**Exports, exchange rate variations and firms reactions: the case of French wine**

***Preliminary Draft***

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Abstract:

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**Introduction:**

Nominal exchange rates are volatile but prices (import prices, consumer prices) and volume of imports and exports do not seem to be as volatile as the variations in exchange rates (Knetter, 1993; Gagnon and Knetter, 1995; Campa and Goldberg, 2005; Goldberg and Hellerstein, 2008; Hellerstein, 2008). There is an incomplete exchange rate pass-through. Goldberg and Knetter (1997) define the exchange rate pass-through (ERPT) as the percentage change in local currency import prices resulting from a one percent change in the exchange rate (for a survey, see Menon, 1995). The question of how exchange rate movements impact the price level is of matter because it raises the question of who bears the cost of such changes (exporter, importer or consumer). Theoretical papers indicate a set of microeconomic or macroeconomic variables that influence exporting firms' optimal degree of ERPT. Krugman (1986) stresses the competitive conditions in foreign markets. Giovannini (1998) underlines the substitutability of the export good. For Feentsra el al. (1996), the strategic complementarities and the market share of the exporting country are significant. For Taylor (2000), exchange rate volatility and inflation are of major importance. One cause of incomplete pass-through is the pricing behavior of exporters in response to exchange rates variations. The pricing to market (PTM) is the way exporters respond to exchange rate changes. We can imagine two extreme cases. First, exporters want that prices of traded goods are sticky in their local currency. This is the assumption of producer currency pricing (PCP) from Obstfeld and Rogoff (1995). Second, exporters want that prices of traded goods are sticky in the foreign currencies. This is the assumption of local currency pricing (LCP) from Betts and Devereux (2000). PTM only exists if the market is not under pure and perfect competition because exporters have a power to set their export prices. Krugman (1986) gives the example of the wine market to show the incomplete exchange rate pass-through. When the dollar decreases, French wines prices in USD do not increase as much (in %) because the US market represents an important share for French wines exports[1]. Nevertheless recent trends exhibit a decline in ERPT elasticities (Campa and Goldberg, 2005: Frankel et al., 2005; Marazzi and Sheets, 2007) meaning that there have been some strategic and structural changes in the pass-through policies of exporters (Hernandez and Leblebicioglu, 2012).

From an empirical point of view, McKenzie and Melbourne's survey (1999) shows that the relationship between the exchange rate changes and exports is rarely statistically significant.

[1] In an unpublished paper cited by Robinson (2009), Wheeler (2004) concludes that ERPT coefficients tumble from 0.73 to 0.50 between 1970 and 1993 for imported French wines to the United States.

When it is the case, this relationship can be positive or negative. The fluctuations of exchange rates can either halt trade, or stimulate it. In both cases, the price exporters' reaction to exchange rate variations is incomplete due to the existence of fixed distribution costs (Campa and Goldberg, 2005). In this line, Tenreyro (2007) concludes, from a broad sample of countries from 1970 to 1997, that nominal exchange rate variations has no significant impact on trade flows. The impossibility of identifying a clear relationship between exchange rates fluctuations and exports can stem from the fact that the analysed data is aggregated and therefore does not allow for the revealing of differences in sector behaviour. For example, on the American market, Hellerstein (2008) shows that beer foreign producers are subjected to a more elevated cost, following a more negative variation on exchange rates than other stakeholders (local producers, distributors or consumers). As for Wang and Barrett (2010), they conclude that transactions on agricultural products between the United States and Taiwan are affected by exchange rate fluctuations, which is not the case for other sectors.

The wine sector may probably allow for further investigation of the ER / exports relationship because of the growing international competition and the wide range of producers' strategies. For instance, since 2000, the maker of Australia's mass-market Yellow Tail wine has a price strategy in USD and export 75% of its production to the United States. Yellow Tail is the wine the most sold in the United States. It is known not only for its kangaroo logo and its fruity finish but also for its attractive price (less than 7 USD) which is sticky in the United States. But, since 2009, the Australian dollar appreciated by 50% against the USD. This huge movement in the currency creates a margin problem to Casella which recorded a spectacular loss in 2012 that threatens its survival and strategy. At the opposite, still French wines exports reach a new record in 2012 at nearly 7.9 billion USD. Since 2000, they fell by 30% in volume but grew by 10% in value whereas euro appreciated against the main currencies. During the last 30 years, wine trade has doubled in volume but French market share has been divided by two suffering the competition from new world wines (OIV, 2013). The French share in total still wines exports in volume was 29% in 1990 and 14% in 2012. During the same period, the other European countries share has risen from 49 to 52% and the New World share, from 3 to 25%. France AgriMer (2013) indicates that a part of French wines producers/exporters react to the increasing competition and to the euro appreciation by pursuing a top-range strategy: higher quality, higher prices and market diversification in order to be, at least partly, isolated from euro variation. This strategy is available for fine wines, typically Champagne and Bordeaux wines, where the supply is monopolistic due to the appellations of origin and the

ranking in the case of Bordeaux wines. This top-range strategy is more difficult to reach for French common wines producers because this market segment is highly competitive. For example, the French bulk wines exports have fallen towards their first three markets (Germany, UK and US) over the last ten years whereas New World exports grew. The euro appreciation may explain this reduction of a key sector of the French economy. Since 2010, it is the second export sector (including spirits and champagne) after the aeronautical sector. In 2012 still wine sector reach a record of 7.9 billion dollars.

