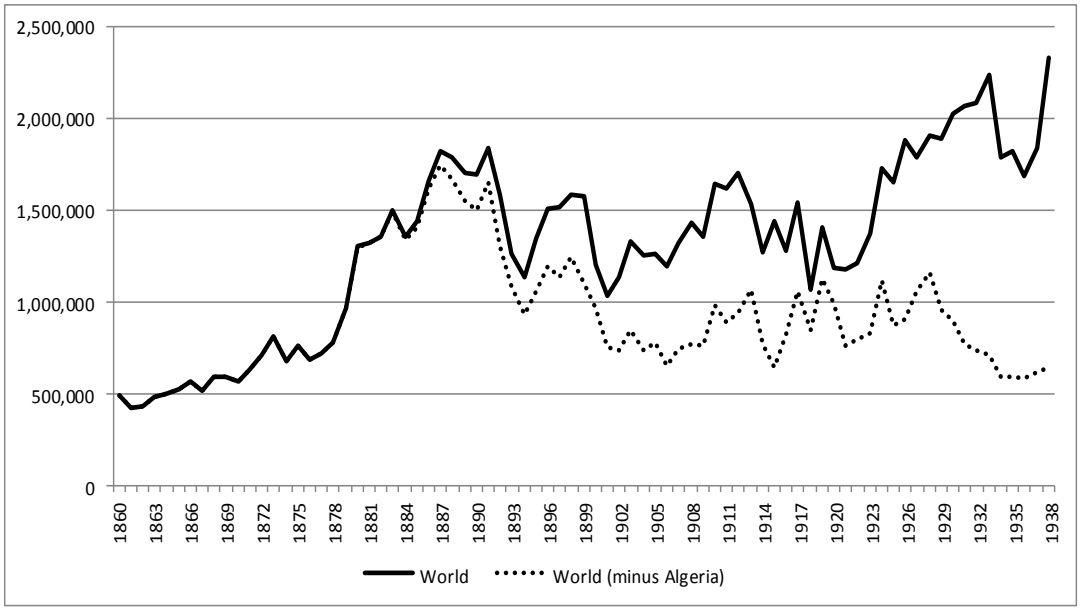
Sources: Own calculation based on Direction General des Douanes, Tableau General.

Figure 4. Evolution of French wine exports (current prices, deflated by a wholesale price index)



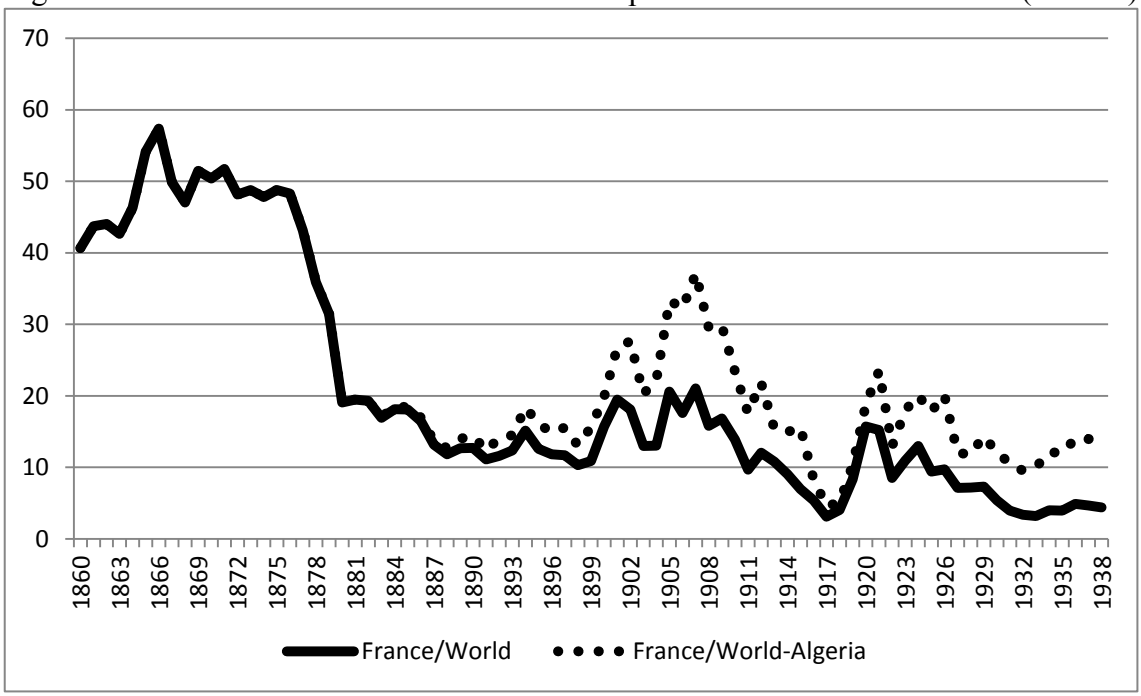
Notes: a Exports at current prices deflated by the French wholesale price index (Mitchell, *International Historical*, pp. 890-891).
Sources: Own calculation based on Direction General des Douanes, Tableau General.

