What Determines Exports of Luxury Products? The Case of Cognac

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What determines exports of luxury products? The case of Cognac*

Antoine Bouët†, Charlotte Emlinger‡, Viola Lamani§

Abstract

The objective of this paper is to analyze the determinants of Cognac brandy exports. After describing the building of a unique database concerning Cognac shipments in volume and value terms to almost 120 destinations between 1967 and 2013, we use this database to construct descriptive statistics concerning the evolution of Cognac exports during nearly half a century. This database points out a decrease in the extensive margin of trade while the intensive margin has more than doubled in 46 years in volume. We also construct a database on protectionism affecting the worldwide exports of Cognac: it reveals the proliferation of prohibitions and of high specific tariffs, resulting in a highly taxed product throughout the world. We analyze the determinants of Cognac exports and base our empirical strategy on a two-step procedure with first a linear probability model to estimate the extensive margin, second Ordinary Least Squares to estimate the intensive margin of trade. Beyond results in line with the gravity literature, our most interesting conclusions are: (i) in many estimations, the extensive (respectively intensive) margin of trade is positively (respectively negatively) correlated with an appreciation of the Euro; (ii) like other luxury products, the elasticity of exports of Cognac to distance is negative, significant and relatively small while the elasticity to GDP is positive, significant and relatively large; (iii) all covariates have the expected impact on exports of Cognac except average custom duty on the intensive margin of trade. We discuss this last result and offer two potential explanations, a Veblen effect and an endogeneity of custom duty.

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1 Introduction

In the past couple of decades Cognac export has been a booming sector of the French economy. Produced in a delimited region but sold in more than 100 countries, it is over 95 percent of the total Cognac production that leaves every year the French territory. In 2013, 441 thousand hectoliters of pure alcohol were shipped worldwide. Meanwhile, the value of Cognac shipments in real terms has quadrupled in the past forty-seven years reaching over 2 billion current euros in 2013.

Cognac is a brandy[1] consumed in almost 120 countries around the world. International trade has been a historical priority for the Cognac region for now 10 centuries. While the production of wine started in the region in the Middle Age, the river Charente, nicknamed the Walking Path by the Romans, offered a unique way, thanks to its seaworthiness to transport products to the Atlantic ocean, then to Northern Europe, in particular in the Netherlands. The birth of Cognac is also associated with international trade. The Dutch decided to distill the product coming from Cognac since this low-alcohol wine was not well-preserved during its transportation towards Northern Europe: the brandy Cognac was born and mixed with water at destination for consumption. At the beginning of the 17^{th} century two major discoveries improved the quality of the brandy: first the double distillation invented by the Lord of Segonzac, second the aging in oak casks. This is the real birth of Cognac with the first Cognac House, Augier, created in 1643. There are today 353 Cognac Houses, the most important being Hennessy (42.1 percent of all bottles sold worldwide in 2014), Martell (14.8 percent), Rémy Martin (14.0 percent), Courvoisier (10.9 percent), the four of which concentrate most of total production of the brandy (around 81.8 percent in volume terms in 2014[2]).

Today more than $440,000$ hectoliters of pure alcohol (HL PA) are exported to almost 120 countries while in 1967 only $179,607$ were sold abroad. Simultaneously in 47 years the unit value of Cognac exports has increased by 66 percent in real terms (deflated by the Gross Domestic Product Deflator). What are the reasons of this success story? What are the main drivers of Cognac sales around the world? The objective of this paper is to identify the determinants of Cognac exports. After building a unique database concerning Cognac shipments in volume and value terms to over 100 destinations between 1967 and 2013 and a database on custom protection on brandy, we estimate the impact of geographical, demand and policy factors on trade.

This paper is directly related to the literature on the determinants of the sales and exports of luxury and alcohol products. Indeed Cognac is a luxury product. If Cognac VS (for Very Special - at least two years old) is sold at prices ranging from 25 € to 45 € per bottle in 2015, Cognac VSOP (for Very Special Old Pale - at least four years old) is sold at prices ranging from 32 € to 57 € per bottle in 2015, and Cognac XO (for Extra Old - at least six years old) is the highest quality of Cognac with prices ranging from 45 € to 94

[1] French and English-speaking countries do not use the same definitions of these products. We adopt here the following definition, close to the one of English-speaking countries. Brandy is a distilled beverage made from wine (Cognac, Armagnac). Eau-de-vie is a distilled beverage made from fruit other than grape (Calvados, Poire, ...). Spirits or liquors is an alcoholic beverage obtained from distillation and includes brandies, eaux-de-vie, but also vodka (made from cereals grains or potatoes), gin (from juniper berries), whisky (grains like barley, corn, rye and wheat), rum (sugarcane), ...

[2] All these figures are from Sud-Ouest - April 11, 2015.

€ per bottle in 2015.[3]. Moreover, important Cognac Houses belong to the famous list of the *Comité Colbert* like Martell and Rémy Martin. The Comité Colbert is an association of seventy-five French luxury brands, founded in 1954 by Jean-Jacques Guerlain *to promote the concept of luxury.* Finally it is noteworthy that spirits are classified as a luxury good by studies estimating income-elasticity of demand. Fogarty (2010) conducts a meta-analysis of the demand for alcohol literature. He finds that "spirits income-elasticity estimates are in a range from -0.29 to 2.52 with a mean of 1.15 and a median of 1.24. He concludes that beer is a necessity and spirits a luxury."[4].

Concerning the economic literature on luxury goods, Fontagné and Hatte (2013) study international competition in high-end products (quality is estimated by unit values) by estimating a gravity equation on 416 HS6 products: they find that exports of high-end products are less sensitive to distance and more sensitive to Gross Domestic Product (GDP) than other products. On the same subject Martin and Mayneris (2013) conclude that high-end variety exporters are mainly characterized by more distant markets on average, and that this goes together with a wider geographic diversification of their exports.

The contribution of the paper is two-fold. First we construct a unique database of Cognac exports to around 120 countries on 47 years. This database is based on information coming from the *Bureau National du Cognac*, an interprofessional organization acting on behalf of all the Cognac growers and firms of the region of Cognac. Consequently these are high-quality data in value and volume. Second we estimate the determinants of Cognac exports based on a two-step procedure with first a linear probability model to estimate the extensive margin, then second Ordinary Least Squares to estimate the intensive margin of trade. This procedure allows us to analyze the impact of different determinants on the probability of trade to a destination and on the intensity of trade.

We find that the probability of trade (the extensive margin) to a destination is positively and significantly correlated with GDP, local consumption of alcohol per capita and a Euro appreciation while being negatively correlated with prohibitions and landlockedness. We find that the intensive margin of trade is positively correlated with GDP, GDP per capita, re-exporting status, local alcohol consumption per capita and average custom duty while being negatively correlated with distance, landlockedness and a Euro appreciation. Consequently all covariates have the expected impact on exports of Cognac, except for the average custom duty on the intensive margin of trade. The robustness of these results is tested adopting different measures of the importer's average custom duty and by extending the time-span of the panel.

Concerning the positive relation between Cognac exports and the importer's average custom duty, relation which is counterintuitive, we discuss this result and offer two potential explanations: first protectionism on this commodity may be endogenous, second this is a luxury product which may exhibit an atypical price-elasticity. A Veblen effect may exist.

Beyond the results in line with the literature on gravity equation, two results may be

[3]Some bottles of Cognac are much more expensive. The price of a bottle of Cognac Hennessy Paradis was 924 € on February 2015 on the website LaCognathèque. On the same website you could buy at the same date a bottle of Richard Hennessy for 2,780 €. Paradis is made of eau-de-vie of at least 25 years (40 years in the case of a bottle of Richard Hennessy).