How do wines exporters react to an appreciation of their currency? Are their prices sticky in their local currency or sticky in the foreign currencies? Or do they react by quality adjustment rather than price adjustment? The goal of the paper is to study the behavior of still French wine exports in response to exchange rate variations over the period 2000-2011. To address this question, we use the Armington model (Armington, 1969) which is an alternative to the Heckscher-Ohlin model (Lloyd and Zhang, 2006). The central assumption of this model is that final goods internationally traded are differentiated by their country of origin. Armington (1969, p.159) indicates that his model: *"… presents a general theory of demand for products that are distinguished not only by their kind – e.g., machinery, chemicals – but also by their place of production"*. By essence, wine is a differentiated product by its kind – e.g., white, rosé, red – but also by its place of production – e.g., France, Spain, Italy, United States, Argentina, Chile, South Africa…-. Alston et al. (1989) considers that the Armington model is well adapted to analyze the international commodity trade. On the demand side, the products from different countries are close substitutes. On the supply side, the Armington model supposes constant return to scale and perfect competition. These assumptions are coherent with the wine industry, notably one should note that the DOC French system implies that returns are fixed by law. Crozet et al. (2011, p. 8) note that: *"champagne as a whole appears to exhibit Armington-style differentiation by place of origin, an implicit assumption of the model"*.

To our knowledge, no published work has been especially devoted to the study of still French wine exports and their relationship with exchange rate variations[2]. Section 1 describes the evolution of the French wines exports over the period 2000-2011. Section 2 concerns the data and the methodology. Section 3 sets out the results. We show that the impact of the Euro

[2] Except the thesis of Lindsey (1987) in the US case and some unpublished papers. These works turn out few evidences of exchange rate impact on wine trade flows.

exchange rate on these exports is very relative. To conclude, we propose other explanations to justify the negative dynamics affecting French wine exports.

## 1. Stylized facts: euro appreciation and French wine exports paradox

On a world scale, the still wine market is characterised by two heavy trends. First, we can observe a persistent rise in world consumption which, according to IWSR (2013), should rise by 3% in volume and near 6% in value from 2012 to 2016. This increase is mainly due to American and Chinese households. By contrast, the European consumption is declining because the proportion of usual consumers is decreasing as well. In France, for example, per capita wine consumption has been falling by 8% between 2007 and 2011 and is going to fall by 3.5% between 2012 and 2016 (IWSR, 2013). The main producers, Spain, France, Italy which represent around 45% of total production in volume, try to offset the decline in national consumption by exporting wine to foreign countries[3].

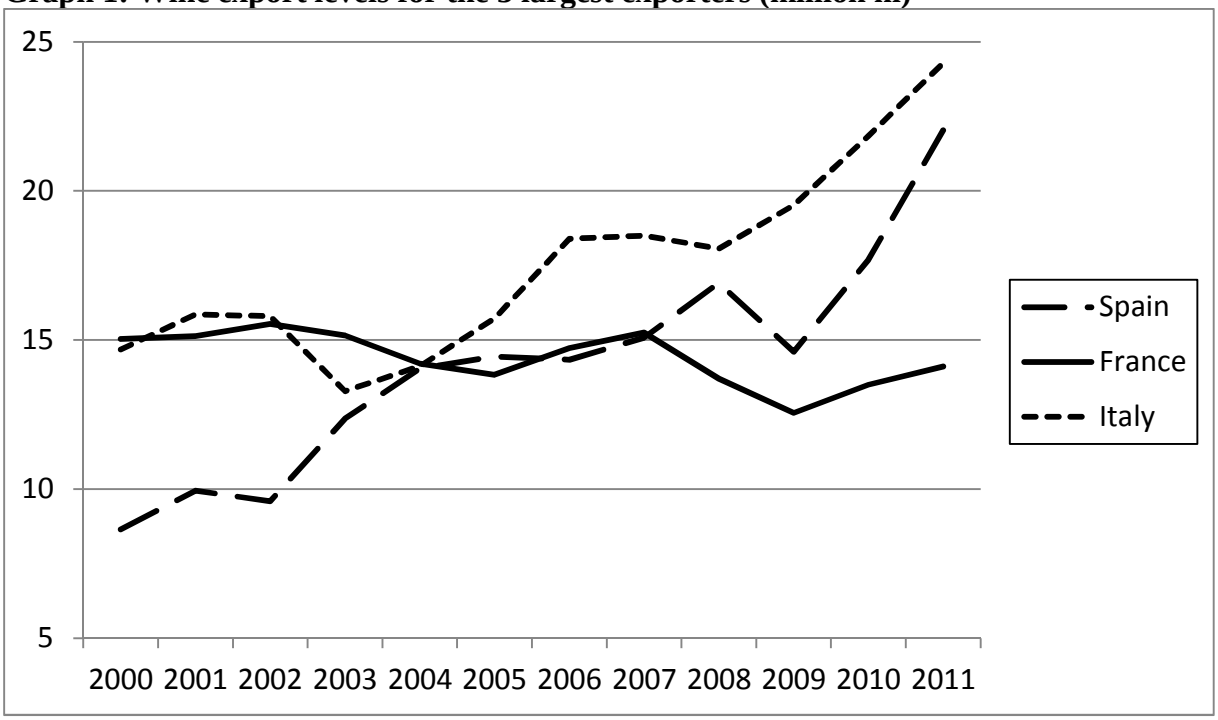
Second, we can observe a progressive reduction of exploited surfaces in the world, at least 3.5% from 2000 to 2011 (OIV, 2013). The world production has declined from 280 Mhl (million hl) in 2000 to 265 Mhl in 2011. The European production has decreased by near 15% between 2006 and 2010. The European Common Organization for Wine wants to reduce European overproduction and to make EU wine more competitive on the world market. In France, the vineyard declines from 907,000 ha in 2000 to 807,000 ha in 2011 (-12%) and the production was reduced by 22% in volume. The American vineyard is stable whereas the Asian vineyard is growing by 3% since 2006. In 2011, the world wine production is about 265 million hl. Italy and France challenge for the producer first place depending meteorological conditions. The gap between production and consumption is historically low (less than 6 million hl).