Figure 5. Evolution of world wine exports (volume)



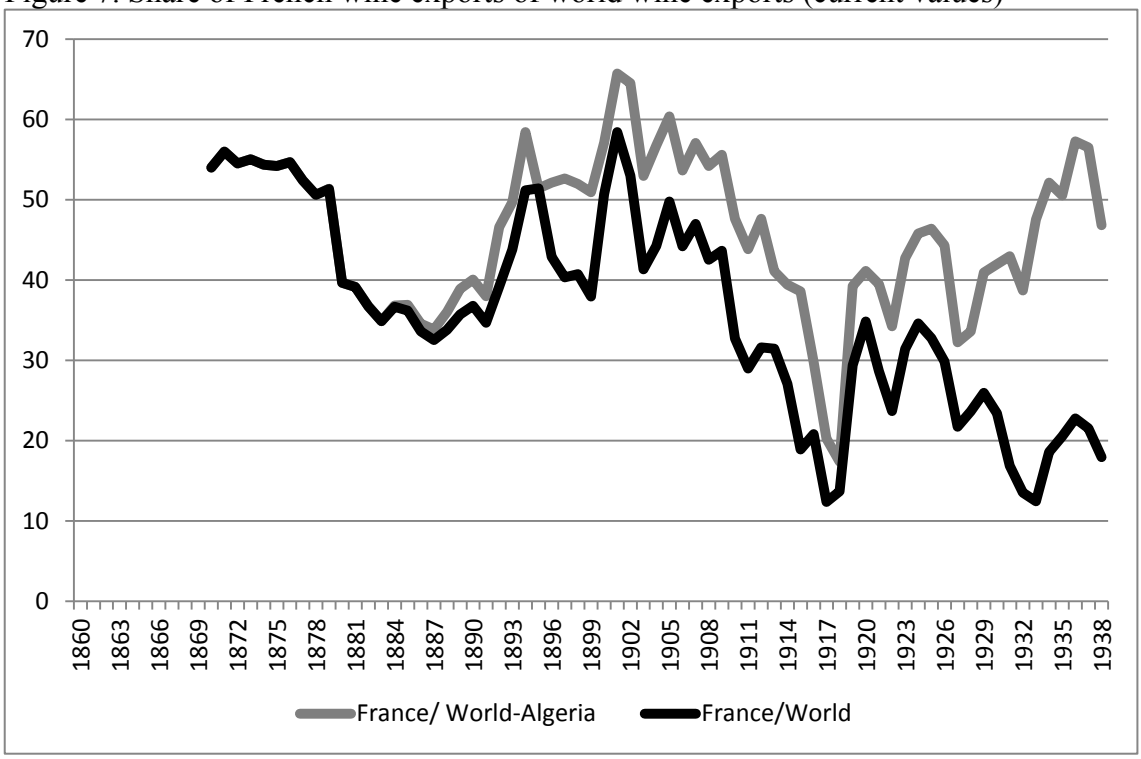
Sources: Anderson and Pinilla, *Annual Database*.

Figure 6. Share of French wine exports of world totals (volume)



Source: Anderson and Pinilla (2017)

Figure 7. Share of French wine exports of world wine exports (current values)



Sources: Anderson and Pinilla, *Annual Database*.