[4]For Nelson (2013) income-elasticity of the demand for spirits is closer to 1. However within the group of spirits income elasticity may vary between vodka, rum and Cognac in particular.

of special consideration. First the elasticity of Cognac exports to distance is significantly negative but relatively low (in absolute terms) as compared to other products. This result has been already highlighted in the literature (see for example Fontagné and Hatte, 2013 or Martin and Mayneris, 2013) and in the case of our estimation it is even lower. Second the extensive margin of trade is positively correlated with an appreciation of the Euro, i.e. the exporter's currency, a relation which has some theoretical foundations (Chaney, 2013), but is seldom empirically verified.

The article is structured as follows. Section 2 presents the database of Cognac exports together with a database on worldwide custom protection on the Cognac product. We then use these original data to present some stylized statistics on the evolution of Cognac exports since 1967. In section 3 we describe our econometric strategy and present our results. In section 4 we conduct robustness checks. Section 5 concludes.

2 Data and descriptive statistics

Two specific databases have been collected during this research project. Most effort has been put in a 47-year long database of Cognac exports from 1967 to 2013[5], while a database on custom protection on Cognac (and more generally on brandy) was collected for a shorter period ($1996 - 2013$) because of lack of availability of the data.[6]

2.1 Cognac sales and export

2.1.1 Database

Raw data of Cognac exports by year and destination has been provided by the Bureau National Interprofessionnel du Cognac. Information on the volume and value of shipments to over a hundred destinations goes from September 1st, 1967 to December 31st, 2013. Between 1967 and 1987 data were paper-based and available on the time dimension of a campaign, from September 1st to August 31st of the following year. Starting from 1988 until now, information was available on a digital and calendar basis.

Different issues were encountered when compiling these data, mainly due to the length of the time series, such as creation/separation of countries, or currency changeover. The first problem with handling a large panel of countries over a long time-span is related to geopolitics. As countries can be created, united or separated over time, our database had to account for such evolutions in the international arena. For example, the countries that were once part of the Union of Soviet Socialist Republics are not represented individually in our database. Consequently we regrouped them after 1991 to recreate the former entity, called FSU (Former Soviet Union). Other groups of countries similar to the FSU, are Ex-Czechoslovakia, Ex-Yugoslavia, Netherlands Antilles, West Indies. Moreover countries that for geographical, economical or political reasons appeared as subdivisions of one other

[5]We are grateful to the Bureau National Interprofessionnel du Cognac for helping us from the start with the constitution of this database but also for the constant attention and the interesting suggestions addressed to our work. In particular we thank Christakis Christodoulou, Stéphane Feuillet, Sébastien Freulon and Catherine Lepage.

[6]Special thanks to Xavier Pichot from the International Trade Centre and Nadia Folio from the Bureau National Interprofessionnel du Cognac.

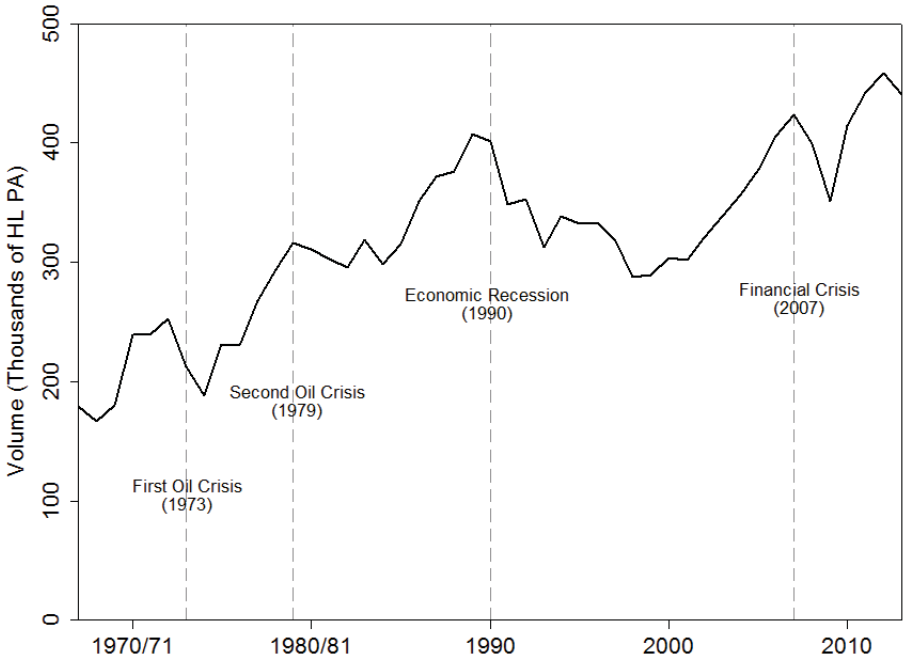

Figure 1: Evolution of total Cognac shipments from 1967 to 2013

were also considered as a unity: Malaysia and Sri Lanka, United Arab Emirates and Oman, Belgium and Luxembourg, etc. For similar reasons Guadeloupe, French Guiana, Martinique, Mayotte, Réunion and Saint Barthélemy were regrouped with France for the whole period of study.

Before 1988, the reference unit of Cognac exports was the French franc (FRF). Based on data provided by Eurostat[7], we then proceeded to establish an exchange rate between the French franc and the fixed Euro using the following formula: $s_{XEU/FRF} = \frac{CF_{XEU/ECU}}{s_{FRF/ECU}}$ with $s_{XEU/FRF}$ the exchange rate euro/FRF, $CF_{XEU/ECU}$ the conversion factor for euro fixed series into ECU), and $s_{FRF/ECU}$ the historical exchange rate of former FRF vs. ECU. The Eurostat data for the exchange rate between the French franc and the fixed Euro was only available from 1971, therefore we turned to the 1971 official fixed exchange rate for the Cognac campaigns: 1967/1968 to 1969/1970.

2.1.2 Descriptive statistics on Cognac sales from 1967 to 2013

Figure 1 presents the evolution of total shipments of Cognac from 1967 to 2013 in volume. At the end of the 1967/1968 Cognac campaign, foreign shipments were equal to about $179,607$ hectoliters of pure alcohol (HL PA), while in 2013, the volume of Cognac exports reached as high as $440,981$ HL PA. In forty-seven years, the volume of foreign shipments has thus more than doubled. However, as shown by Figure 1, there have been significant ups and downs: first oil crisis in 1973, second oil crisis in 1979, economic recession in the early 1990's, financial crisis in $2007-08$, all these economic events have apparently significantly hurt the Cognac world sales.

[7]See http://ec.europa.eu/eurostat/data/database: historical data and bilateral exchange rates.

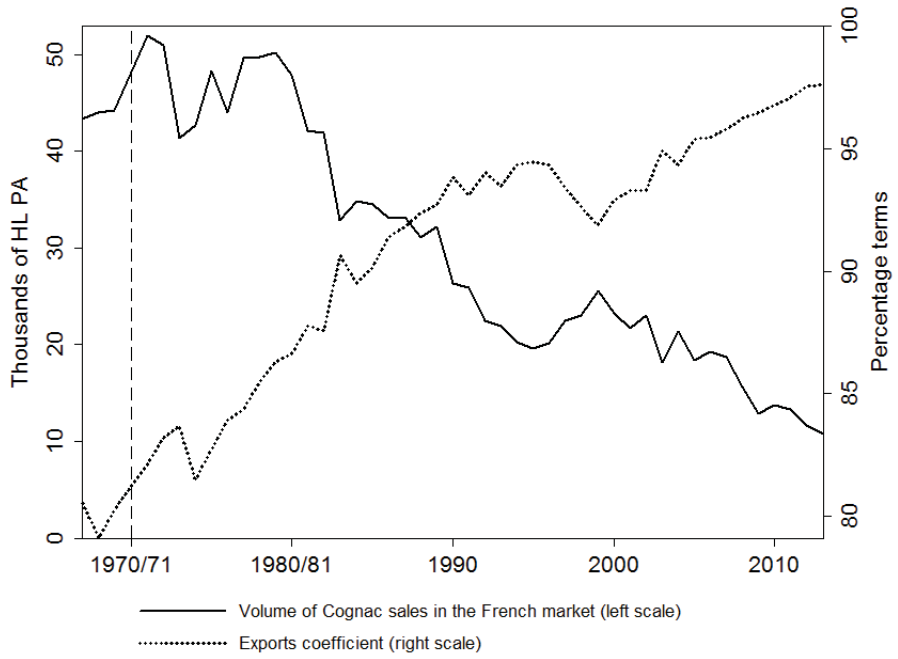

Figure 2: Evolution of the domestic sales and exports coefficient from 1967 to 2013