Since 2000, exports in volume have grown by nearly 65% (OIV, 2013). Graph 1 illustrates the recent trends of the wine exports of the three main producers since 2000 which represent more than 60% of world trade in volume. It reveals a downturn in French exports between the start and the end of the period observed. Labys and Cohen (2006) pointed out that this decreasing trend in French world market share is statically significant since the 1990's. The exports

[3] Data from the French national statistical agency (INSEE) indicate that grape-growers or wine-makers sell their production to *négociants*. For example, nearly 90% of Bordeaux wine exports are made by *négociants.* Consequently, it is impossible to have direct trade flows from producers to foreign markets.

comparison with its main competitors, Italy and Spain, is equally instructive. During this period, Italian and Spanish exports are progressing. OIV statistics (2013) indicate that the French market share (in volume) is at 14% in 2011 against 24% for Italy and 22% for Spain. This market share has been in constant regression since the 1990's. In 2000, France was the world market leader (25%) ahead Italy (24%) and Spain (14%). During the last ten years, French volume has been reduced by more than 10%. In the same time, wine exports from the New World grew (see Graph 2) and also their market share (see Graph 3). French wine market position[4] is declining between 1990 (46.9%) and 2009 (27.8%) whereas Spain and Italy progress (Pouch, 2011).

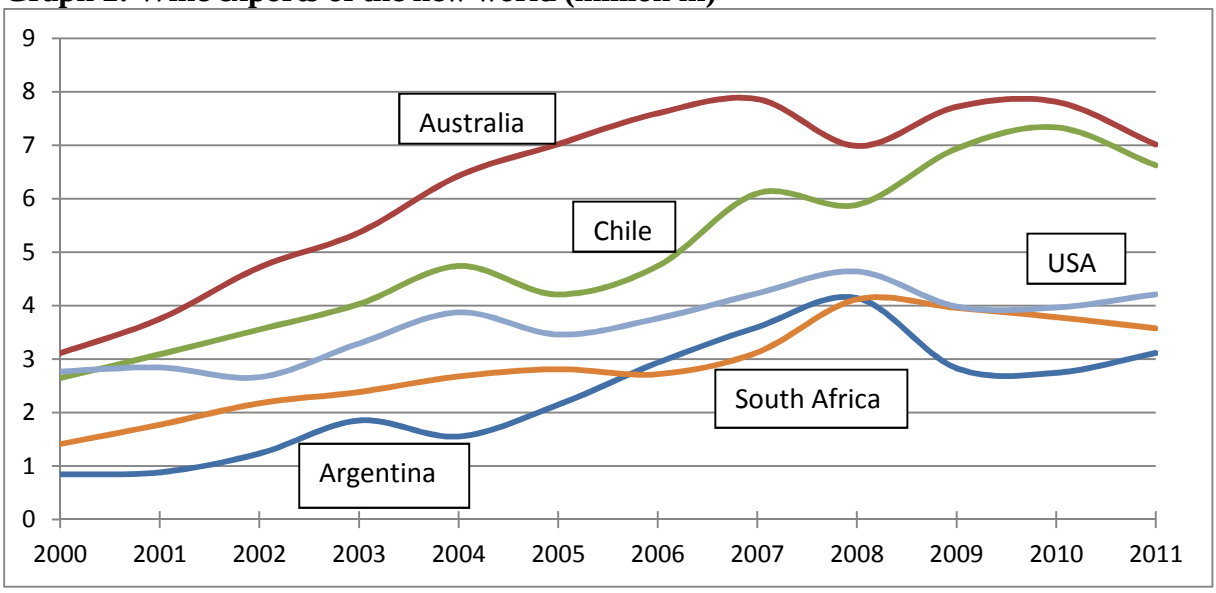
**Graph 1: Wine export levels for the 3 largest exporters (million hl)**




Source: OIV (2013)