Table 4: Results of the Gravity models estimated by PPML. Total exports of French wine

VARIABLES	(1) PPML(TC)	(2) PPML(TC)+ FE	(3) PPML(Dist)	(4) PPML(Dist)+ FE
l_GDP_{jt}	0.431***	0.0150	0.467***	0.125
	(0.112)	(0.0714)	(0.116)	(0.100)
l_Y_{it}	0.178	0.232***	-0.101	0.120
	(0.134)	(0.0831)	(0.0949)	(0.103)
l_Y_{jt}	-0.122**	-0.296***	-0.138***	-0.283***
	(0.0560)	(0.0352)	(0.0461)	(0.0339)
l_TC_{ijt}	-0.461***	-0.156*		
	(0.107)	(0.0856)		
l_Dist_{ij}			-0.638***	
			(0.141)	
French Colony	0.908**	5.646***	1.103**	5.572***
	(0.400)	(0.957)	(0.438)	(0.891)
WWI	-1.009***	-0.797***	-1.162***	-0.895***
	(0.161)	(0.178)	(0.149)	(0.161)
Dep30	-0.987***	-0.716***	-1.098***	-0.822***
	(0.167)	(0.155)	(0.152)	(0.172)
Soviet State	-6.775***	-5.914***	-6.884***	-6.015***
	(0.231)	(0.0818)	(0.213)	(0.0422)
USA Prohibition	-3.798***	-3.963***	-3.892***	-4.168***
	(0.408)	(0.110)	(0.395)	(0.130)
Constant	4.433***	5.979***	10.86***	5.724***
	(1.374)	(0.427)	(1.229)	(0.545)
Observations	3,003	3,003	3,003	3,003
R^2	0.486	0.756	0.590	0.733
RESET (p-value)	0.02	0.002	0.006	0.17
Importer FE	No	Yes	No	Yes

Notes: a Clustered robust standard errors in parentheses. ***, ** and * denote significant at 1%, 5% and 10%, respectively. [+]Some regressors excluded to ensure that the estimates exist.
b In model (4), the presence of exporter's fixed effects prevents the distance variable from being included.
Sources: Own data base. See Appendix for detailed data description.

Table 5: Results of the Gravity models estimated by PPML. Wine exports in bottles (high quality).

VARIABLES	(1) PPML(TC)	(2) PPML(TC)+FE	(3) PPML(Dist)	(4) PPML(Dist)+FE
l_GDP_{jt}	0.736***	0.529***	0.818***	0.653***
	(0.125)	(0.139)	(0.144)	(0.188)
l_Y_i	0.141	-0.0347	-0.260*	-0.180
	(0.201)	(0.0876)	(0.154)	(0.145)
l_Y_j	-0.140*	-0.0826	-0.165**	-0.0800
	(0.0776)	(0.111)	(0.0665)	(0.108)
l_TC_{ijt}	-0.604***	-0.175*		
	(0.137)	(0.100)		
l_Dist_{ij}			-0.764***	
			(0.166)	
French colony	1.134***		1.461***	
	(0.368)		(0.460)	
WW1	-0.651***	-0.715***	-0.913***	-0.845***
	(0.103)	(0.155)	(0.131)	(0.192)
Dep30	-0.695***	-0.713***	-0.894***	-0.831***
	(0.171)	(0.229)	(0.192)	(0.271)
USA Prohibition	-3.386***	-3.985***	-3.686***	-4.228***
	(0.507)	(0.164)	(0.566)	(0.198)
Constant	-0.403	2.859***	7.183***	2.586**
	(1.434)	(1.055)	(1.645)	(1.151)
Observations	2,983	2,983	2,983	2,983
R^2	0.597	0.823	0.661	0.793
RESET (p-value)	0.00	0.00	0.00	0.03
Importer FE	No	Yes	No	Yes

Notes: a Clustered robust standard errors in parentheses, ***, ** and * denote significant at 1%, 5% and 10%, respectively.

b [+]Some observations and regressors excluded to ensure that the estimates exist. French colony has been excluded in regression with FE because the estimates did not converge.

c In model (4), the presence of exporter's fixed effects prevents the distance variable from being included

Sources: Own data base. See Appendix for detailed data description.