As stated in the introduction, Cognac is from its inception an export product. While we showed that there has been a growing trend in Cognac exports worldwide, despite the ups and downs, the French market has registered a slow and long decline since the beginning of the seventies. In 1971, the sales in volume on the domestic market were equal to $52,020$ HL AP, while in 2013, it had decreased to $10,829$ HL AP, a division by 4.8 in 42 years. Meanwhile the rate of foreign exports compared to the overall shipments (export coefficient) of Cognac has gone beyond the 95 percent threshold (see Figure 2).

Concerning the long term decrease of the sales of Cognac in France, at least two reasons have been put on the table during discussion with the Bureau National Interprofessionnel du Cognac. First brandy is the object of excessive indirect taxation in France. Second the Cognac was traditionally consumed as a digestif in France, that is to say drunk after the dinner. Abroad it has been for a long time drunk alone or mixed in cocktails (with sparkling water or soda) as an aperitif (before the dinner), a custom that is not widespread in France where aperitifs prioritize rum (mojito, punch, pina colada).[8]

In 1967, Cognac was shipped to 148 countries. As shown by the graph 3, there is to be a concentration of destinations, as the number of importing countries has decreased to 119. This is an important feature of this sector: the total exports in volume and in value are increasing in the long term while the number of importing countries is decreasing (see Figure 3. Several facts explain most of this phenomenon. First a certain number of countries (15) have implemented prohibitions of brandy sales between 1979 (Iran) and today, most of them in application of the islamic law. Second some countries, in particular in Africa,

[8]See also Coussié, 1996. Both explanations have also been cited by newspapers like Le Figaro (11/18/2011), la Charente Libre (11/9/2011), La Vigne-Mag (11/9/2011) or by websites focusing on Cognac (www.cognacforgeron.com).

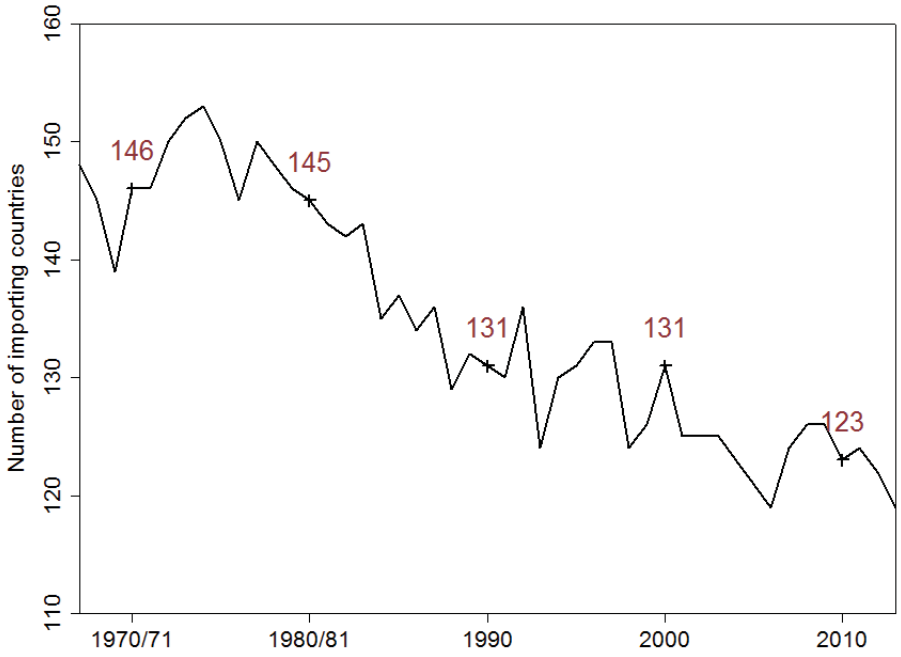

Figure 3: Number of destinations of Cognac exports from 1967 to 2013

have experienced civil war between 1990 and 2005 (Burundi, Chad, Comores, Rwanda...) and consecutively interrupted their imports of Cognac. The remaining ones that ceased to import Cognac have recorded economic stagnation or even recession[9]: this point will be tackled by our econometric estimation.

Europe has been the cradle of Cognac consumption. In the 18^{th} century the first exports of Cognac were in England and Northern Europe. After the second world war, Europe is still the first continent in terms of destination of exports: in 1967, European imports were equal to $118,140$ hectoliters of pure alcohol. The creation of the customs union in 1968 may have played an important role in expanding the trade of goods across the European community members. The volume of European imports increased by nearly 36 percent in a four-harvest year time span (1967/1968 - 1971/1972). However shipments to Europe decreased due to the oil crises and a slowdown of economic activity starting in the early 1980's in relative terms vis-a-vis other continents (see Figure 4). In 1980, shipments to Europe were still more important both in terms of volume and value, than shipments to the Americas and Asia. In the mid-eighties, while Europe entered a rather long phase of decline, the American and especially the Asian markets were becoming the most dynamic destinations of sales.

Figure 5 shows the distribution of Cognac exports to America between 1967 and 2013: the United States has always been by far the main destination in this continent while Cognac exports to Canada and Latin America were quite marginal. It is however necessary to pinpoint that Cognac consumption in the United States, greatest importer of the region, is irregular. On one hand, Cognac is a usual target of US retaliation exerted under the aegis

[9]These are all African countries. Let us remind that the 1980's and the 1990's decades are often referenced as the lost decades in Africa.