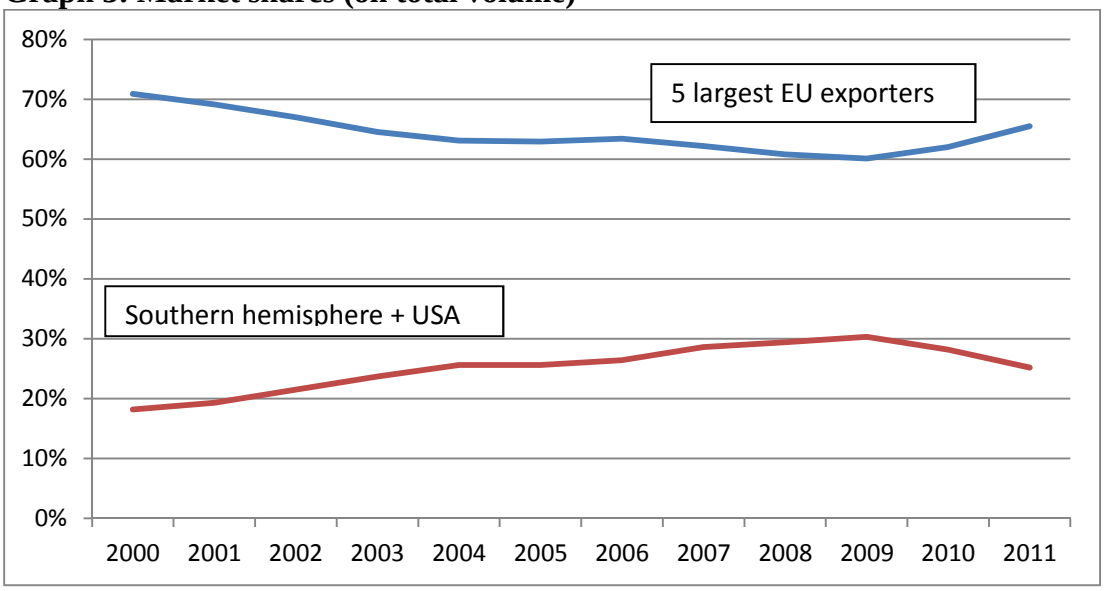
[4] Market Position = [Xik-Mik]/[Xi+Mi]*100, X exports, M imports, both expressed in value; i wine and k country. Market position is the country weight in wine international trade.

**Graph 2: Wine exports of the new world (million hl)**




Source: OIV (2013)

**Graph 3: Market shares (on total volume)**



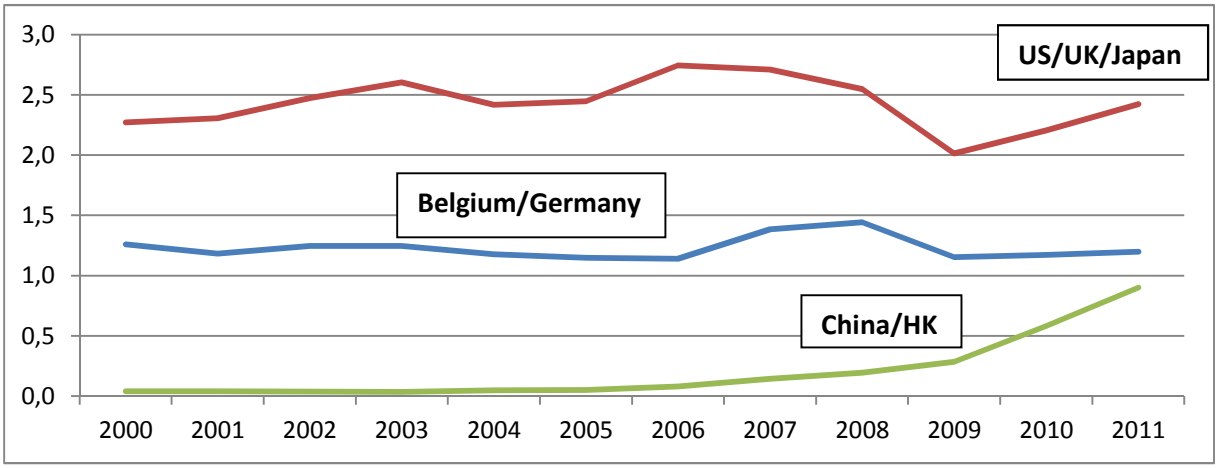

Source: OIV (2013)

Turning to the French case, graph 4 exhibits the recent trends of wine exports in nominal euro to the seven first markets (Belgium and Germany in the Eurozone, UK, US and Japan for the traditional markets, China and Hong Kong for the emerging markets). Graph 3 represents the euro evolution against USD, JPY, GBP, HK Dollar and RNM. We can identify 3 features:

- We can observe that exports to Germany and Belgium are quite stable between 2000 and 2011. The growth rate over period is negative.

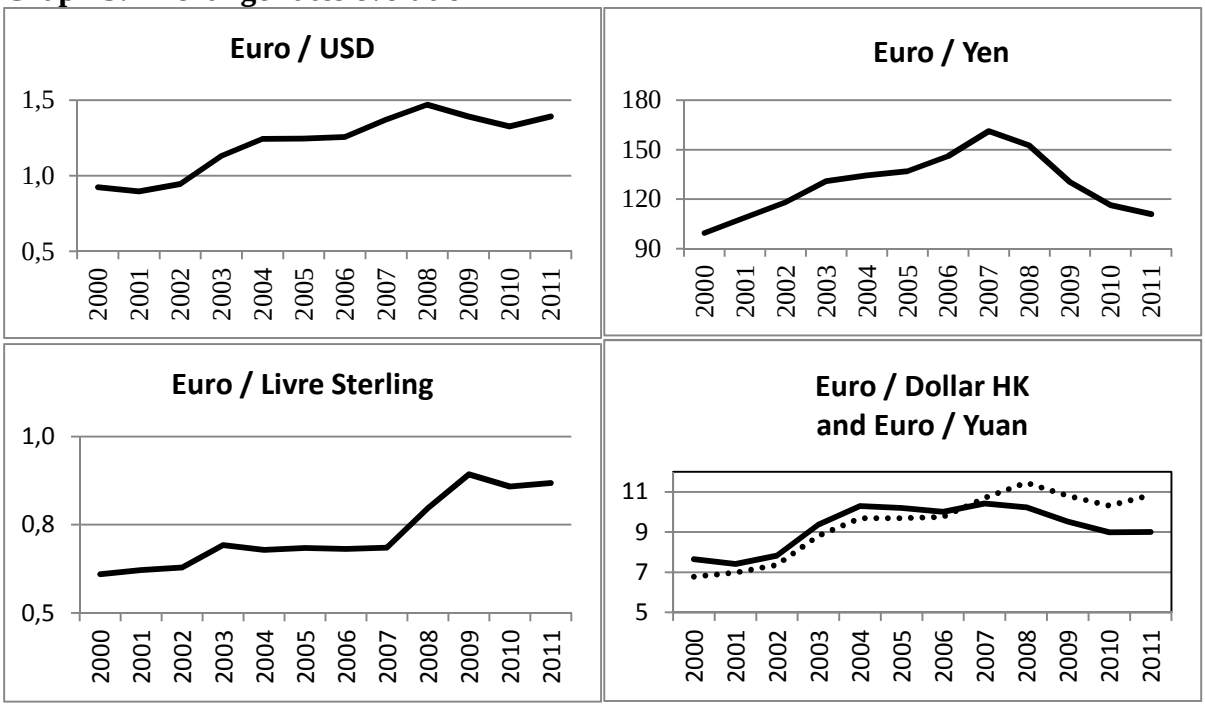
- Between 2000 and 2011, the euro has appreciated relative to the USD (50%), the GBP (42%) and the JPY (12%). The French wine exports to the American, British and Japanese markets have increased until the crisis (which is a period of strong appreciation of the euro) and then declined in 2008 and 2009 (which is a period of depreciation of the euro). In 2010 and 2011, the French wine exports progression takes place in a context where the euro has depreciated relative to the JPY and is quite stable relative to USD and GBP.