Table 6: Results of the Gravity models estimated by PPML. Wine exports in casks (low quality)

VARIABLES	(1) PPML(TC)	(2) PPML(TC)+FE	(3) PPML(Dist)	(4) PPML(Dist)+FE
l_GDP_{jt}	0.257*	-0.206***	0.272*	-0.106*
	(0.144)	(0.0555)	(0.144)	(0.0610)
l_Y_{it}	0.217	0.381***	-0.0100	0.286***
	(0.158)	(0.101)	(0.0905)	(0.0792)
l_Y_{jt}	-0.122**	-0.387***	-0.134***	-0.371***
	(0.0573)	(0.0421)	(0.0502)	(0.0405)
l_TC_{ijt}	-0.400***	-0.140		
	(0.116)	(0.0909)		
l_Dist_{ij}			-0.599***	
			(0.167)	
French colony	0.815*	4.571***	0.952**	4.580***
	(0.468)	(0.297)	(0.475)	(0.255)
WWI	-1.356***	-1.017***	-1.464***	-1.099***
	(0.244)	(0.207)	(0.232)	(0.192)
Dep30	-1.248***	-0.845***	-1.323***	-0.944***
	(0.296)	(0.207)	(0.278)	(0.216)
Soviet State	-5.968***	-5.098***	-6.040***	-5.189***
	(0.334)	(0.0677)	(0.316)	(0.0410)
Constant	5.906***	6.937***	11.97***	6.588***
	(1.541)	(0.562)	(1.683)	(0.587)
Observations	2,990	2,808	2,990	2,808
R^2	0.223	0.668	0.319	0.661
RESET (p-value)	0.658	0.334	0.340	0.199
Importer FE	No	Yes	No	Yes

Notes: a Clustered robust standard errors in parentheses, ***, ** and * denote significant at 1%, 5% and 10%, respectively.

b [+]Some observations and regressors excluded to ensure that the estimates exist.

c In model (4), the presence of exporter's fixed effects prevents the distance variable from being included.

Sources: Own data base. See Appendix for detailed data description.

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APPENDIX: DATA FOR THE ECONOMETRIC MODELS

Countries: The trade partners of France included in the model are those for which individual data are provided in the statistics: Austria, Belgium, Denmark, Germany, Greece, Norway, Spain, Italy, Russia, Sweden, Switzerland, The Netherlands, United Kingdom (from Europe), Canada and United States (from North America), Argentina, Brazil, Chile, Colombia, Cuba, Equator, Peru, Mexico, Uruguay and Venezuela (from Latin America), Algeria, French Sub-Saharan Africa, Morocco and Tunisia (from Africa), French Indochina, Japan and European Asian colonies (from Asia), and Australia (from Oceania).

Wine types: The wine export series has been constructed based on France's foreign trade statistics which classify wine into seven categories. We have grouped them into just two: ordinary wine (low quality wine) and bottled wine (high quality wine) according to their unit values. Ordinary wine includes: Vins ordinaires en futailles de la Gironde, Vins ordinaires en futailles d'ailleurs, Vins de liqueur en futailles. Bottle wine includes : Vins ordinaires en bouteilles de la Gironde, Vins ordinaires en bouteilles d'ailleurs, Vins de Champagne et autres vins mousseux, Vins de liqueur en bouteilles. Note that in the French foreign trade statistics the meaning of 'vins ordinaires' corresponds to table wines.

Transport costs: In gravity models, the distance between the two trading partners is commonly used to approximate the transport costs between them, which are very difficult to measure for each pair of trading countries. In our case, instead of proxying transport costs with distance, we can use real transport costs. Our variable is time-varying and hence permits us to examine its evolution over time. To calculate the cost of transporting wine, we have used its cost per tonne from Marseille to Saint Petersburg in 1910 (Degrully, 1910). We have subsequently obtained an annual series, in nominal terms based on freight rates calculated by Federico and Tena (2016) for wheat between the port of Le Havre and Odessa. We have subsequently deflated this series with a wholesale price index from France to obtain the real costs (Mitchell, 1992:890-891). Subsequently, we have taken into account the distance between France and each destination country in order to obtain specific freight series for the trade between France and each country. This implies the assumption that transport costs per tonne/mile were similar for wine and wheat, and proportional to the distance for each destination.

Alternatively, we have also replaced the cost of transport with the distance to approximate transport costs (CEPII). Logically, in this case, this variable is time invariant which prevents us from analyzing its evolution.

We cannot measure the impact of the construction of the railway network on transport costs, but it was significant. According to Loubère (1978:285) in France, after the construction of the railway network, the cost of transport was reduced to 3% of the final price of ordinary wine and 1% of quality wine.

Zero values: The model explaining the total exports of French wine contains 23% of zeros, implying that 690 of the observations out of the 3,003 were zero. As for the model for bottled wine exports (high quality), we found 30% of zeros, 899 of the observations of the volume of exports were zero. Finally, we found 36% of zeros in the dependent variable of the model explaining wine exports in casks (low quality), implying 1,087 zero observations.

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