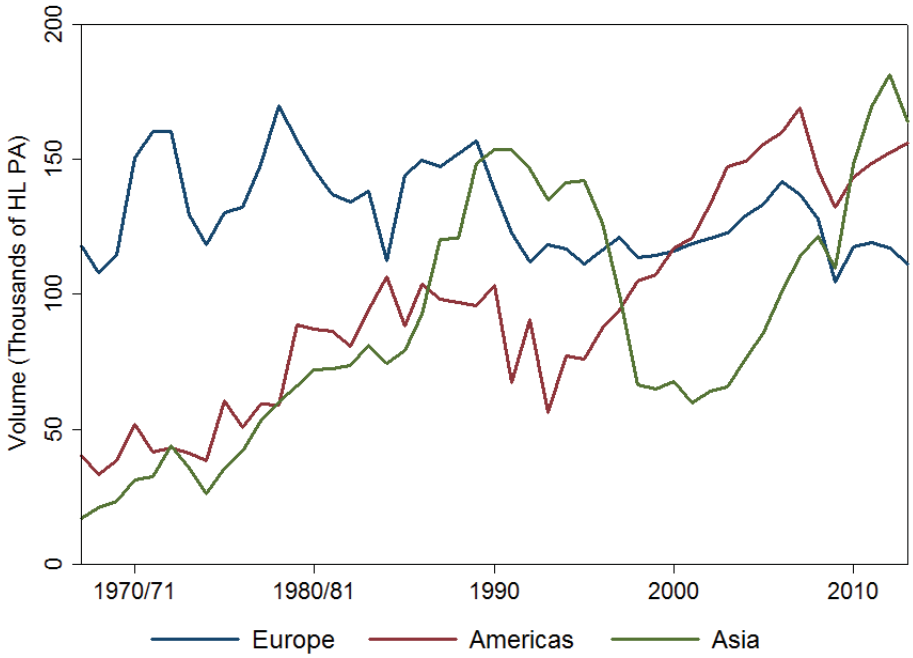

Figure 4: Cognac exports by continent from 1967 to 2013

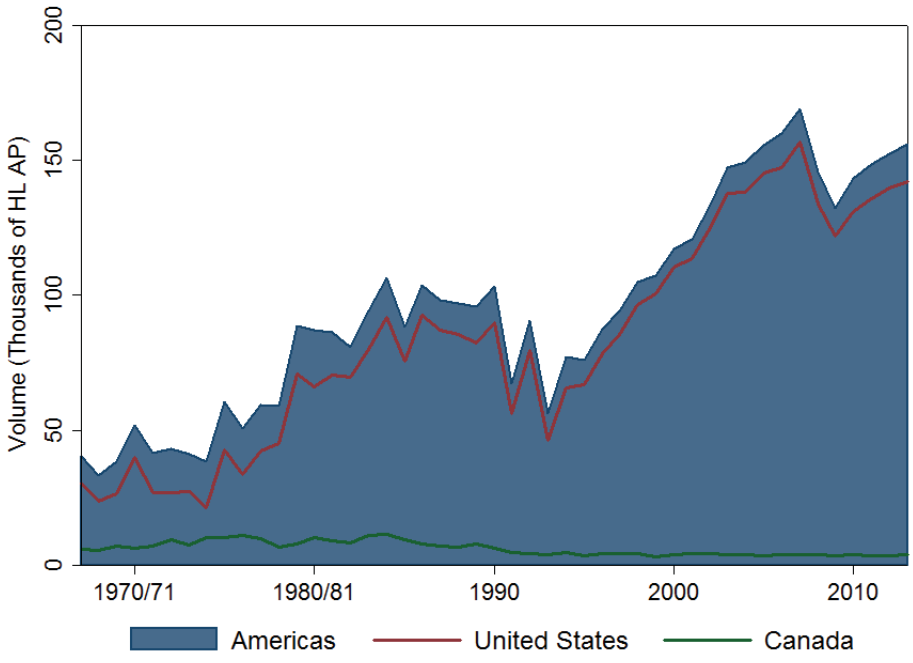

Figure 5: Distribution of Cognac exports to America from 1967 to 2013

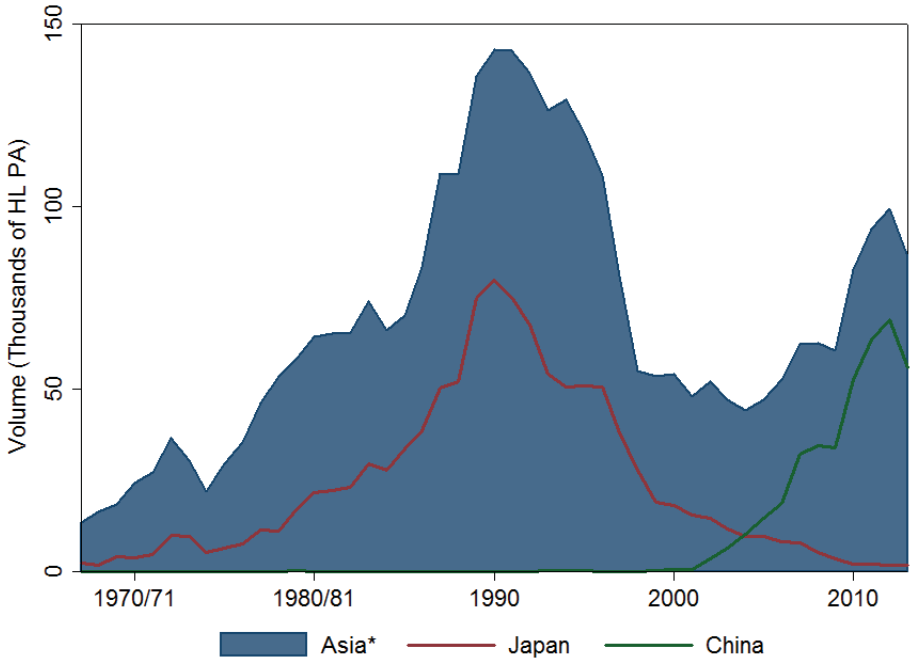

Figure 6: Distribution of Cognac exports to Asia* (Singapore and Hong Kong excluded) from 1967 to 2013

of the multilateral trading system and its dispute settlement mechanism[10]. On the other hand, Cognac became a fashion consumption good when Cognac was referenced in rap lyrics and the African-American culture: in 2001 after Busta Rhymes, Puff Daddy and Pharell Williams sang *'Pass the Courvoisier'*, exports of Cognac to the US jumped by 30 percent in one year. Since 1979, the US destination is each year the first destination of Cognac exports in volume with the exception of 1991 and 1993 when the US was outpaced by Japan.

At the beginning of the 1990, the slowing down of sales to Europe and America places Asia at the forefront of Cognac exports destination. Then the mid-1990's were morose for Cognac exports, consequences of the Gulf war and of the financial crises of Southeast Asia and Japan. The 2000-2010 decade saw a boost of Cognac exports, with the Americas as the greatest importing continent and Asia achieving its pre-crisis level only in 2010, twenty years after it. Having 'survived' the 2007 financial turmoil better than Europe and the Americas, Asia becomes in 2010 the first importing continent (see figure 6). It is noteworthy that Cognac exports to Japan have been booming until 1990 then have continuously declined until today. Exports to China have relayed and this destination is now a priority for Cognac Houses. Meanwhile, Africa and Oceania are only marginal destinations for Cognac exports, with less than 5,000 HL AP (2 million bottles) each.

[10]See the chicken war, in 1962-63, and more recently the maize war in 1986 when Spain and Portugal acceded the European Union. Each time the US government exerted retaliation on exports of Cognac.

2.2 The protection database

Three types of custom instruments restrict worldwide exports of Cognac: ad valorem duties (duties defined in percentage), specific duties (defined in monetary units by units of volume), and prohibitions. In the study we do not take into account domestic fiscality and in particular consumption taxes levied on the sales of Cognac.

Information on ad valorem and specific custom duties comes from the International Trade Center. Information on prohibitions come from the Bureau National Interprofessionnel du Cognac. 15 countries are applying today a prohibition on the sales of brandy in general, Cognac in particular: Afghanistan, Saudi Arabia, Bangladesh, Brunei Darussalam, Guyana, Iran, Kuwait, Libya, Mauritania, Pakistan, Somalia, Sudan, Surinam, Yemen and Zimbabwe. Prohibitions are seldom complete since sales of Cognac may be authorized to luxury hotels, duty free shops, or religious minorities.

While ad valorem duties were easy to treat, the only difficulty being the identification of the trade regime - MFN or regional -, we met several difficulties in the treatment of specific duties. All monetary amounts were converted into €. Exchange rates are annual averages of daily observations from Datastream. Specific duties were either defined by hectoliter, by hectoliter of pure alcohol, by liter, or by liter of pure alcohol. We also met gallons under several definitions, in particular either US gallons or imperial gallons.[11] Specific duties are sometimes applied on "per proof" gallons or liters.[12]

Table 1 indicates summary statistics on this database covering 18 years and 193 importing countries. It shows that custom protection on Cognac exports is very high. The simple average of ad valorem duties on all destination*year pairs is 38.1% when 0 are included, but 67.4% when 0 are excluded. The highest ad valorem duty is 3,000% and is still implemented in Egypt in 2015.