**Graph 4: French wine exports to seven first countries (million €)**




Source: FEVS (2012)

**Graph 5: Exchange rates evolution**




- The exports to Asia are increasing over the period and are bursting from 2008 to 2011 whereas the euro has appreciated relative to the RMB (17.6%) and mainly relative to the HK Dollar (59%). The trade liberalization and the growth could explain this trend. The global export evolution is explained by the development in Asian emerging markets. Since February 2008, Hong Kong's wine importation is not subject to duties and there is no certification requirement: excise duty on wine has been reduced from 40% to 0%. In 2011, the growth rate is 29%. Between 2008 and 2011, the French exports in volume were multiplied by 5.

Despite a loss of market share, the French wine exports reach a new record in 2012 with a total of 7.9 billion. Between 2000 and 2011, French volume has been reduced by more than 10% but value has increased by 30%. What drives these divergent evolutions between volume and value? Is quality changing during the period? Is there a price evolution? Has the exchange rate an impact on export? Or does competition increase on the world wine market? To better understand the main drivers of French wines exports over 2000-2011, the Armington model is used.

## 2. Data and methodology

From data obtained from FEVS, we built an original database that covers the years 2000 to 2011. For this period, we have taken information concerning exports in value and in volume to the seven firsts countries of destination (Belgium, Germany, China and Hong-Kong, Japan, USA and United Kingdom) for 239 French wines. Data are then disaggregated to the finest level available in French trade statistics, with 239 types of wine following the packaging (wine in bottle or in bulk), the color, and above all appellations, we get a sufficient microeconomic level allowing us to consider the wines in a homogeneous manner inside each type. This dataset represents a panel in three dimensions: time, destination and type of wine.

In the line of the standard Armingtonian approach, we regress the volume of exports on foreign demand and an index of price-competitiveness (Goldstein and Khan, 1985). As mentioned by the literature (see the seminal paper of Linder, 1961), we have to add a structural competitiveness variable to complete the Armingtonian analysis and to reflect the quality of the exported good (Morris, 1985). Indeed, price competitiveness only partially explains the export performance (Junz and Rhomberg, 1973). To go further and improve the quality of the Armingtonian approach we augment the model by the inclusion of a "new world" production variable. This variable reflects the growing competition on the world wine market: more actors and more production (as seen with graphs 2 and 3). That can reduce the French exportations because consumers like variety. New wines give them the opportunity to taste anything else. There is a strong reference to the new trade theory at this stage (see Krugman, 1980). Diversity is naturally demanded by consumers. New products are sometimes adopted only because they are new. The increasing new world production doesn't imply that French wines are less competitive but that consumers like diversity. This variable is the sum of the total production of Argentina, Australia, Chile, Germany, Portugal, South Africa, USA (data obtained from OIV).

The general regression model is therefore as follows:

$$logX_{kit} = \alpha_i + \beta \cdot logRER_{kit} + \gamma \cdot logGDPh_{kit} + \delta' \cdot Q_{kit} + \mu \cdot logNWP_{kit} + \varepsilon_{kit} \quad (1)$$

All quantitative variables are expressed in logarithms. The index $k = 1, \dots, 239$ refers to the number of types of wine (appellation, color, and packaging); $i = 1, \dots, 7$ represents the

number of destination countries and $t = 2000, \dots, 2011$ refers to the years. $X$ denotes the export volume of the wine $k$ to the county $i$ at year $t$. $RER$ is the real exchange rate of euro against country i's currency. $GDP$ per capita ($GDPh$), obtained from the World Bank, is currently used as an income variable which reflects the foreign demand directed to the home country in the case of vertically differentiated trade (Durkin and Krygier, 2000; Deardorff, 1984). Importers preferences have been taken into account by modeling a country fixed effect ($\alpha_i$). $Q_{kit}$ represents a vector of qualitative variables which capture the quality of wines exported. It represents the structural competitiveness. Last, $NWP_{kit}$ is the total wine production of the new wine world (see above for the countries list). $\varepsilon_{kit}$ is the error term.