Table 1 shows the average world protection on line HS6 220820: Spirits obtained by distilling grape wines or grape marcs (grape brandy). Therefore this line concerns mostly Cognac. Is this line the object of specific protectionism throughout the world? In order to respond to this question we obtained from CEPII[13] (MacMAP database) the data on world protection (simple average) in 2001, 2004, 2007, 2010, 2011 and 2013 on chapter 22 (Beverages, spirits and vinegar) by HS6. These data are represented in Annex 2 (file attached).

Protection is already high on mineral waters, sodas, fruit and vegetable juice (lines 220110 to 220290), lower on vinegar (220900), and very high on alcoholic beverages (220300 to 220890). Consequently protection on brandies is comparable to protection on other alcoholic beverages.

Moreover it is noteworthy that our measure of an average ad valorem equivalent of custom duty is higher than the one provided by the MAcMAP database. There are at least three explanation. First we use a different unit value to calculate the Ad Valorem Equivalent of specific duties. Second our country coverage is different and covers more countries. Rates of

[11] The imperial gallon is defined as 4.54609 liters, and is used in the United Kingdom, Canada, and some Caribbean nations; the US gallon is defined as 3.785 liters and is used in the US and some Latin American and Caribbean countries.

[12] A proof gallon is one liquid gallon of spirits that is 50 percent alcohol at 60 degrees Fahrenheit. So distilled spirits bottled at 80 proof (40 percent alcohol) are 0.8 proof gallons per gallon of liquid.

[13] Many thanks to Houssein Guimbard for his kind cooperation.

Table 1: Worlwide custom protection on Cognac - 1996/2013 - Statistics for 193 importing countries

	AV Duty	Spec. duty HL PA	Spec. duty bottle	AVE of Spec. duty	Prohib.	Global AVE	Global AVE w/ Proh.
Min	0.0 %			0.0 %	0	0.00%	0.0 %
Max	3,000 %	1,076.9 €	38.5 €	2,065.9 %	1	3,000 %	3,000 %
Simple Average	38.1 %	41.8 €	1.49 €	75.4 %	7.22 %	113.5 %	149.6 %
Median	10.0 %			0 %		20.0 %	21.5 %
Simple Average (0 excl.)	67.4 %	232.7 €	8.31 €	419.0 %		153.5 %	196.5 %

AV means Ad Valorem; AVE means Ad Valorem Equivalent; excl. means excluding
Prohib. means Prohibitions; w/ Proh. means with Prohibitions.

protection are very high in a certain number of countries and if we remove the ten countries where protection is the highest (Vanuatu, Belize, Kiribati, Solomon Islands, Seychelles, Malaysia, Namibia, Papua New Guinea, Fiji, Egypt) we obtain a measure which is quite close to the one provided by MAcMAP; for example in 2013, the average protection on 220820 is 34.75 percent for MacMAP and 36.33 percent according to our evaluation when these 10 countries are removed. Third our average protection on line 220820 given in Table 1 (113.5 percent) also includes protection data from 1996 to 2001 and protection on this line has significantly decreased during this period.

Specific duties on brandy imports are relatively high. Their simple average is 41.8 € per HL PA, which is equivalent to 1.49 € per bottle of 70 cl and 40 degrees[14]. If 0 are excluded, this simple average is 8.31 € per bottle of 70 cl and 40 degrees. On 7.22% of all destination*year pairs, there is a prohibition. The two last columns of Table 1 indicates a global average by adding the different elements of custom protection. Column "Global AVE" does not take into account prohibitions. Column "Global AVE w/ Prohib." takes into account prohibitions by estimating an ad valorem equivalent to prohibition at 500%. National custom protection on Cognac varies from 0% to 3000%.

3 Econometric estimation

We first detail our empirical strategy and describe data. Then we present results and conduct robustness checks.

[14]To estimate ad valorem equivalents of specific duties we divide the specific duty by the yearly average unit value. We take the annual average unit value and not the bilateral unit value to avoid endogeneity bias; high specific duties could lead to a change in the composition of the quality exported to decrease protection in relative terms.

3.1 Empirical strategy and data

Our evaluation of the determinants of Cognac exports is based on a gravity equation.[15] In this model, exports depend on demand (GDP of importing country), supply (GDP of exporting country) and trade costs (tariffs and transportation costs proxied by distance and other geographical and historical factors).

Our equation presents specific features. First, as we perform estimation only on French exports, we do not need exporter's GDP: supply can be controlled using time fixed effects.

Second, we add importer's GDP per capita, consumption of alcohol per capita to take into consideration the characteristics of Cognac demand, as a luxury product and an alcoholic beverage.

Third we considered a religion variable, in particular a dummy which takes the value one when half or more of the population is muslim [16]. However this variable is significantly and negatively correlated with the consumption of alcohol per capita. The integration of both variables gives inconsistent results while integrating only one gives consistent results for both variables and similar results for others: when integrated separately, the coefficient of the consumption of alcohol per capita is positive and significant and the coefficient of the religion variable is negative and significant while when they are integrated in the same regression both coefficients are significant and positive. We prefer to omit one variable and to keep the consumption of alcohol per capita which is not a binary variable and, as such, a better measurement of a local taste for alcohol.

Fourth, Anderson and von Wincoop (2003) recommend to use relative trading costs in gravity equation and not absolute trading costs: trade from i to j is all the more important that i and j are nearby, but also that i and j are far from all other countries. In our specification we do not need to construct a relative distance indicator and relative protection rate since all exports are from France to j. Fourth, as the international trade of Cognac is characterized by a high level of re-exportation from a limited number of countries, we use a "re-exporter" variable to take into account this pattern.[17]

Fifth following Grossman, Melitz and Rubinstein (2007) we could consider the case where the sample of destinations of Cognac exports is a non random sample (destinations whose GDP might be too low or which are too distant from France could be potentially excluded). In that case conventional estimators, such as least-squares, applied on a sample of non-zero exports would be biased and we should adopt the Heckman (1979)'s two-step procedure to correct this sample selection issue. A right selection variable would be the prohibition variable. However, following this method, we find that our sample of destinations of Cognac exports is not biased. Consequently least-squares estimators are not biased.

We proceed by first evaluating the impact of the traditional and more specific gravity determinants on the probability of exporting to a given destination (extensive margin) and then on the volume of these exports (intensive margin).

Let $Q_{j,t}$ be the volume of Cognac exported to country j at time t. We note $\Phi_{j,t}$ a binary variable with $\Phi_{j,t} = 1$ if $Q_{j,t} > 0$ and $\Phi_{j,t} = 0$ if $Q_{j,t} = 0$. The extensive margin is estimated

[15] See Head and Mayer, 2014, for a complete presentation.

[16] Source: CIA Factbook.

[17] The list of re-exporting countries has been provided by the Bureau National Interprofessionnel du Cognac.

following equation 1 using a linear probability model. Using alternative nonlinear models like probit or logit in presence of year fixed effects would yield biased results as the fixed effects maximum likelihood estimates would be inconsistent due to the incidental parameter problem[18].

$$Prob[\Phi_{j,t} = 1] = \alpha_0 + \alpha_1 ln(Y_{j,t}) + \alpha_2 ln(y_{j,t}) + \alpha_3 ln(d_j) + \alpha_4 ln(e_{j,t}) + \alpha_5 ln(AC_{j,t}) + \alpha_6 ln(AVE_{j,t}) + \alpha_7 Ll_j + \alpha_8 Pr_{j,t} + \nu_t + u_{j,t} \quad (1)$$

The intensive margin is estimated by ordinary least squares following equation 2.

$$ln(Q_{jt}) = \alpha_0 + \alpha_1 ln(Y_{j,t}) + \alpha_2 ln(y_{j,t}) + \alpha_3 ln(d_j) + \alpha_4 ln(e_{j,t}) + \alpha_5 ln(AC_{j,t}) + \alpha_6 ln(AVE_{j,t}) + \alpha_7 Ll_j + \alpha_8 Rel_j + \alpha_9 Reexp_j + \alpha_{10} Pr_{jt} + \nu_t + u_{jt} \quad (2)$$

where $Y_{j,t}$ country j's GDP at time t, $y_{j,t}$ the GDP per capita of country j at time t, d_j the distance of France to country j and $e_{j,t}$ is the nominal exchange rate of country j's currency vis-a-vis the Euro, AC_{jt} is the consumption per alcohol per capita in country j at year t[19], $AVE_{j,t}$ is the global average custom protection on brandy[20] (ad-valorem equivalent), implemented by country j at year t (see section 2.2). Other variables are dummy variables: Ll_j is a dummy taking the value 1 if country j is landlocked, $Reexp_j$ a dummy that equals 1 if country j is either Hong-Kong, Panama, Singapore, United Arab Emirates or the Netherlands (list of re-exporting countries given by the Bureau National Interprofessionnel du Cognac), Pr_{jt} is a dummy variable that takes the value 1 if country j implemented a prohibition on brandy at year t. Finally, ν_t are time fixed effects.

Data on each country j's GDP and GDP per capita are in constant 2005 US dollars and were retrieved from the World Bank World Development Indicators Databank. Nominal exchange rates are annual averages of daily observations from fxtop.com[21] and we use CEPII's weighted bilateral distance measure. The variable $AC_{j,t}$ representing the consumption of alcohol per capita, expressed in liters of pure alcohol, is from the World Health Organization. The variable Ll_j is from CEPII. Summary statistics of the aforementioned variables and the list of all importing countries in 2013 are available in the Appendix, in Tables 5 and 6 respectively.

Equations 1 and 2 are estimated for the period $1996-2013$: tariffs data are not available before 1996. However we proceed to the same estimations without the variable $AVE_{j,t}$ on a 47-year-long database on Cognac exports (period $1967-2013$ - see section 3.3).

[18] For a detailed description of this problem see for example: Lancaster (2000), Greene (2002), Arellano and Hahn (2006).

[19] The risk of a collinearity between this variable and the dependent variable is small. Based on statistics from the World Health organization we estimate at 6.2 the consumption of liters of pure alcohol (PA) per capita in 2010. With a world population of 6.9 blns and sales of cognac at 396,292 hl of PA in 2010, we estimate at 0.09 percent the share of Cognac in the total consumption of alcohol in the world.

[20] HS6: 220820: Spirits Obtained By Distilling Grape Wine or Grape Marc.

[21] Whenever fxtop.com data were missing, we resorted to annual averages of midpoint daily rates from oanda.com

3.2 Results

Columns $1-2$ and $3-4$ of Table 2 report the results of estimation of equations 1 and 2 respectively.

"Classical" gravity variables have significant coefficients with the expected sign: the importing country's GDP has a significant and positive impact on Cognac exports, whether on the probability of trade (the extensive margin) or on the trade volume (the intensive margin). Distance, on the other hand, has the opposite impact both on the probability of trade and trade volume.

The GDP per capita of the destination country seems to have a negative impact on the probability of trade. Landlockedness acts as a trade barrier, restricting both positive trade volume and probability of trade. The variable controlling for local consumption of alcohol in the destination markets has a positive impact on the trade volume and probability of trade.

The exchange rate has a significant positive impact on the probability of trade and the opposite impact on the intensive margin (columns 1 and 3), which means that the appreciation of the euro would increase the probability of trade but decrease Cognac trade volumes. The decision in favor of exporting Cognac to a given destination depends on whether local sales would be enough to cover for fixed costs of establishing a positive trade flow. In case of an euro appreciation, the price of the local currency (destination's currency) vis-a-vis the euro decreases, which implies that fixed trade costs in local currency also decrease. Therefore as long as these costs are in local currency, it is not surprising that the impact of the exchange rate on the extensive margin is positive. This positive effect of exchange rate on the extensive margin of trade while the effect is negative on the intensive margin has some theoretical foundations (see for example Chaney, 2013).[22]

Meanwhile, a status of re-exporter country has a positive and significant impact on trade volumes.

In columns 2 and 4 we add controls on prohibitions and custom protection implemented in the destination markets. As expected, prohibitions prevent product from entering into markets, as its estimated coefficient is significant and negative (column 2) but they do not have a significant impact on trade volumes. Custom protection on the other hand, have no impact on the extensive margin but a positive and significant one on the intensive margin.

3.3 Discussion

We compare the results of Table 2 with those in the existing literature and in particular with studies focusing on the determinants of high-end vs. low-end export flows.

According to our estimations, the elasticity of Cognac exports to the GDP of the importing country is 0.68. This estimated coefficient is slightly greater than other luxury products according to Fontagné and Hatte (2013): 0.4866 when considering worldwide export flows and 0.556 in the case of French export flows.[23] The destination country's wealth (GDP

[22] "Since the entry cost into the foreign market is paid in foreign currency, this means a relaxation of the liquidity constraint for constrained exporters" (Chaney, 2013, p. 22).

[23] Fontagné and Hatte (2013) base their estimations on OLS with distance, GDP, and GDP per capita as covariates.

Table 2: Extensive and Intensive margins of trade (1996-2013)

	(1) Extensive Margin	(2) Extensive Margin	(3) Intensive Margin	(4) Intensive Margin
ln GDP	0.06***	0.04***	0.68***	0.67***
	(0.00)	(0.00)	(0.02)	(0.02)
ln GDP/cap	-0.01*	0.01	0.40***	0.42***
	(0.01)	(0.01)	(0.04)	(0.05)
ln Distance	-0.06***	-0.04***	-0.25***	-0.36***
	(0.01)	(0.01)	(0.05)	(0.06)
Landlocked	-0.20***	-0.21***	-0.57***	-0.63***
	(0.02)	(0.02)	(0.12)	(0.12)
ln Exchange rate	0.01***	0.00	-0.05***	-0.02
	(0.00)	(0.00)	(0.02)	(0.02)
ln Alcohol Cons/cap	0.09***	0.06***	0.50***	0.59***
	(0.01)	(0.01)	(0.05)	(0.05)
Prohibition		-0.37***		-0.36
		(0.05)		(0.36)
ln Global AVE I		-0.01		0.64***
		(0.01)		(0.09)
Re-exporter			2.11***	2.69***
			(0.24)	(0.27)
Time FE	yes	yes	yes	yes
N	2685	2087	2050	1691
Adj. R^2	0.296	0.317	0.645	0.647

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

per capita) impact on Cognac trade flows, estimated at a 0.40 order of magnitude, is also comparable to Fontagné and Hatte (2013)'s estimations (0.3145 and 0.394 in case of worldwide and French high-end export flows respectively) but significantly lower than in Martin and Mayneris (2013)results (0.87) based on aggregated French-firm level data for 2005 on 200 products.[24] On the other hand, the impact of distance on Cognac exports is significantly lower in absolute value compared to other luxury products in Fontagné and Hatte (2013): -0.25 in the case of Cognac; -0.734 and -0.578 for worldwide and French exports respectively in Fontagné and Hatte(2013). So Cognac is a luxury product whose exports are negatively affected by distance but much less sensitive to distance than other products, including other luxury products.

As to the significant positive impact of custom duties on Cognac trade flows (0.64), so that an increase of a tariff on Cognac leads to more sales of the product worldwide, we offer the following explanations.

First as stated in introduction and confirmed with the elasticity of exports with respect to distance, Cognac is a luxury product. The economic analysis of demand for luxury product is seldom.