The real exchange rate ($RER$) represents a price-competitiveness variable which has two components (Dornbusch, 1987). It depends on nominal exchange rate ($NER$) and a relative price index so that:

$$RER = NER \cdot \frac{P}{P*}$$

Where $P$ ($P$*) is the national (foreign) price index. A decrease of competitiveness in a given country can come from an appreciation of the domestic exchange rate and/or from a relative increase of domestic prices (compared to foreign prices).

From a partial equilibrium point of view we can use for $P$ and $P$* the average wine price for each French type of wine ($P_{kit}$) and the average price of foreign wine in Italy and Spain because these countries are the two main competitors of France on the wine world market. Wine prices in Spain and Italy were quite stable in the 2000 decade (Agreste, 2010). We then assume for simplification that this average price can serve as a benchmark and equals 1. Therefore, with $P$ the French wine average prices:

$$logRER_{kit} = logNER_{kit} + logP_{kit} \quad (2)$$

Combining equation (2) with equation (1) gives:

$$logX_{kit} = \alpha_i + \rho \cdot logNER_{kit} + \theta \cdot logP_{kit} + \gamma \cdot logGDPh_{kit} + \delta' \cdot Q_{kit} + \mu \cdot logNWP_{kit} + \varepsilon_{kit} \quad (3)$$

Measuring quality in trade model is always tricky. No direct measures exist and we have to use proxy of quality. In industrial sectors a proxy can be Research and Development for example. But in the wine sector the problem is more problematic because wine quality is

highly subjective. Fortunately, the French system of denomination by origin (DO, in French: AOC - *Appellation d'Origine Contrôlée*) gives objective information about the way by which wine is produced. Each AOC has a very accurate terms of reference *(cahier des charges)* which contribute to quality and specificity of a given *terroir* / wine type. A second level of quality features can be used with French data. A distinction is made between wine sell in bottle and wine (even of the same AOC) sell in bulk. This distinction allows for a binary quality variable: wine in bottle represents the high quality and bulk wine is the lower quality. Then $Q_{kit}$ consists in a vector of dummies variables for each AOC and the two possible packaging (bottle or bulk).

However, one problem arises at this stage. The local (euro) price of wine ($P$) could be seen as a quality proxy as well (Hallak, 2006). Indeed, the average price of exports partially reveals the average quality of wines exported towards this destination: export prices are not exact measures of quality but they indicate the quality level (Wooldridge, 2002). It could therefore be used as a proxy for the average quality of exports. Hallak (2006, p.255) wrote: *"Quality differences are presumably one of the main sources of cross-country variation in export prices. However, this variation might also reflect differences in prices for goods of the same quality, which might stem, for example, from differences in production costs"*. In order to avoid this problem we have decided to disentangle the price effect according to the AOC and the packaging. In other words the price effect on exports could be different for different types of wine. For example, a rise in price can induce a positive impact on volume exported for bottle wine and a negative for bulk; in first case, it could come from a quality improvement perception by the consumer; in the second case it could come from a decreasing competitiveness perception by the consumer. Then, price is not always a quality signal for consumer. It depends on which markets/products we are talking about. Then the interpretation of the influence of $P$ on exports volume has to be differentiated following the type of wine (bottle, bulk, AOC) and we will have to be very careful in the interpretations.

This is particularly true for the distinction between bottle and bulk, because these are often perceived as two very different products. Bottled wine is a pretty much differentiated market than bulk wine market which is much more homogeneous and sensitive to price variations. Therefore it appears useful as well to disentangle the impact of exchange rate according to this distinction bottle/bulk and AOC. Equation (3) turns into:

$$logX_{kit} = \alpha_i + \rho \cdot \log(Q_{kit} \cdot NER_{kit}) + \theta \cdot \log(Q_{kit} \cdot P_{kit}) + \gamma \cdot logGDPh_{kit} + \delta' \cdot Q_{kit} + \mu \cdot logNWP_{kit} + \varepsilon_{kit} \quad (4)$$

Equations (3) and (4) imply however two strong assumptions. First of all, we assume the absence of relationship between the nominal exchange rate and the prices in local currency. In other words we assume that it doesn't exist any pricing to market behavior from the French exporters. We have tested this assumption in a non-reported regression which confirms a significant correlation between prices and nominal exchange rate. That confirms the incomplete pass-through or the PTM effect for French exporters. We have then two possibilities to correct this weak colinearity problem between $NER_{kit}$ and $P_{kit}$: either we find an instrument (correlated to prices but not to the exchange rate) to replace the price in the previous equations or we use the residual of the regression of the price on the nominal exchange rate as a wine price independent of the exchange rate (by construction there is a perfect orthogonality between this "price residual" and the exchange rate). The first solution is traditional to solve the colinearity problems, but it requires a good instrument: a competitiveness variable by kind of wine. There is no good instrument available in this case. For example, labor costs, which would be a good instrument, are not available at the appellation level and wine packaging level. Consequently we abandon this strategy and adopt the second one. Then we use the price residual in the following regressions.

The second assumption we have to make for running the regressions is the instantaneous (inside a year) link between exchange rate variations and exports in volume. However that is not sure: volume adjustments can take more than one year because there are long term contracts, strong habits and partnerships between importers and exporters. These habits could be captured by the introduction of the lagged dependent variable in the right side of equations (3) and (4). This solution would have the advantage of taking into consideration not only the hysteresis effect of trade volume but also to model the long term effect of exchange rate on trade volume (because $X_{kit-1}$ contains $NER_{kit-1}$). The dynamic panel obtained from equation (4) is given by:

$$\log X_{kit} = \alpha_i + \sigma \cdot \log(X_{kit-1}) + \rho \cdot \log(Q_{kit} \cdot NER_{kit}) + \theta \cdot \log(Q_{kit} \cdot P_{kit}) + \gamma \cdot \log GDPh_{kit} + \delta' \cdot Q_{kit} + \mu \cdot logNWP_{kit} + \varepsilon_{kit} \quad (5)$$

This dynamic panel specification is known as a Koyck lag model. The short-run (same-period) effect of a 1% change in the exchange rate is given directly by $\rho$ while the long-run (cumulative) effect of a sustained 1% change in the exchange rate is: $\frac{\rho}{1-\sigma}$

Nevertheless, this specification raises a problem of correlation of $X_{kit-1}$ with the fixed effects $\alpha_i$ and with the error term $\varepsilon_{kit}$. In order to avoid this problem one solution suggested by Arellano and Bond (1991) is to use a generalized method of moments (GMM) procedure consisting in a first difference transformation of model (5) and to treat the dependent variable lagged two or more periods as instruments for the lagged dependent variable ($X_{kit-1}$). The application of this GMM-DIFF estimator of Arellano and Bond (1991) allows for consistent estimation of the short and long term effect of exchange rate on the exports volume.

## 3. Results

In Table 1, we compare a static model and a dynamic model in the case of equation (3). All the variables have the expected signs and are significant at 1% level.

**Table 1:**

| | **Static Model** *fixed-effects Panel Least Squares* | **Dynamic Model** *Panel Generalized Method of Moments* |
|---|---|---|
| **Volume (t-1)** | - | 0.144*** |
| **GDP per Capita** | 0.607*** | 0.4017*** |
| **Exchange Rate** | -0.313*** | -0,399*** |
| **Price residual** | -0.977*** | -1.015*** |
| **New World Production** | -0.638*** | -0.385*** |
| **Total panel unbalanced observations** | 13,220 | 9,936 |
| **Adj. $R^2$** | 0.209 | |
| **J-statistic** | | 170.42 |
| **Instrument rank** | | 59 |
| **Effect of a 1% variation in exchange rate on exports (long term)** | | -0.466*** |

*** Significance at 1%, ** at 5%,* at 10%.

If we look at the static model results (column 1), Foreign demand increases French wines exports whereas exchange rate, price and new world production evolutions have a negative effect. These results are confirmed when we observe the dynamic model results (column 2).

Even if the coefficient is low, we can identify a consumption inertia effect. A proportion of French wine consumers / retailers doesn't change their consumption / selling habit when the euro appreciates.

The dynamic panel specification (Koyck lag model) implies:

- the short-run (same-period, i.e. one year) effect of a 1% change in the exchange rate is given directly by the $\beta$ of the static model;
- while the long-run (cumulative) effect is: $\frac{\beta}{1-\sigma}$ where $\sigma$ is the coefficient of the lag dependant variable.

In table 2, there is homogeneity in the results between the two specifications. Unsurprisingly the long term effect is stronger than the static or the short term effect meaning that the export volume adjustment to exchange rate variation takes more than one year. It confirms the classical theory of the J curve with a hysteresis effect of export volume to price even without PTM. In what follows we only show the dynamic specification which is more relevant.

If we want to detail the exchange rate impact, we can first distinguish bottled wines and bulk wines (see Table 2, issued from equation (5)) assuming that bottled wines may be less subject to exchange rate variation because of their quality which is higher than bulk wines quality.

**Table 2**

| | **Dynamic Model 3** ***Panel Generalized Method of Moments*** |
|---|---|
| **Volume (t-1)** | 0.163*** |
| **GDP per Capita** | 0.371*** |
| **Bottle*Exchange Rate** | -0.403*** |
| **Bulk*Exchange Rate** | 0.011 |
| **Bottle*Price residual** | -0.865*** |
| **Bulk*Price residual** | -1.078*** |
| **New World Production** | -0.379*** |
| **Total panel unbalanced observations** | 9,936 |
| **J-statistic** | 168.208 |
| **Instrument rank** | 61 |
| **Effect of a 1% variation in exchange rate on Bottle exports (long term)** | -0.481*** |
| **Effect of a 1% variation in exchange rate on Bulk exports(long term)** | 0.0131 |

** Significance at 1%, ** at 5%,* at 10%.

From table 2 we can see that the impact of exchange rate variations is significant for bottled wines (with a negative sign) but non-significant for bulk. So, when euro appreciates, bottled wines exports decline. The other variables have the expected signs and are significant at 1% level. These results are not consistent with our previous assumptions and with the facts because, during the last decade, volume exports have decreased but value exports have increased. The value increase is mainly due to the most prestigious *appellations* (Bordeaux essentially, Bourgogne marginally) and do not concern common wines. Concerning bulk wines, the non-significance could result from quality difference inside the bulk category. For instance, bulk wines from Bordeaux prestigious appellations, as Communales du Médoc (Margaux, Saint-Julien, etc.) or Pessac-Léognan, could balance less prestigious appellations in France, Languedoc for example. The Bordeaux bulk price may be higher than the Languedoc bulk price and the exchange rate impact may be specific. A distinction between the *appellations* and between the packages may be introduced to have a better estimation of the exchange rate impacts on exports.