In their estimation of a gravity equation on wine, Dal Bianco et al. (2015) found coefficients of tariffs negative in all specifications. In their preferred estimation (PPML) the elasticity of trade to tariffs is 0.472. For Raimondi and Olper (2011), trade of spirits is negatively and significantly responsive to tariffs, but less (in absolute value) than trade of wine or trade of soft drinks. Elasticity of trade to tariffs are in a range of -1.0 to -2.1 across methodologies concerning spirits, in a range of -1.4 to -8.4 concerning wine and in a range of -3.0 to -5.1 concerning soft drinks

With traditional assumptions on utility, i.e. utility uniquely depends on own consumption and marginal utility is positive and decreasing, it cannot be concluded that the demand for luxury product is increasing with price. Indeed, in the case of a Giffen product, demand decreases with price decreasing. However this is due to the fact that: (i) a Giffen product is an inferior good; (ii) the budget share allocated to this good is substantial. Consequently the price decrease implies a massive income effect and the consumer decreases consumption of this good to switch to other goods.

With a good supporting positive, or even greater than unity, income elasticity like Cognac, in case of a price increase, both substitution and income effects are negative and consumption must decrease. So we have to find an explanation with a different theoretical framework. Following Morgenstern (1948) and Duesenberry (1949), Leibenstein (1950) proposes to relax the assumption that consumption of any individual is independent of the consumption of others. Based on this point of departure he derives three effects: the *bandwagon* effect when a consumer's demand is increasing with the demand of other consumers, the *snob* effect when a consumer's demand is decreasing with the demand of other consumers, and the *Veblen* effect when a consumer's demand increases with price. The last effect is related to conspicuous consumption: utility derived from buying a unit of this good depends on the intrinsic qualities of this good and positively on the price paid for it. Consequently demand for this good depends not only on the price really paid by the consumer, but also

[24]Martin and Mayneris (2013) baseline estimation uses GDP per capita, population and distance as covariates in an OLS regression.

on the *conspicuous* price, i.e. the price that other people think the consumer paid for it, or as stated more precisely by Leibenstein (1950 - p. 203) "'the price that the consumer thinks other people think he paid for the commodity"'.

Let us add that these *untraditional* effects are present in the social interaction literature. Since Leibenstein (1950), several theoretical approaches have been proposed to better account for bandwagon effects in consumer demand behavior: Becker (1974), Bernheim (1994), Granovetter (1978) or Akerlof (1997). In particular Granovetter (1978) uses a threshold model in which an individual decision to consume a particular good depends on the number of people who decided to consume that good in previous periods. The extent to which previous consumers affect an individual choice can, in turn, depend on the importance of social ties among consumers.[25]

The second explanation that we propose is that the tariff may be endogenous to Cognac exports. Many importing countries are small and/or developing countries with limited domestic fiscal base. Imports of Cognac being associated with conspicuous consumption, a government may react to the occurrence of imports of this product on its territory by imposing custom duties. Custom duties are a politically appreciated source of public revenue (there is a large literature on endogenous protectionism). This effect is exacerbated considering that Cognac brandy is a *vice* product and might be the object of high taxation, not only excise duties but also custom duties. Increase in Cognac imports may encourage local authorities to again augment custom duties on this product, in order to collect more revenues and fight the consumption of a *vice* product, while local consumers are presumably rich.

It is likely that the demand for Cognac is price-inelastic: Fogarty (2010) and Nelson (2013) confirm that the demand for spirits is inelastic to price (-0.55 for Nelson, 2013). For this author this explains why there is a continuing policy interest in alcohol taxes (Nelson, 2013, p. 313). This point was already mentioned by Ramsey (1927) In taxing commodities which are rival for demand like wine, beer and spirits, the rules to be observed is that the taxes should be such as to leave unaltered the proportion in which they are consumed (Ramsey, 1927, p. 59)

3.4 Robustness tests

We perform two tests in order to check the robustness of our results. First, we estimate equations 1 and 2 using alternative measures of custom protection (Table 3). Second, we expand our panel, covering the period $1967 - 2013$ (Table 4).

3.4.1 Alternative custom protection measures

We use different computations of average protection on Cognac to test the robustness of our results obtained in the second and forth column of Table 3. The Ad Valorem Equivalent of specific duties is either calculated by dividing the specific duty expressed in Euros by hectoliters of pure alcohol by the annual average unit value on flows towards all destinations (methodology used in Table 1 and in the central estimations) or by the unit value of the flow to this specific destination (*ln Global AVE II*). Using this alternative measure of custom

[25] We thank Tanguy Bernard for indicating and explaining all this literature.

protection leads to the same results, that is to say, that custom duties have no impact on the probability of export of Cognac, but a significant positive impact on the traded volume.

In the second and fourth columns we use a different control for custom protection (ln AVE (MacMap)) based on the MacMap Database from CEPII. The results we obtain are qualitatively similar to the previous ones.

Table 3: Extensive and Intensive margins of trade (1996-2013)

	(1)	(2)	(3)	(4)
	Extensive Margin	Extensive Margin	Intensive Margin	Intensive Margin
ln GDP	0.04***	0.05***	0.68***	0.66***
	(0.00)	(0.01)	(0.02)	(0.04)
ln GDP/cap	0.01	0.01	0.41***	0.40***
	(0.01)	(0.01)	(0.05)	(0.09)
ln Distance	-0.04***	-0.05***	-0.37***	-0.33***
	(0.01)	(0.01)	(0.06)	(0.10)
Landlocked	-0.21***	-0.18***	-0.60***	-0.54**
	(0.02)	(0.04)	(0.13)	(0.23)
ln Exchange rate	0.00	0.00	-0.02	-0.01
	(0.00)	(0.01)	(0.02)	(0.04)
ln Alcohol Cons/cap	0.06***	0.05***	0.59***	0.60***
	(0.01)	(0.01)	(0.05)	(0.09)
Prohibition	-0.37***	-0.44***	-0.35	0.70
	(0.05)	(0.09)	(0.36)	(0.58)
ln Global AVE II	-0.00		0.66***	
	(0.01)		(0.08)	
ln AVE (MacMap)		0.07		0.75**
		(0.04)		(0.30)
Re-exporter			2.71***	2.92***
			(0.27)	(0.47)
Time FE	yes	yes	yes	yes
N	2087	664	1691	534
Adj. R^2	0.317	0.310	0.650	0.615

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

3.4.2 Extending the panel to the period 1967-2013

We test the robustness of our baseline results by expanding our panel, covering the period $1967 - 2013$, exploiting therefore the Cognac trade database described in detail in section 2.1.1.

Table 4: The extensive and intensive margins of trade (1967-2013)

	(1)	(2)
	Extensive Margin	Intensive Margin
ln GDP	0.05***	0.62***
	(0.00)	(0.02)
ln GDP/cap	-0.03***	0.53***
	(0.00)	(0.03)
ln Distance	-0.04***	-0.33***
	(0.01)	(0.04)
Landlocked	-0.20***	-0.75***
	(0.02)	(0.09)
ln Exchange rate	0.00***	0.01
	(0.00)	(0.01)
ln Alcohol Cons/cap	0.05***	0.31***
	(0.01)	(0.03)
Re-exporter		1.90***
		(0.16)
Time FE	yes	yes
N	4522	3762
Adj. R^2	0.238	0.690

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The LPM and OLS estimation results concerning the extensive and intensive margins respectively are shown in Table 4. We find that both the size of the destination market and its consumption habits have a positive impact on the probability of trade. These results are in line with those obtained for the 1996-2013 period. Being a major re-exporter country has also a positive effect.

Meanwhile, landlockeness and distance have a negative impact on the extensive margin. These results are robust when comparing to those of the recent period. The GDP per capita tends to decrease the probability of trade when we look at the long period dataset. The exchange rate, on the other hand, has a positive impact on the probability of trade.

Results concerning the intensive margin are in line with those of the previous estimation of Table 2, except for the exchange rate whose impact is insignificant in the longer period.

4 Conclusion

In this paper we present a new database on high-quality data on Cognac exports towards over 100 countries on 47 years. We evaluate the determinants of these exports using a Heckman (1979)'s procedure with prohibition as a selection variable. We find that the probability of trade to a destination is positively and significantly correlated with GDP and consumption of alcohol per capita while being negatively correlated with prohibitions, landlockedness and global average protection. We also find that the intensive margin is positively correlated with GDP, GDP per capita, global average protection, the re-exporting status and the alcohol consumption while being negatively correlated with distance, landlockedness, the religion dummy and the exchange rate. The elasticity of Cognac exports to distance is relatively low. This confirms a result from the literature that sales of luxury products are less sensitive to distance and in the case they are even less sensitive. In many specifications of our estimation we also verify Chaney (2013)'s theoretical predictions that the extensive (respectively intensive) margin of trade is positively (respectively negatively) correlated with an appreciation of the exporter's currency.

All covariates have the expected impact on exports of Cognac except global protectionism on intensive margin of trade. We discuss this result and offer two potential explanations. First since Cognac is a luxury product, its consumption might be conspicuous and demand for Cognac may increase with price: this would be a confirmation of Leibeinstein (1950)'s qualification of a Veblen effect. Second in many countries custom tariff might be endogenous to exports of Cognac, therefore representing a politically-accepted source of public revenue.

Future work is still needed. In particular it is necessary to estimate precisely the price-elasticity of Cognac in order to test the accuracy of our alternative explanation of the relation between average protection on Cognac and exports of Cognac. Moreover the database of Cognac exports offers a precise measurement of quality, by the age of the youngest eau-de-vie incorporated in the brandy. This is a better measurement of quality than unit value or price, which are often used in the literature or than a subjective expert's ranking. The structure by quality of exports is another fascinating subject that will be soon the object of our consideration.

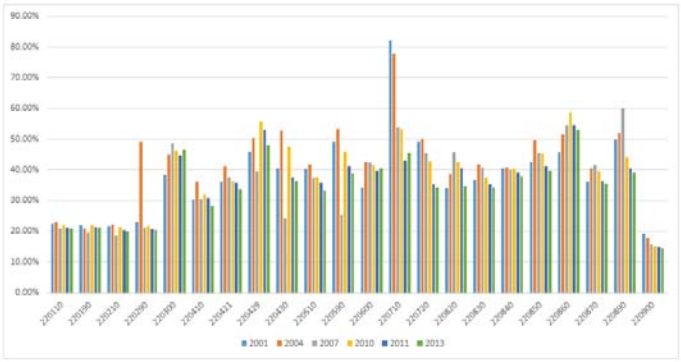

Figure 7: World average custom duty on beverages - Chapter 22 - Source: MacMAP

5 Appendix

Table 5: Summary statistics [1996-2013]

Variable	Mean	Std. Dev.	Min.	Max.	N
Total Volume (HL PA)	1,551.865	9,442.746	0	156,656.086	4,230
GDP (billion constant 2005 USD)	233.4780	1,045.1970	0.0175	14,522.7121	3,357
GDP/cap (constant 2005 USD)	10,559.387	17,203.069	73	158,603	3,357
Distance (km)	6,708.002	4,300.071	473.73	18,894.29	3,888
Alcohol Cons/cap (liters PA)	4.827	3.919	0	23.5	2,864
Adv Duty (%)	38.8	2.328	0	30	2,658
Spe Duty (Euro/HL PA)	42.8	138.094	0	1,076.882	2,658
Global AVE (%)	121.5	3.442	0	30	2,658
Global AVE II (%)	115.9	3.36	0	30	2,658
Exchange rate (local currency per 1 €)	2,408.157	49,052.639	0.002	1,777,042.822	4,117

Table 6: List of importing countries in 2013

1	Albania
2	Algeria
3	American Oceania
4	Andorra
5	Angola
6	Antigua and Barbuda
7	Argentina
8	Armenia
9	Aruba
10	Australia
11	Austria
12	Azerbaijan
13	Bahamas (the)
14	Bahrain
15	Barbados
16	Belarus
17	Belgium and Luxembourg
18	Benin
19	Bermuda
20	Bosnia and Herzegovina
21	Brazil
22	Bulgaria
23	Burkina Faso
24	Cambodia
25	Cameroon
26	Canada
27	Cayman Islands (the)
28	Chile
29	China
30	Colombia
31	Congo
32	Congo (the Democratic Republic of the)
33	Costa Rica
34	Croatia
35	Cuba
36	Cyprus
37	Czech Republic (the)
38	Cte d'Ivoire
39	Denmark
40	Djibouti
76	Korea (the Republic of)
77	Kyrgyzstan
78	Lao People's Democratic Republic (the)
79	Latvia
80	Lebanon
81	Lithuania
82	Macao
83	Macedonia (the former Yugoslav Republic of)
84	Malaysia
85	Maldives
86	Mali
87	Malta
88	Mauritius
89	Mexico
90	Mongolia
91	Montenegro
92	Montserrat
93	Morocco
94	Myanmar
95	Nepal
96	Netherlands (the)
97	Netherlands Antilles
98	New Caledonia
99	New Zealand
100	Niger (the)
101	Nigeria
102	Norway
103	Oman
104	Panama
105	Paraguay
106	Peru
107	Philippines (the)
108	Poland
109	Portugal
110	Qatar
111	Romania
112	Russian Federation (the)
113	Saint Barthlemy
114	Saint Kitts and Nevis
115	Saint Lucia

Table 7: List of importing countries in 2013 - cont'd

41	Dominican Republic (the)
42	Ecuador
43	Egypt
44	El Salvador
45	Equatorial Guinea
46	Estonia
47	Ethiopia
48	Fiji
49	Finland
50	French Polynesia
51	Gabon
52	Georgia
53	Germany
54	Ghana
55	Gibraltar
56	Greece
57	Grenada
58	Guatemala
59	Guinea
60	Haiti
61	Honduras
62	Hong Kong
63	Hungary
64	Iceland
65	India
66	Indonesia
67	Iraq
68	Ireland
69	Israel
70	Italy
71	Jamaica
72	Japan
73	Jordan
74	Kazakhstan
75	Kenya
116	Saint Pierre and Miquelon
117	Saint Vincent and the Grenadines
118	Senegal
119	Serbia
120	Seychelles
121	Sierra Leone
122	Singapore
123	Slovakia
124	Slovenia
125	South Africa
126	Spain
127	Sri Lanka
128	Suriname
129	Sweden
130	Switzerland
131	Taiwan (Province of China)
132	Tajikistan
133	Tanzania, United Republic of
134	Thailand
135	Togo
136	Trinidad and Tobago
137	Tunisia
138	Turkey
139	Turkmenistan
140	Turks and Caicos Islands (the)
141	Ukraine
142	United Arab Emirates (the)
143	United Kingdom (the)
144	United States (the)
145	Uruguay
146	Uzbekistan
147	Venezuela, Bolivarian Republic of
148	Viet Nam
149	Virgin Islands (British)
150	Virgin Islands (U.S.)

Table 8: Extensive and Intensive margins [1996-2013]

	(1)	(2)
	Extensive margin	Intensive margin
ln GDP	0.31***	0.67***
	(0.03)	(0.02)
ln GDP/cap	0.05	0.42***
	(0.04)	(0.05)
ln Distance	-0.40***	-0.40***
	(0.10)	(0.06)
Landlocked	-0.86***	-0.61***
	(0.10)	(0.12)
Religion	0.01	-0.45***
	(0.12)	(0.14)
Re-exporter	0.00	2.79***
	(.)	(0.27)
ln Exchange rate	0.01	-0.02
	(0.02)	(0.02)
ln Alcohol Cons/cap	0.29***	0.49***
	(0.04)	(0.06)
Prohibition	-1.25***	-0.34
	(0.16)	(0.35)
ln Global AVE I	-0.05	0.65***
	(0.06)	(0.09)
Time FE	yes	yes
N	2000	1691
adj. R^2		0.649
pseudo R^2	0.385	

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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