In table 3, we consider:

- From one hand, Bordeaux bottled wine, Bourgogne bottled wine and the other French bottled wines
- From another hand, Bordeaux bulk wine, Bourgogne bulk wine and the other French bulk wines

**Table 3:**

| | **Dynamic Model 4** ***Panel Generalized Method of Moments*** |
|---|---|
| **Volume (t-1)** | 0.171*** |
| **PIB per Capita** | 0.362*** |
| **Bordeaux Bottle*Exchange Rate** | 0.597*** |
| **Bordeaux Bulk*Exchange Rate** | 2.254*** |
| **Bourgogne Bottle*Exchange Rate** | -1.201*** |
| **Bourgogne Bulk*Exchange Rate** | 1.344 |
| **Other Bottle*Exchange Rate** | -0.486*** |
| **Other Bulk*Exchange Rate** | -1.230** |
| **Bordeaux Bottle*Price Residual** | -0.581*** |
| **Bordeaux Bulk*Price Residual** | -1.214*** |
| **Bourgogne Bottle*Price Residual** | -0.820*** |
| **Bourgogne Bulk*Price Residual** | -0.976*** |
| **Other Bottle*Price Residual** | -0.932*** |
| **Other Bulk*Price Residual** | -1.022*** |
| **New World Production** | -0.387*** |
| **Total panel unbalanced observations** | 9,936 |
| **J-statistic** | 173.90 |
| **Instrument rank** | 69 |
| **Effect of a 1% variation in exchange rate on Bordeaux Bottle (long term)** | 0.72*** |
| **Effect of a 1% variation in exchange rate on Bourgogne Bottle** | -1.466*** |
| **Effect of a 1% variation in exchange rate on Bordeaux Bulk (long term)** | 2.564*** |
| **Effect of a 1% variation in exchange rate on Bourgogne Bulk (long term)** | non-significant |
| **Effect of a 1% variation in exchange rate on other Bottle (long term)** | -0.709*** |
| **Effect of a 1% variation in exchange rate on other Bulk (long term)** | -1.502** |

*** Significance at 1%, ** at 5%,* at 10%.

Foreign demand (+), price competitiveness (-), past exported volume (+) and the New World production (-) have all the expected signs and are significant at 1% level. Nevertheless exchange rate has an ambiguous impact:

- Positive and significant at 1% level for Bordeaux bottled and bulk wines.
- Negative and significant at 1% level for Bourgogne bottled wines and for all other common wines.

Exchange rate has a strong and positive effect on Bordeaux wines exports. When the euro appreciates relative to other currencies, Bordeaux wines exports are increasing; this increase is however restricted by the sale price. What is the explanation of such a paradox? This result could be interpreted as a strategy of Bordeaux *négociants*. When Euro appreciates the sellers change the composition of the exports in two ways. First, best wine are exported (because they are more expensive and then less sensitive to exchange rate variations), common wines are sold on national and European markets. Therefore Bordeaux *négociants* react to exchange rate variations by changing the quality composition of the exports. In this way, they gained from the increasing demand for quality in the 2000 decade. Second, Bordeaux *négociants* have changed the geographical composition of their sales: fewer sales toward countries with low currency (UK, US) and more toward countries with higher currencies (China, HK), as seen in graph 5.

Therefore there are two opposite behaviours. Bordeaux exports increase when Euro appreciates while other wines exports decrease when Euro appreciates. The Bordeaux strategy comes from the organisation of the trade in Bordeaux: *negociants* have a lot of power and huge wine portfolios. Moreover they have a large range of quality in their portfolio. They can drive very fine strategies thanks to these features. In other regions the organisation is not exactly the same and the range of quality is tiny sometimes. The *place of Bordeaux* has a unique capacity in France to implement this kind of strategy.

What can be said about the impact of exchange rate variations on French wines exports? The exporters' reaction may be a price or a margin reaction to absorb the exchange rate variations. Our regressions show an incomplete pass-through concerning exchange rate variation and French wines exports. French exporters can follow a gain strategy by selling wines, outside the Eurozone, at a higher price. But this price reaction is incomplete because some markets, UK and Japan for example, are saturated and margins are already low. French exporters can also follow strategic reactions. The first strategic reaction is to increase exported wines

quality in order to reduce the competition. This top-range strategy is adopted by Champagne and Bordeaux exporters to the United States for example. The non-price competitiveness is a way to be isolated from euro variations. But this kind of strategy is not accessible for French common wines. The second strategic reaction is to reallocate the exports flows to countries where the currency is strong or stronger. National currency can be seen as a barrier to international trade (Rose and van Wincoop, 2001). And, following Viner (1950) a barrier can imply a trade diversion. In our case, French exporters concentrate their development to China and Hong-Kong which currencies depreciation is lower than for USD or GBP.

**Conclusion:**

The evolution of the euro is not a sufficient explanation to understand the recent trend of French wines exports. The gain in value and the loss in volume is the result of combined effects: more quality, higher price and market diversification. A part of French exporters seems to be engaged in a gain strategy which depends upon the demand strength resulting from Chinese and American households. This strategy will be as well winning when India, South Korea or the Mercosur will remove their tariff barriers.

To increase exported volume, one solution is to simplify the French wines supply. OIV (2013) indicates that the number of French grape varieties is the higher in the world (346 against 150 in Spain for example). The number of different appellations is also higher than in the rest of the world. This supply diversity must be difficult to understand for occasional consumers. A readily accessible and easily understood supply may have to be found to increase exported volume.

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